



Sunrain Solar Energy Co., Ltd.
Add: Ninghai Industrial Zone Lianyungang, China. / Tel: 86-518-8505-1803 / Fax: 86-518-8595-9517
E-mail: info@sunrain.com / <http://en.sunrain.com>



**Warm Your
Heart with
Sunrain Solar**

Technological Introduction of Vacuum Tubes

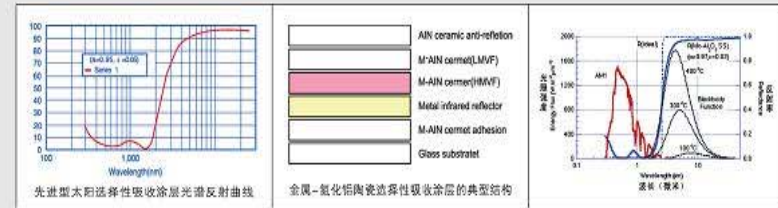
In order to keep the leading position in technology, Sunrain employed many experts from all over the world. Dr. G. Harding, the chief scientific consultant, the chief scientist from Australia Project & Science Institute and "Father of Film Coating in the World" is the excellent representative among them. Dr. G. Harding invented the "Multi-layer (SS-C/Cu) selective absorption layer technology" which is the leading technology in the world till now. At present many film coating methods which are widely used in the all-glass vacuum collectors in China are all improved based on Dr. G. Harding's invention.



Dr. Geoff. L. Harding

Originator in Vacuum Tube Industry
Father of International Film Coating Industry
Chief Doctor of Australian state Institute
Cambridge University Double-Doctor Degree

Sunrain Chief Scientific Advisor, based on his great contribution to Sunrain ranking into the Top 3 in World ETC Industry, he was awarded "Hoyt Clarke Hotel Prize" at 5th. May by American Solar Energy Society (ASES).



The coating film layer of vacuum tube

Compare the economic benefits of solar water heater and other water heaters
(For example in China)

Concept	Heaters	Solar water heater (100kg/18x1.5)	Electric (¥0.50/kwh)	Gas (¥85/15kg)
Equipment Investment		2,500	1,000	600
Life time		15	5	5
Daily output 50°C hot water(l/g)		Winter80/summer200	Winter80/summer200	Winter80/summer200
Number of days used annually		300 days	300 days	300 days
Money for energy per year		0	945	842
Equipment investment in 15 years		2,500	3,000	1,800
Total expenses in 15 years ¥		2,500	17,175	14,430
Risk		NO	YES	YES
Pollution		NO	YES	YES
Inner house occupancy		NO	YES	YES

Split Solar Collector Heat Pipe

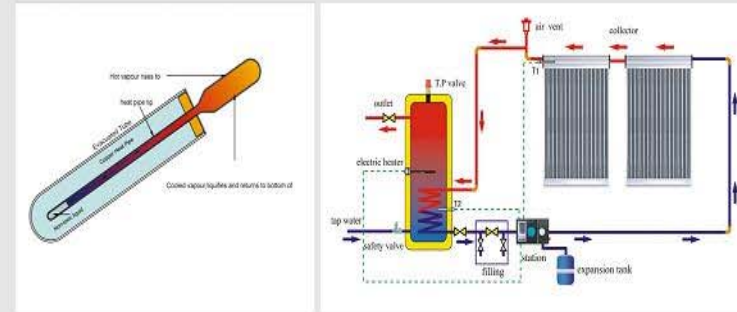


CHARACTERS

- 1.the water is heated by the heat pipe rapidly.
- 2.there is no water in the vacuum tube ,so the tube will not break in winter.
- 3.it can be combined with the architecture perfectly.
- 4.it can be combined with existing pipeline.
- 5.it will be affected by the local water quality ,it doesn't suit hard water .
- 6.it can still work in the event of occasional tube breakage.

