

Apricus Solar Collector Owner's Manual

Thank you for purchasing an Apricus solar collector.

We sincerely hope that you enjoy your solar powered showers with the knowledge that you are now *part of the SOLUTION.*

Customer Service Is Important to Apricus

It is important that your system be installed properly.

You should expect your installer to:

- Be on time
- Be polite
- Answer any and all questions you have about your system
- Clearly label all parts of the system
- Explain the basic operation of the system to you
- Clean up after the installation
- Leave you with a completed installation record form & this owners manual
- Label system components clearly

If you have any feedback about the service provided by the installer please contact us:

Call: (877)-458-2634

Email: inquiry-usa@apricus.com

Date of Installation: _____

Installer's Name: _____

Installer's Contact Details: _____

Information about Apricus Products including all manuals can be found at **www.apricus.com**

OTHER SYSTEM COMPONENTS

The complete solar hot water system will also include components from other manufacturers.

Please refer to the documentation provided with those components for details of operation, maintenance and warranty.

1. Education

Apricus strongly believes in educating the home owner about the basic operation of the solar water heating system. By gaining a basic understanding you can develop realistic expectations about the operation of the system, develop habits which maximize energy savings and most importantly, ensure safe and reliable operation.

Understanding Water Heating

Before explaining how your solar hot water system operates it is important for you to understand how water heating works.

A water heater is traditionally an insulated tank full of water with an electric heating element or gas burner in the bottom. The water is heated to about 130-140°F depending on the thermostat setting. An average 4 person household will use about 80-100 gallons of hot water per day. This amount of water requires a large amount of energy to heat which is why it is important to use solar to reduce the amount of electricity or gas used.

When you open the hot water facet in your house, pressurized cold water enters the bottom of the tank forcing the hot water out the top of the tank. (Figure 2.1). Notice how the water in the picture is separated into two distinct layers. Because hot rises and cold falls, the water in the tank doesn't mix very much. This is known as stratification and allows the water coming out of the tank to remain at a fairly consistent temperature before the water suddenly turns cold once all the hot is depleted.

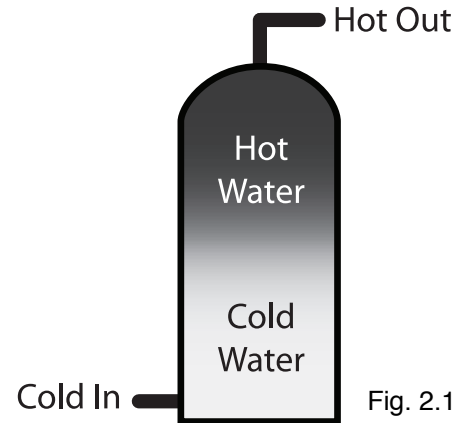


Fig. 2.1

A hot water scald can occur at temperatures over about 125°F and so most

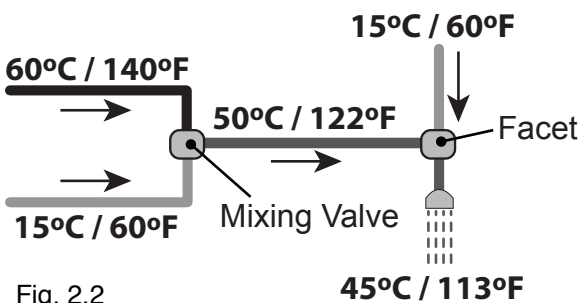


Fig. 2.2

new houses have a mixing valve installed which mixes the cold and hot to achieve a safer temperature of about 120°F. If you are in an older house the plumber should recommend installation of one as this is a very important safety device, especially if there are young or elderly people in the household. Figure 2.2 shows the basic operation of the mixing valve.

The water generally leaves the storage tank at 140°F. It then passes through the anti-scald valve which brings the temperature down by mixing with cold water. Most people will then cool it down further at the tap by mixing it with more cold water.

2. Solar Water Heating

The Apricus solar collector is a solar thermal heating device which converts the sun's energy into usable heat.

Step 1. The evacuated tubes absorb energy from the sun and convert it to heat. In the summer an Apricus 30 tube collector can produce as much as 13kWh / 45kBtu of heat energy per day.

Step 2. The heat inside the evacuated tubes is transferred up into the insulated heat exchanger where a copper heat exchanger is located.

Step 3. An electronic controller measures the temperature of the solar collector and the water in the bottom of the storage tank. If the collector is hotter (which means there is heat available) the controller supplies power to the pump which circulates fluid through the solar collector heat exchanger.

Step 4. Throughout the day the pump circulates fluid through the collector, gradually heating the water in the storage tank.

