

### Holder/Issued to/Manufacturer

## Jiangsu Sunrain Solar Energy Co., Ltd.

Ninghai Industrial Zone, 222243 Lianyungang City, Jiangsu Province, China

### Product name and description

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

Models:	TZ58/1800-10R	TZ58/1800-12R	TZ58/1800-15R	TZ58/1800-18R
	TZ58/1800-20R	TZ58/1800-22R	TZ58/1800-24R	TZ58/1800-25R
	TZ58/1800-28R	TZ58/1800-30R		
	TZ58/1800-10R2	TZ58/1800-12R2	TZ58/1800-15R2	TZ58/1800-18R2
	TZ58/1800-20R2	TZ58/1800-22R2	TZ58/1800-24R2	TZ58/1800-25R2
	TZ58/1800-28R2	TZ58/1800-30R2		

### 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 9806:2013 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 2022-12-19 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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Magnus Sturesson

Certificate No. SC1195-17 | issue 1 | 2017-12-20

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<b>Annex to Solar Keymark Certificate Supplementary Information</b>	<b>Licence Number</b>	<b>SC1195-17</b>
	<b>Issued</b>	<b>2017-12-20</b>

Annual collector output in kWh/collector at mean fluid temperature $\vartheta_m$ , based on ISO 9806:2013 test results													
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
TZ58/1800-10R (R2)		1274	1054	812	1045	829	613	764	590	425	826	639	456
TZ58/1800-12R (R2)		1505	1246	959	1235	979	724	903	697	502	976	755	539
TZ58/1800-15R (R2)		1851	1533	1180	1519	1205	890	1111	858	618	1200	929	663
TZ58/1800-18R (R2)		2198	1819	1401	1803	1430	1057	1319	1018	734	1425	1103	787
TZ58/1800-20R (R2)		2429	2011	1549	1993	1581	1168	1458	1125	811	1575	1219	870
TZ58/1800-22R (R2)		2660	2202	1696	2182	1731	1279	1596	1232	888	1725	1335	952
TZ58/1800-24R (R2)		2891	2393	1843	2372	1882	1390	1735	1339	965	1875	1451	1035
TZ58/1800-25R (R2)		3006	2489	1917	2467	1957	1446	1804	1393	1003	1950	1509	1076
TZ58/1800-28R (R2)		3353	2776	2138	2751	2182	1613	2012	1553	1119	2174	1683	1200
TZ58/1800-30R (R2)		3584	2967	2285	2941	2333	1724	2151	1660	1196	2324	1799	1283
Annual output per m <sup>2</sup> gross area		744	616	475	611	484	358	447	345	248	483	374	266
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	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	2400	Pa
Maximum tested negative load	2400	Pa
Hail resistance using steel ball (maximum drop height)	1,2	m

Energy Labelling Information				
	Reference Area, $A_{sol}$ (m <sup>2</sup> )	Data required for CDR (EU) No 811/2013 - Reference Area $A_{sol}$		
TZ58/1800-10R (R2)	1,71	Collector efficiency ( $\eta_{col}$ )	34	%
TZ58/1800-12R (R2)	2,02	<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 (<math>A_{sol}</math>) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2013.</i>		
TZ58/1800-15R (R2)	2,49			
TZ58/1800-18R (R2)	2,95			
TZ58/1800-20R (R2)	3,26			
TZ58/1800-22R (R2)	3,57			
TZ58/1800-24R (R2)	3,88			
TZ58/1800-25R (R2)	4,04			
TZ58/1800-28R (R2)	4,51	Data required for CDR (EU) No 812/2013 - Reference Area $A_{sol}$		
TZ58/1800-30R (R2)	4,82	Zero-loss efficiency ( $\eta_0$ )	0,399	--
		First-order coefficient ( $a_1$ )	1,06	W/(m <sup>2</sup> K)
		Second-order coefficient ( $a_2$ )	0,009	W/(m <sup>2</sup> K <sup>2</sup> )
		Incidence angle modifier IAM (50°)	1,19	--
<i>Remark: The data given in this section are related to collector reference area (<math>A_{sol}</math>) 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>				