Material

- 1.Outer tank: Alnico-1.5mm
- 2.Manifold: 1inch
- 3.New manifold. more stronger
- 4.The frame can be adjusted
- 5.Easy installation
- 6.Tail stock support is made of Alnico



Parameter Table

Type	Area(M ²)	Vacu- m tube Qty (pcs)	Length/Width/Height(mm)	Gros s wet (Kg)	20GP/40GP/40H C loading Qty (sets)
TZ58/1800-10R4	1.01	10	828*1978*110	34	140/300/340
TZ58/1800-15R4	1.52	15	1218*1978*110	53	92/200/228
TZ58/1800-20R4	2.02	20	1608*1978*110	71	70/150/170
TZ58/1800-25R4	2.53	25	1998*1978*110	89	56/120/136
TZ58/1800-30R4	3.04	30	2388*1978*110	109	46/100/112
Vacuum tube size: ∅ 58*1800					

Remark

1. Manifold Connections(mm/inch):1
2. Max.stagnation temperature(Pa):0.9Mpa
3. Operating fluid pressure(Pa):0.6Mpa
4. Max.stagnation temperature(degree):95
5. Max.service temperature(degree):200
6. Distance from tube to tube(mm)70

Split Solar Collector Heat Pipe

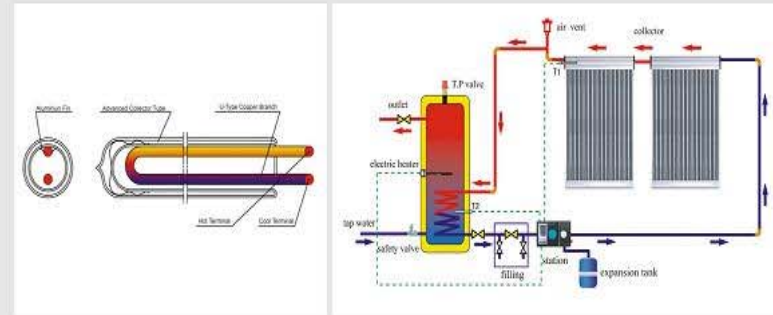


CHARACTERS

1. The vacuum tubes absorb the solar energy and transfer into the heat energy, then pass it to the U pipe, it can get high temperature.
2. Have a good performance of bearing pressure, suitable pump circulation there is no water in the vacuum tube, so the tube will not break in the winter.
3. It is steady and credible.
4. It can be combined with the architecture perfectly, the installation is flexible and can work under any installation angle.
5. It can be combined with existing pipeline.
6. It can still work in the event of occasional tube breakage.

Material

1. Outer tank; Alnico-1.5mm
2. Manifold: ϕ 22mm thickness 2mm
3. U copper type: 8mm thickness 0.6mm.



Parameter Table

Type	Area(M ²)	Volume of the fluid(L)	Vacuum tube Qty (pcs)	Length/Width/Height(mm)	Gross wet (Kg)	20GP/40GP/40HC loading Qty (sets)
TZ47/1500-10U	0.991	0.9	10	1660*920*150	26.7	72/156/176
TZ47/1500-15U	1.492	1.35	15	1660*1270*150	38.3	52/112/126
TZ47/1500-20U	1.992	1.8	20	1660*1620*150	50.6	40/86/98
TZ47/1500-25U	2.493	2.25	25	1660*1970*150	63.3	32/70/80
TZ47/1500-30U	2.993	2.7	30	1660*2320*150	75	28/58/66
Vacuum tube size: ϕ 47*1500						

Remark

1. Manifold Connections(mm/inch): 22mm(outer)/1/2
2. Test pressure(Pa):0.9Mpa
3. Operating fluid pressure(Pa): 0.6MPa
4. Max. service temperature(degree): 95
5. Max. stagnation temperature(degree): 252
6. Distance from tube to tube(mm): 70

