Solar Keymark Certificate

SC0749-18

Holder/Issued to/Manufacturer

Changzhou Blueclean Solar Energy Co., Ltd.

No.8 Xilin Industrial Park, Changzhou,China 213000

Product name and description

Vacuum tube solar thermal collectors for water heating.
For technical information see Appendix (2 pages).

Models:	SB-1800/58-12ST	SB-1800/58-13ST	SB-1800/58-14ST	SB-1800/58-15ST
	SB-1800/58-16ST	SB-1800/58-17ST	SB-1800/58-18ST	SB-1800/58-19ST
	SB-1800/58-20ST	SB-1800/58-21ST	SB-1800/58-22ST	SB-1800/58-23ST
	SB-1800/58-24ST	SB-1800/58-25ST	SB-1800/58-26ST	SB-1800/58-28ST
	SB-1800/58-29ST	SB-1800/58-30ST		

Performance specification

The product is found to comply with the requirements in EN 12975-1:2006+A1:2010 Solar collectors, Part 1: General requirements and the Specific CEN Keymark Scheme Rules for Solar Thermal Products and are based on test results according to EN ISO 9806:2017 Solar thermal collectors – Test methods.

Marking

Products conforming to this certificate shall be marked in accordance with the requirements in the Specific CEN Keymark Scheme Rules for Solar Thermal Products. The marking shall, together with the Keymark logo, show the identification code of the empowered certification body (RISE Research Institutes of Sweden AB, No. 012), also see CEN-CENELEC Internal Regulations Part 4 Certification, Annex A.

Validity

This certificate is valid until 2023-10-22 provided that the conditions in the Solar Keymark Rules are fulfilled and the standard or rules are not modified significantly. The validity of the certificate can be checked in the database, see Solar Keymark website http://www.solarkeymark.org.

Miscellaneous

The manufacturer's factory production control procedures are under surveillance by the responsibility of RISE. RISE certification rules SPCR 402 for Keymark – Solar Thermal Products applies.

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2017-08-08

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Annex to Solar Keymark Certificate

Annex to Solar Keymark Certificate - Summary of EN 12975 Test Results				
			Licence Number	**SC0749-18**
			Date issued	**2018-10-22**
			Issued by	**RISE**

Licence holder	Changzhou Blueclean Solar Energy Co.,Ltd.		**Country**	China	
Brand (optional)	Blueclean		**Web**	www.sunstar-solar.com	
Street, Number	No.8 Xilin Industrial Park		**E-mail**	sales@blueclean.com.cn	
Postcode, City	213000	Changzhou	**Tel**	+86	519-83118708

Collector Type	Evacuated tubular collector

	Gross area (A_G)	Gross length	Gross width	Gross height	Power output per collector Gb = 850 W/m²; Gd = 150 W/m² ϑm - ϑa					
					0 K	10 K	30 K	50 K	70 K	47 K
Collector name	m²	mm	mm	mm	W	W	W	W	W	W
SB-1800/58-12ST	2,03	2000	1013	160	812	788	729	655	566	667
SB-1800/58-13ST	2,19	2000	1095	160	878	852	788	708	612	721
SB-1800/58-14ST	2,35	2000	1175	160	942	914	845	759	656	773
SB-1800/58-15ST	2,51	2000	1255	160	1007	976	903	811	701	826
SB-1800/58-16ST	2,67	2000	1335	160	1071	1039	960	863	746	878
SB-1800/58-17ST	2,83	2000	1415	160	1135	1101	1018	914	791	931
SB-1800/58-18ST	2,99	2000	1495	160	1199	1163	1075	966	835	984
SB-1800/58-19ST	3,15	2000	1575	160	1263	1225	1133	1018	880	1036
SB-1800/58-20ST	3,33	2000	1665	160	1335	1295	1198	1076	930	1096
SB-1800/58-21ST	3,47	2000	1735	160	1391	1350	1248	1121	969	1142
SB-1800/58-22ST	3,63	2000	1815	160	1456	1412	1306	1173	1014	1194
SB-1800/58-23ST	3,79	2000	1895	160	1520	1474	1363	1225	1059	1247
SB-1800/58-24ST	3,95	2000	1975	160	1584	1537	1421	1276	1103	1300
SB-1800/58-25ST	4,11	2000	2055	160	1648	1599	1478	1328	1148	1352
SB-1800/58-26ST	4,27	2000	2135	160	1712	1661	1536	1380	1193	1405
SB-1800/58-28ST	4,59	2000	2295	160	1841	1786	1651	1483	1282	1510
SB-1800/58-29ST	4,75	2000	2375	160	1905	1848	1708	1535	1327	1563
SB-1800/58-30ST	4,90	2000	2450	160	1965	1906	1762	1583	1369	1612
Power output per m² gross area					401	389	360	323	279	329

