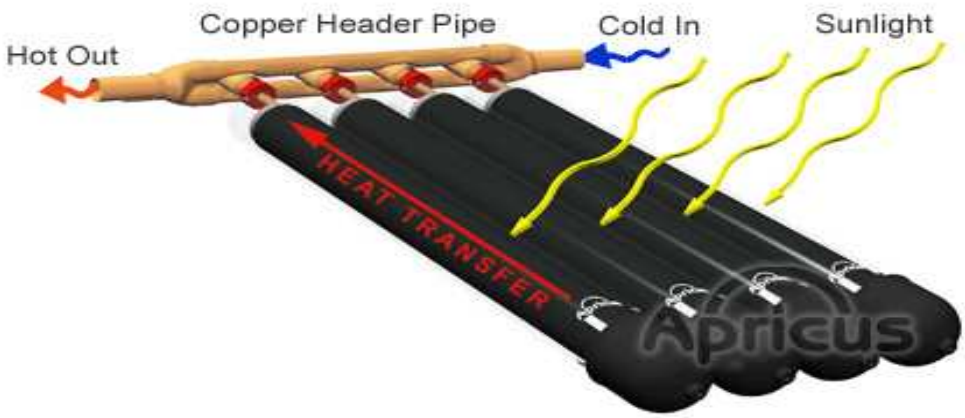
How the Apricus Solar Collector Works

The operation of the Apricus solar collector is very simple.



Step 1. Solar Absorption--Solar radiation is absorbed by the evacuated tubes and converted into heat.

Step 2. Solar Heat Transfer--Heat pipes conduct the heat from within the solar tube up to the header.

Step 3. Solar Energy Storage--Water is circulated through the header via intermittent pump cycling. Each time the water circulates through the header the temperatures is raised by a small amount. Throughout the day, the water in the storage tank is gradually heated. The temperature the water in the tank will reach will depend upon the amount of solar radiation, the size of the tank and the hot water usage in the day.

Evacuated Tubes

Apricus solar collectors use twin-glass evacuated tubes. They are comprised of two glass tubes, fused together at the top and bottom. The space between the two tubes is evacuated to form a vacuum. The structure is therefore very similar to a Thermos flask you may use to keep water hot. The outer layer of the inner tubes is coated with a special selective layer which absorbs sunlight very efficiently. The vacuum layer insulates very well against heat loss providing excellent performance even in cold weather.

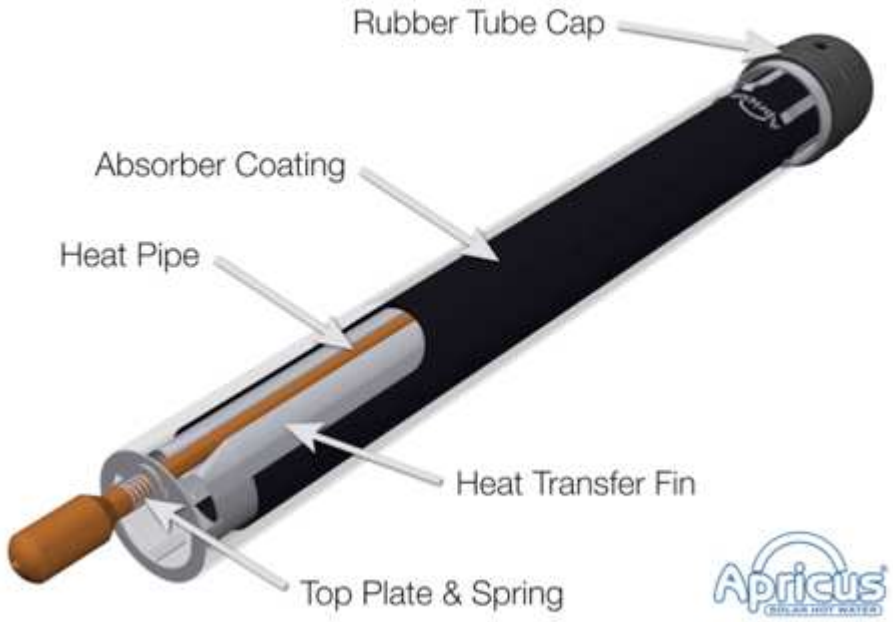
Apricus solar collectors have from 10 to 30 evacuated tubes, with each tube 1.8m / 70″ long and 58mm / 2.3″ in diameter. Each tube contains a long heat transfer fin and a heat pipe. The fin acts to hold the heat pipe in place against the inner wall of the tube, and also provides additional heat transfer.

Heat Pipes

Heat pipes are commonly used in many industries, in particular in computers, working to transfer the heat from the CPU away to the heat dissipator past which the fan blows air. Heat pipes are also used in many industries to move heat from one point to another.

Apricus has specially designed a heat pipe for use with evacuated tubes. The operating temperature range from freezing to more than 200 ºC / 395 ºF means that many common heat pipe designs are not viable. Apricus heat pipes are designed to be begin working at a low temperature (30 ºC / 86 ºF), are able to transfer heat consistently up to high temperatures and can withstand freezing conditions without damage.

Below is a diagram which shows the basic operation of the heat pipe.



The operation is very simple. The heat pipe is basically a copper pipe that has been evacuated to form a vacuum. The heat pipe contains a small volume of purified water which acts as the “working fluid”. Because the pressure in the heat pipe is very low, the water boils at only 30ºC / 86ºF. The resultant steam rushes to the top of the heat pipe where it off-loads heat, after which it condenses back to water and runs back down to repeat the cycle. Using this process, Apricus heat pipes have a heat transfer capacity in excess of 110Watts, with the evacuated tubes in strong sunlight able to provide around 50-60Watts.

Solar Controller

Apricus offers the highest quality of solar controller to provide reliable control of your hot water system. The controller is not only easy to use, it is simple to programme and install. It measures the water temperature in two different places in the system to ensure the water is turned on at the optimum time. Additional desirability of this controller is the frost protection and smart control of the hot water booster element for dramatically improved energy efficiency.

Triple Speed Pump

Most solar hot water heating systems are “active” which means that a circulation pump is required to force water through the solar collector.

The circulation pump is not responsible for developing pressure, it is simply used for circulating the water through the solar collector. Â In many cases where the length of piping is more than 5m and especially if the house is 2 or more storeys high, a single speed pump does not have enough pressure. A 3 speed pump allows the installer to adjust to a suitable speed setting to ensure a fast enough flow-rate is achieved.