Large-Scale Solar Collector



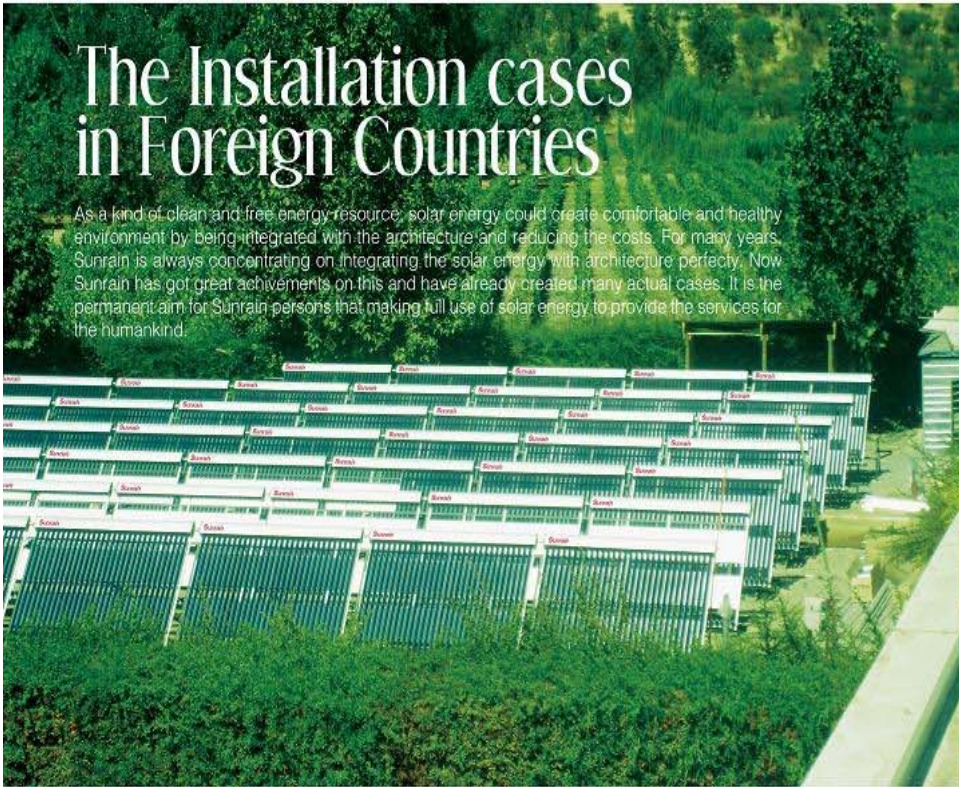
CHARACTERS

1. Applicable on solar hot water supply/ swimming pool heating/house heating.
2. Automatically running, telecommuting controlling.
3. All-day/time-lapse mode.
4. Design according to locale, integrate with construction perfectly.
5. Any type of back up.



Parameter Table

Type	Tube orientation	Absorb Area(m ²)	Vacuum tube Qty(pcs)	Vacuum Tube		Length/Width/Height(mm)
				Qty(pcs)	Length(mm)	
TZ47/1500-50G	horizontal	3.3	50	47	1500	3200*1863*210
TZ47/1500-25G	Vertical	1.65	25	47	1500	1693*1863*210
TZ58/1800-10G	Vertical	0.98	10	58	1800	883*2035*210
TZ58/1800-15G	Vertical	1.47	15	58	1800	1298*2035*210
TZ58/1800-20G	Vertical	1.97	20	58	1800	1713*2035*210
TZ58/1800-20G	Vertical	2.95	30	58	1800	2543*2035*210



The Installation cases in Foreign Countries

As a kind of clean and free energy resource, solar energy could create comfortable and healthy environment by being integrated with the architecture and reducing the costs. For many years, Sunrain is always concentrating on integrating the solar energy with architecture perfectly. Now Sunrain has got great achievements on this and have already created many actual cases. It is the permanent aim for Sunrain persons that making full use of solar energy to provide the services for the humankind.



CHILE

The Large Scale Project in Korea



Syria



The garage in USA



The hotel in Belgium



The living house in Belgium



The gymnasium in Belgium



The Living house in Korea



The military government building in Malaysia



The Swimming pool in Holland



The building in Shandong Province



The flat solar collector



Building in Suzhou



The house in Holland



The University of Nottingham



The living house in Holland