3. Boosting

Solar will contribute the hot water heating, but doesn't replace the need for auxiliary heat sources such as electricity, gas or heat pump. The system will be configured to ensure you have enough hot water even during periods of low solar contribution. During summer months only a small amount of boosting will be required, with more boosting in cooler months; this is fully automated. Refer to the instructions for your water heater or boiler for operation details and ask the installer for more information about how your system is configured.

4. Understanding Solar Contribution

Some home owners make the mistake of thinking that once they install a solar water heater they can turn off their booster off all most year round. Generally you should not turn off your boosting system. Firstly, in most areas it is a requirement that you heat the water to a specific temperature each day or week to kill Legionella bacteria. Secondly, in the winter solar radiation is only half to one third as strong in summer, and therefore is not able to provide the same amount of hot water as in the summer. Your solar system will normally be designed to meet almost 100% of summer hot water needs and will provide about 30-50% in the winter. This generally results in a contribution of 60-80% annually, depending on your location.

5. Maintenance

WARNING

Apart from maintenance specifically outlined as “OWNER”, any maintenance or repair must only be completed by authorized persons. At no time should any inspection or maintenance be completed by the home owner if it involves climbing on the roof or any potentially unsafe behavior. The solar collector warranty may be void if non-authorized persons attempt to maintain or repair the solar collector or associated system components. The solar system operates at high pressure and high temperature and can result in damage to both property and person if not correctly operated and maintained.

Periodic inspections by an authorized Apricus installer is recommended to ensure optimum system operation.

Cleaning (OWNER)

Regular rain should keep the evacuated tubes clean, but if particularly dirty they may be washed with a soft cloth and warm, soapy water or glass cleaning solution but ONLY if the solar collector easily and safely accessible. If the tubes are not easily and safely accessible, high-pressure water spray is also effective.

Inspection (OWNER)

Should there be any problem with the system the installer may ask the home owner to inspect various aspects of the system before traveling to the home. The following investigations may be completed by the home owner, if easily and safely accessible.

- a) The pump station foam casing may be removed (pulled off) to check the following system information:
 - i) Pressure gauge reading
 - ii) Temperature gauge reading
 - iii) Pump operation/noise
 - iv) Flow meter reading
- b) Visual check for degradation of piping insulation
- c) Visual inspection of solar collector tubes

Broken Tubes

If a tube happens to break make sure to safely clean up any broken glass that is on the ground. The home owner must not climb onto the roof. Call the Installer or local Apricus representative to organize a replacement tube to be installed.

Plumbing System

Under no circumstance should the home owner open or close any of the valves in the system unless there are clear instructions from the Installer to do so. Changing a valve's position could cause unsafe pressure buildup, damage to the system or release of high pressure, high temperature liquid.

Controller

Under no circumstance should the home owner change any of the controller system settings, as it may result in unsafe operation. The only exception may be use of a holiday mode.

Storage Tank

The water supply to the storage tank must not be turned off.

The thermostatic settings on the water heater must not be changed.

Sediment Buildup (Hard Water / Limescale) (OWNER)

If in areas prone to limescale formation the storage tank should be flushed by the home owner or Authorized Person as outlined in the tank manufacturer's operation manual. This should be completed as often as once every 6 month in areas with particularly hard water, and annual in most areas.

If installed in a direct flow system or closed loop using a brazed plate heat exchanger (BPHE) an inline strainer should be fitted before the pump to catch any sediment and allow periodic clean out.

Other Components

Please refer to the owner's manuals of other system components for information regarding safety procedures.

It is recommended that as a minimum the following maintenance plan is followed. Also refer to the manufacturer's guidelines for the storage tank, gas water heater or other system components. Maintenance should be completed by authorized persons.

Maintenance Plan

The following maintenance activities are recommended to ensure optimal and safe system operation. Please contact the Contractor who completed the Installation to organize any maintenance. Maintenance guidelines for other system components can be found in the respective owner's manuals which should have been provided to you upon completion of the installation. These documents provide additional maintenance and warranty information.

Replacement Parts

For replacement parts contact the Contractor who installed the system as listed on the installation manual.

If unavailable contact Apricus Inc.:

E-mail: warranty-usa@apricus.com

Ph: +1 203-488-8215

6. Operation Notes

Freeze Protection for Direct Flow Systems

If you have recently purchased a direct flow system where potable water circulates through the collector you may need to drain the system in the event that sustained temperatures below 23°F occur. In the event that a forecast of freezing temperatures occur please contact your local Apricus installer to drain the system or follow the instructions in section 8.9 of the Apricus Installation and Operation Manual.

In the event of a power outage the "drip-valve" on the Apricus Direct Flow Pump Station will open and cause water to drip out. This is a safety measure to ensure that the system does not freeze.

