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Installation Guide

Solar Batch Water Heater

Batch solar water heating is Affordable !

Using solar energy to heat water is a very old development. With new evacuated tube the technology has become both efficient and affordable. The system includes a double wall stainless steel tank with 2 inches of urethane foam insulation (R 14) and 12 double wall vacuum tubes.

The water tank can be plumbed for seasonal use. The vacuum tubes are unique in that the absorber coating is 360 degrees around the inner wall of the vacuum so that the aperature is perpendicular to the sun from early in the morning to late in the evening. Behind the tubes is a spectral quality stainless steel reflector plate to capture radiation on the back face of the array.

Evacuated tubes do not diminish their gain due to wind or cold because a vacuum prevents conductive and convective losses. The selective surface coating inside the vacuum reduces emissivity and does not reradiate the ultra violet solar energy. System efficiency of batch water heaters are well over 50% and are the highest of any system design.

The batch tank holds 17 gallons of potable water. The vacuum tubes will rise cold water from the typical 58 deg F by more than 60 degrees in a 7 hour solar day. The performance rating of the solar array is 450 watt hour or 1,555 BTU hour. Typical performance is above 138 deg F in one solar day of bright sunlight.

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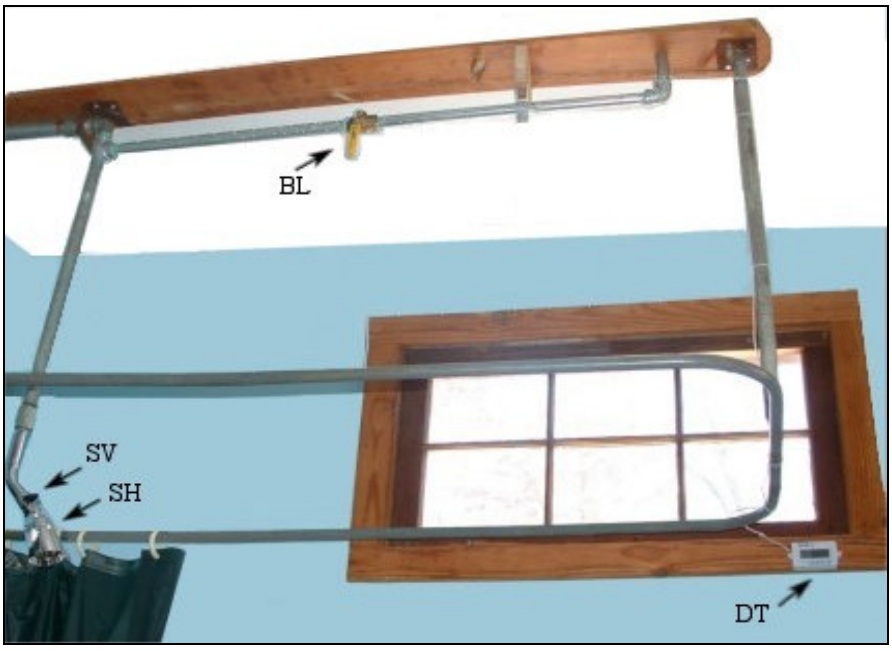

Bathroom Plumbing ---- Single line installation

Batch water heating systems are easy to install which makes them even more Affordable and practical.

They interface with the pressurized water system of a typical home. Your existing electric or on demand gas water heater remains in place----you simply use less non renewable processed fuels when you use solar gain to heat water.

The above photo and the plumbing schematic attached show how simple valves isolate the solar collector from the pressurized water. The solar storage tank is open to atmosphere and is filled by the house mains. In the above the solar tank is filled then isolated from the pressure side while the sunlight heats the water. Switching two valves allows gravity to drain the system to a shower or faucet to the washing machine.

Gravity is an awesome force. Water that is pushed up to the solar storage tank integrated into the collector array does not require any more effort to come down.

Another way to plumb the system is to use the brass float valve accessory. It operates just like a toilet float valve—the pressurized water fills the tank until the float ball rises and closes off the valve. When hot water is drawn down the tank is automatically refilled.

DT - Digital thermometer with probe inserted into solar storage tank on roof. Uses AAA battery.
BL - Ball valve to fill or gravity drain the solar storage tank.
SV- Finger valve in front of shower head, closed when filling collector tank and draining to washer.
SH – Shower head, recommended **Whedon Products Inc**, low pressure, adjustable spray, (FP4C) brass & stainless unit.

See the attached plumbing schematic for suggested installations options.

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Detail of mounting frame

Detail of roof penetration

This particular installation was done on a south facing gable roof. Aluminum roof mounting brackets were fabricated for the legs of the collector integrated stainless steel frame. The riser pipe is 1/2 inch galvanized steel through the 2 inch standard no caulk Oatey flashing.

The water line is wrapped in two layers of Rubatex high temp pipe insulation. The inner insulation wrap goes below the roofing and into the attic ceiling insulation.

The aluminum standoffs roof angles are caulked and bedded onto the roof. The right side, which has the weight of the tank above it is mounted into the roof joist with 5/16 stainless lag bolts while the left legs are screwed with short ¼ inch lags into the plywood sheathing. This solar water collector has weathered 60 miles per hour wind gusts.

There are many ways to mount the collector. On or off of a roof (on 4 x 4 platform) or cantilevered off a south facing wall. We can provide custom mounting brackets for your installation when provided with good sketches and measurements for offsets.

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Accessories

Digital thermometer with probe battery powered.

Float valve for automatic cold water fill.

Evacuated Tube Specifications

Length	1500mm
Outer tube diameter	47mm
Inner tube diameter	37mm
Thermal expansion	$3.3x10^{-6}$ °C
Material	Borosilicate Glass 3.3
Absorptive Coating	Graded Al-N/Al
Absorptance	>92% (AM1.5)
Emittance	<8% (80°C)
Vacuum	P<$5x10^{-3}$Pa
Stagnation Temperature	<212 °F
Heat Loss	<0.8W/ (m2°C)
Maximum Strength	0.8MPa
Hail Rating	25mm
Warranty	5 years

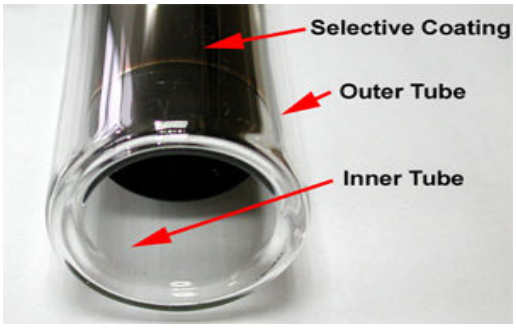

Figure 1 Double Wall Vacuum Tube

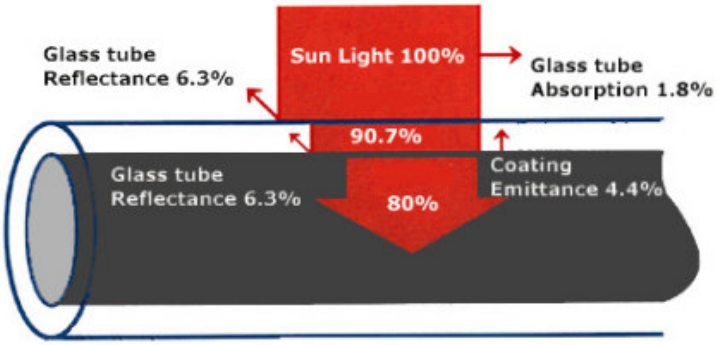

Figure 2 Evacuated Tube Work Principle