

Solar Water Heater



The Working Principle of the All Glass Vacuum Tube

Evacuated tubes are the absorber of the solar water heater. They absorb solar energy converting it into heat for use in water heating. This type of tube is chosen for its reliability, performance and low manufacturing cost. Each evacuated tube consists of two glass tubes made from extremely strong borosilicate Glass. The outer tube is transparent allowing light rays to pass through with minimal reflection, The inner tube is coated with a special selective coating (AL-N/AL) which features excellent solar radiation absorption and minimal reflection properties, The top of the two tubes are fused together and the air contained in the space between the two layer of glass is pumped out while exposing the tube to high temperatures, This "evacuation " of the gasses form a vacuum, which is an important factor in the performance of the evacuated tubes. Why a vacuum? As you would know if you have used a glass lined thermos flask, a vacuum is an excellent insulator, This is important because once the evacuated tube absorbs the radiation from the sun and converts it into heat, we don't want to lose it! The vacuum helps to achieve this, The insulation properties are so good that while the inside of the tube may be 150° C / 304oF, the outer tube is cold to touch, This means that evacuated tube water heaters can perform well even in cold weather when flat plate collectors perform poorly due to heat loss (during high Delta-T conditions)In order to maintain the vacuum between the two glass layer, a barium getter is used (the same as in television tubes) During manufacture of the evacuated tube this getter is exposed to high temperatures which causes the bottom of the evacuated tube to be coated with a pure layer of barium, This barium layer actively absorbs any CO, CO₂, N₂, O₂, H₂O and H₂ out-gassed from the evacuated tube during storage and operation, thus helping to maintaining the Vacuum..



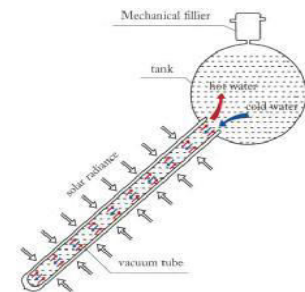
Technical Data of Single Target All Glass Vacuum Tube

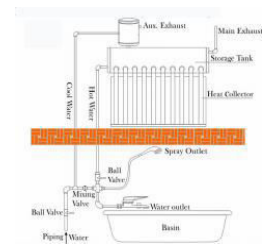
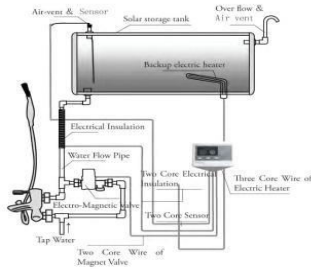
- Structure: Double Glass Tube with Co-axial Structure
- Glass Material High Boron Silicon 3.3 Glass
- Outer Diameter and Thickness: $\phi = 58 \pm 0.77 \text{mm}$ & $t = 1.6 \text{mm}$ $\phi = 47 \pm 0.77 \text{mm}$ & $t = 1.6 \text{mm}$
- Inner Diameter and Thickness: $\phi = 47 \pm 0.77 \text{mm}$ & $t = 1.6 \text{mm}$ $\phi = 37 \pm 0.77 \text{mm}$ & $t = 1.6 \text{mm}$
- Vacuum Tube Length : 1800($\pm 5 \text{mm}$)
- Absorptive Coating Performance: AL-N/AL Selective Absorption Coating
- Sediment Method: Direct Reaction Splash Jetting
- Thermal expansion : $3.3 \times 10^{-6} \text{ } ^\circ\text{C}$
- Maximum Strength : $\leq 0.8 \text{MPa}$
- Stagnation Temperature: $> 200^\circ\text{C}$
- Absorption Rate: a_s 0.92-0.93(AM1.5)
- Emission Rate: $\sum h_r \leq 0.08$
- Vacuum Ratio: $\leq 5.0 \times 10^{-5} \text{Pa}$
- Solarization Parameter for Empty Vacuum Tube: $> 256 \text{M}^2\text{C}/\text{KW}$
- Solar Auxiliary Energy with Immersed Solarization: $< 2.8 \text{MJ}/\text{M}^2$
- Average Heat Loss Coefficient's $U_T < 0.6 \text{W} (\text{m}^2)$
- Hailstone Resistance: $\phi 30 \text{mm}$
- Vacuum Tube Life: 15 Years .