Performance parameters test method		Steady state - outdoor							
Performance parameters (related to AG)		η0,hem	a1	a2					
Units		-	W/(m²K)	W/(m²K²)					
Test results		0,401	1,108	0,009					
Incidence angle modifier test method		Steady state - outdoor							
Bi-directional incidence angle modifiers	Yes								
Incidence angle modifier	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal	$K_{\theta T,coll}$	1,02	1,04	1,14	1,23	1,32	1,42	0,95	0,47	0,00
Longitudinal	$K_{\theta L,coll}$	1,00	0,99	0,98	0,96	0,92	0,86	0,72	0,31	0,00

Heat transfer medium for testing	Water		
Flow rate for testing (per gross area, A_G)	dm/dt	0,020	kg/(sm²)
Maximum temperature difference for thermal performance calculations	$(\vartheta_m-\vartheta_a)_{max}$	47,01	K
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)	ϑ_{stg}	240	°C
Effective thermal capacity, incl. fluid (per gross area, A_G)	C/m²	4,42	kJ/(Km²)
Maximum operating temperature	ϑ_{max_op}	150	°C
Maximum operating pressure	$p_{max,op}$	600	kPa

Testing laboratory	Intertek Testing Services Shenzhen Ltd. Guangzhou Branch	http://www.intertek.com	
Test report(s)	170614204GZU-001	**Dated**	2018-10-08

Comments of testing laboratory	Datasheet version: 5.01, 2016-03-01
No comment.	

RISE Research Institutes of Sweden AB | Certification
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Annex to Solar Keymark Certificate

Annex to Solar Keymark Certificate	Licence Number	SC0749-18
Supplementary Information	Issued	2018-10-22

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

Standard Locations		Athens			Davos			Stockholm			Würzburg		
Collector name	ϑ_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
SB-1800/58-12ST		1500	1232	941	1226	965	707	897	686	489	969	743	525
SB-1800/58-13ST		1622	1332	1017	1326	1044	764	969	741	529	1048	804	567
SB-1800/58-14ST		1740	1429	1091	1422	1120	820	1040	795	568	1124	862	608
SB-1800/58-15ST		1859	1526	1165	1519	1196	876	1111	850	606	1201	921	650
SB-1800/58-16ST		1977	1624	1240	1616	1272	932	1181	904	645	1277	980	691
SB-1800/58-17ST		2095	1721	1314	1713	1349	988	1252	958	684	1354	1038	733
SB-1800/58-18ST		2214	1818	1388	1810	1425	1043	1323	1012	722	1430	1097	774
SB-1800/58-19ST		2332	1916	1463	1907	1501	1099	1394	1066	761	1507	1156	816
SB-1800/58-20ST		2466	2025	1546	2015	1587	1162	1474	1127	804	1593	1222	862
SB-1800/58-21ST		2569	2110	1611	2100	1654	1211	1535	1175	838	1660	1273	898
SB-1800/58-22ST		2688	2208	1685	2197	1730	1267	1606	1229	877	1737	1332	940
SB-1800/58-23ST		2806	2305	1760	2294	1806	1323	1677	1283	915	1813	1391	981
SB-1800/58-24ST		2925	2402	1834	2391	1882	1379	1748	1337	954	1890	1449	1023
SB-1800/58-25ST		3043	2500	1908	2488	1959	1434	1819	1391	993	1966	1508	1064
SB-1800/58-26ST		3162	2597	1983	2584	2035	1490	1889	1445	1031	2043	1567	1106
SB-1800/58-28ST		3399	2791	2131	2778	2187	1602	2031	1554	1109	2196	1684	1188
SB-1800/58-29ST		3517	2889	2205	2875	2264	1658	2102	1608	1147	2272	1743	1230
SB-1800/58-30ST		3628	2980	2275	2966	2335	1710	2168	1659	1183	2344	1798	1269
Annual output per m² gross area		740	608	464	605	477	349	442	338	242	478	367	259
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m²			1714 kWh/m²			1166 kWh/m²			1244 kWh/m²		
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 ϑm (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)	B	--
Maximum tested positive load	2400	Pa
Maximum tested negative load	2100	Pa
Hail resistance using steel ball (maximum drop height)	0,8	m

Energy Labelling Information

	Reference Area, A_{sol} (m^2)
SB-1800/58-12ST	2,03
SB-1800/58-13ST	2,19
SB-1800/58-14ST	2,35
SB-1800/58-15ST	2,51
SB-1800/58-16ST	2,67
SB-1800/58-17ST	2,83
SB-1800/58-18ST	2,99
SB-1800/58-19ST	3,15
SB-1800/58-20ST	3,33
SB-1800/58-21ST	3,47
SB-1800/58-22ST	3,63
SB-1800/58-23ST	3,79
SB-1800/58-24ST	3,95
SB-1800/58-25ST	4,11
SB-1800/58-26ST	4,27
SB-1800/58-28ST	4,59
SB-1800/58-29ST	4,75
SB-1800/58-30ST	4,90

Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}

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/m², 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)	0,401	--
First-order coefficient (a_1)	1,11	W/(m²K)
Second-order coefficient (a_2)	0,009	W/(m²K²)
Incidence angle modifier IAM (50°)	1,18	--

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.