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**Warm Your
Heart with
Sunrain Solar**

Technological Introduction of Vacuum Tubes

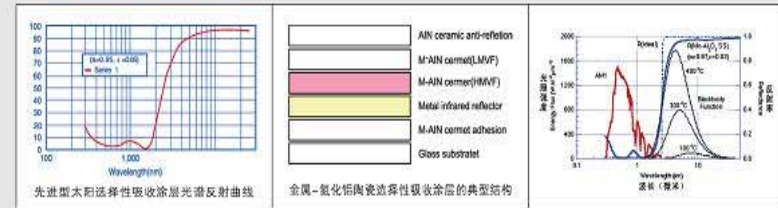
In order to keep the leading position in technology, Sunrain employed many experts from all over the world. Dr. G. Harding, the chief scientific consultant, the chief scientist from Australia Project & Science Institute and "Father of Film Coating in the World" is the excellent representative among them. 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

Non-pressure Series One Pipe Inlet-outlet

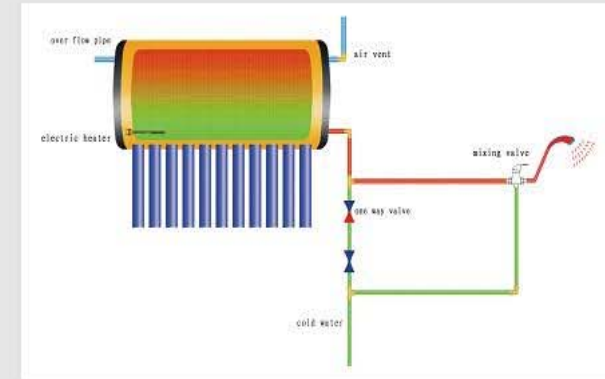


CHARACTERS

The design of this type uses the all-glass evacuated solar collector tubes as the heat-absorb element. The high vacuum degree of the clearance between the outer and inner tube can reduce the heat emission which caused by convection and conduction to a very low level. All-glass evacuated tube transfers sun energy into heat energy by the high absorption rate and low emittance rate of layer films. Depend on the different density between the hot water and the cold water, a cycle can be created in the tube which hot water ascending and cold water descending status. Keeping natural circulation like this, the water in the tank will be heated.

Material

1. inner tank: stainless steel SUS304-0.5mm
2. vacuum tube: QB-AL-N/AL-47-1500/58-1800
3. outer tank: painted steel -0.4mm / aluminum-zinc coated steel-0.45mm; stainless steel SUS304.
4. frame: coated galvanized steel -1.5mm; stainless steel SUS430-1.5mm
5. the material of insulation: polyurethane
6. the reflector: aluminum component; AL 99.85% surface oxidation; stainless steel



Parameter Table-1

Type	Area(M ²)	Vacuum tube			Volume(liters)	Gross wet (Kg)	20GP/40GP/40HC loading Qty(sets)
		Length (mm)	Φ(mm)	Qty (pcs)			
TZ47/1500-15	1.423	1500	47	15	90	55	56/118/134
					130	58	52/114/128
TZ47/1500-18	1.718	1500	47	18	110	63	48/104/118
					150	66	40/88/100
TZ47/1500-20	1.909	1500	47	20	120	69	45/96/108
					165	74	38/80/92
TZ47/1500-24	2.293	1500	47	24	140	77	36/84/96
					200	82	34/70/78
TZ47/1500-30	2.868	1500	47	30	170	88	34/74/81
					245	93	30/64/68
TZ47/1500-36	3.444	1500	47	36	205	100	28/61/70
					300	109	26/54/60

Remark

1. Solar heat storage tank diameter(mm):375/475
2. Thickness, insulated(mm):50/60
3. Vent connection(inch):1/2
4. Electric heater connection(inch):1
5. Water connections(inch):1/2
6. Collector angle(degree):38/45

Parameter Table-2

Type	Area(M ²)	Vacuum tube			Volume(liters)	Gross wet (Kg)	20GP/40GP/40HC loading Qty(sets)
		Length (mm)	Φ(mm)	Qty (pcs)			
TZ58/1800-12	1.647	1800	58	12	120	46	48/100/116
TZ58/1800-14	1.924	1800	58	14	140	52	42/88/100
TZ58/1800-16	2.201	1800	58	16	160	59	38/78/84
TZ58/1800-18	2.478	1800	58	18	180	65	36/76/80
TZ58/1800-20	2.755	1800	58	20	200	71	32/68/72
TZ58/1800-24	3.310	1800	58	24	240	79	26/56/60
TZ58/1800-30	4.142	1800	58	30	300	98	22/46/52

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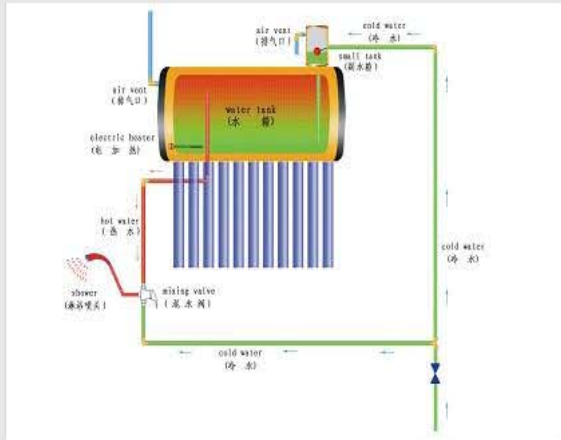


CHARACTERS

The design of this type is according with the international fashion trend, it is easy to operate. The design is scientific and reasonable, it could always provide hot water.

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3. Outer tank: painted steel-0.4mm/ aluminum-zinc coated steel-0.45mm/ stainless steel SUS304
4. Insulation: polyurethane 50mm/60mm
5. Frame: coated galvanized steel-1.5mm/ stainless steel SUS430-1.5mm
6. Reflector: aluminum component/stainless steel



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