The Working principle of the Non-pressurized Solar Water Heater

The vacuum tubes absorb the solar radiation and convert it into the heat energy, and heat the water directly in the tube and the heated water goes up into the storage tank, at the same time the cold water comes down, forming the circulation, and thus the temperature rises up, the water in the whole system gradually is heated. The cold-water can be supplied into the tank automatically by the small tank. When the tank is full of water, the small tank will stop work. So we just need to keep the cold-water inlet open, the system can supply the water by itself.

Maybe in the winter or during the cloudy days, the solar energy is not enough; the water can't be suitable for use. We can use the heat element as auxiliary energy to heat the water in cloudy days or at nights. When the temperature of the water in the tank is lower, the heat element will work which controlled by the controller automatically.





Solar Water Heater with Controller Solar Water Heater with Assistant Tank We may produce different model of solar water heater according to customers' requirement. We may make different color for end cover of water tank, 0.31mm-0.6mm inner tank and so on and offer OEM service.

Product Details

Approvals	ISO,CE
Capable	Solar- Key mark , ROHS ,CSA , TUV ,UR, In metro
Brand Name	Reverie
Region	India
Brief Description	<p>Solar hot water heater</p> <ul style="list-style-type: none"> • stable performance • three target vacuum tube • 304 stainless steel inner tank • coloured steel /stainless steel /Aluminium outer tank • galvanized steel stand
Type	Non Pressure
Body Materials	Carbon Steel, Glass, Stainless Steel
Heating System	Thermo siphon
Connection	Direct-Plug
Installation	Floor Stand
Colour	White with Black
Current Type	AC
With Accessories or Not	Yes
Voltage	110-220V
Circulation Type	Direct Loop
Frequency	50HZ
Certification	CE, ISO, UL
Pressure	Unpressurized



Key Specification

Inner tank:	SUS 304-2B stainless steel, 0.31 mm thickness
Inner tank diameter:	360 mm
Outer tank:	Coloured steel / galvanized steel/stainless Steel
Out tank diameter:	460 mm
Capacity of Water Tank:	100L/150L/200L/250L/300L
Insulation layer:	High Pressure Polyurethane Layer with Thickness of 50mm
Heat preservation:	72-80hrs
Frame:	Galvanized Steel with Painting, or aluminium alloy, or stainless steel.
Welding:	Argon arc welding
Vacuum tube type:	3 target tube AL-N-AL/SS/CU coated
Absorption rate:	≥ 93%, thermal radiation rate: ≤ 6%
Outer glass tube diameter:	58 mm
Inner glass tube diameter:	47 mm
Length of the vacuum tube:	1800 mm
Thickness of the glass tube:	1.6 mm, super hard borax and silica glass
Angle of bracket:	28, 30, 45degree
Seal:	High quality silicone rubber polymer
Hail resistance:	25 mm
Idle sunning property parameters:	250, 2.5 hours to boiling point

Technical Data:

Model	Water Tank Volume(L)	Vacuum Tube (m m)	Tube Qty.	Inner Water Tank	Outer Water Tank	Frame
SS-100/10G	100	58*1800	10	304 Stainless steel	Color steel/ Stainless Steel/Galvanized Steel	Galvanized steel / Aluminum / Stainless steel
SS-150/15G	150	58*1800	15			
SS-200/20G	200	58*1800	20			
SS-250/24G	250	58*1800	24			
SS-300/30G	300	58*1800	30			
SS-400/35G	400	58*1800	40			
SS-500/40G	500	58*1800	50			



Working Principle:

- This system uses the Thermosiphon principle, Solar vacuum tube is plugged into the bottom of water tank;
- The water is filled inside the solar vacuum tube, Solar vacuum tube transmit solar energy to heat energy;
- The temperature of water inside solar vacuum tube is rising, As the thermosiphon principle;
- The hot water rise up, and arrive in the water tank, the cold water inside the water tank go down the solar vacuum tube,
- So the system runs by this circulation way until the water become very hot. It's a green product.

Application:

- Hotels, resorts, hospitals and hostels
- Process industry, boiler feed, laundry and canteens
- Agricultural sector, hatcheries and dairies
- Swimming pool heating
- Health clubs (Steam /Sauna)