Component	Frequency	Inspection
Insulation	3 years	Check for degradation
Controller	3 years	Check data-logger operation, system settings.
Pump operation	3 years	Check flow rates, pump noise, vibration etc
Solar Collector	3 years	Check tubes for any vacuum loss
Heat Transfer Fluid	1 year for propylene glycol 3 years for high temp rated	Check appearance, pH and hydrometer reading.
Storage Tank	3 years 1 year in regions with hard water	Flush tank of sediment buildup. Check and replace anode if applicable.
Brazed Plate Heat Exchanger	3 year 1 year in regions with hard water	Back-flush domestic water side of brazed plate heat exchanger with vinegar (if required).

WARNING

Extended periods of cold weather at temperatures below the design limitations of the system's freeze protection method may cause freezing and damage to exposed parts of the system. It is the owner's responsibility to protect the system in accordance with the Installer's instructions, if weather is anticipated to approach or exceed the specified freeze tolerance limit.

Failure to implement effective freeze protection may result in rupture of piping and can cause substantial property damage.

Vacation and Prolonged Non-Use

In the event that your hot water system will not be used for longer than 3 months please contact your local Apricus installer who can drain your system.

WARNING

If no hot water is used for 2 weeks at a time or more and the water heater is left in an operating condition, a quantity of highly flammable hydrogen gas may accumulate in the top of the hot water tank. To dissipate this gas safely, it is recommended that a hot water tap be turned on for several minutes at a sink, basin or bath, but not a dishwasher, clothes washer or other appliance. During this process, there must be no smoking or open flame or any other electrical appliance operating nearby. If hydrogen is discharged through the tap it will usually sound like air escaping. THIS STATEMENT IS INCLUDED AS A REQUIREMENT OF CERTAIN COUNTY/STATE REGULATIONS.

Water Quality & Inspection

a) In direct flow systems, the water flowing through the manifold header must qualify as potable water and meet the following requirements:

Total dissolved solids	< 600 p.p.m.	Total hardness	< 200 p.p.m.
Chloride	< 250 p.p.m.	Free Chlorine	< 5 p.p.m
Magnesium	< 10 p.p.m.	Sodium	< 150 p.p.m
pH	6.5 - 8.5	Electrical conductivity	< 850 μ S/cm

b) In areas with "hard" water (>200ppm), lime scale may form inside the header pipe (direct flow), or inside the storage tanks/heat exchanger (closed loop). In such regions, it is advisable to install a water softening or anti-scale device to ensure the long term efficient operation of the solar water heating system.

✘ *Failure to install and maintain a water softening device in an area with "hard" water may void warranties.*

c) Any heat transfer fluid MUST be GRAS (Generally Recognized As Safe by the FDA) or a dual wall heat exchanger with leak detection must be used. Such liquids should be checked on a periodic basis, ideally once annually, but no less than once every 3 years, or as determined appropriate given experience in that climate and as may be specified by the manufacturer. Refer to 3.31 for more information on heat transfer fluids. As a general rule the following tests should be completed (see also sections 11.5 & 11.9).

- i) Check for cloudiness or "sludging" that would indicate fluid breakdown
- ii) Check pH. It should be within the range specified by the manufacturer
- iii) Use a hydrometer to check freeze protection level

✘ *Performance losses due to scale formation is not eligible for warranty claims.*

✘ *Performance losses or any component failure related to fluid degradation are not eligible for warranty claims.*

Metallic Corrosion

Chloride: Copper is susceptible to corrosion, especially if high concentrations of chloride are present. The solar collector may be used for heating of spa or pool water, but levels of free chlorine must not exceed 5 ppm, otherwise the copper header may corrode.

Copper Corrosion: On rare occasions, corrosion of copper pipe may occur causing blue staining at the point of hot water usage. This corrosion is generally due to either poor water quality or electrical current on the copper pipe due to poor grounding or contact with some electrical appliance or electrical source causing galvanic reactions.

Air Pollutants: Air pollutants such as acid rain, emissions from industrial exhausts and various chemicals in the air may cause corrosion of the collector casing and frame. A site inspection should be completed to identify any potential pollutants prior to installing system.

Coastal Regions: The 439, 301 and 304 grade stainless steels used for Apricus solar collector frames, clips and fasteners are corrosion resistant to salt water. Installation near the sea is not normally a problem. In some coastal regions, the combination of salt spray and living sea microbes can result in rapid corrosion of the stainless steel. In such cases, the frame needs to be cleaned thoroughly and sprayed with an enamel paint to provide protection (zinc based paint is NOT suitable).

Refer also to water quality requirements above.

✘ *Corrosion related damage is not eligible for warranty claims.*

Emergency Shut Down Procedure

In case of emergency please contact your local Apricus installer. If no one is available you can isolate the solar collectors from your domestic hot water system by locating and turning the isolation valves 90°. The isolation valves should be clearly labeled on the solar storage tank.

7. Warranty

For current Apricus warranty information please visit www.apricus.com or contact your local Apricus representative.