



# Apricus Australia

## Heavy Duty Glass-Lined Electric Water Heaters

### Owner's Guide and Installation Manual

For End Users and Installers

Models: AP315GL336  
AP315GL348

#### **Scope:**

This document outlines the owner's instructions and installation manual. By using this manual, you will be able to understand the product better and for the installer, make sound decisions regarding installation.

Last Update Date: 12/10/2015

This manual outlines the installation procedures for correct assembly, installation and safe operation of the heavy duty electric water heaters. This water heater must be installed and serviced by a qualified person in accordance with relevant standards and local authority and OH&S regulations. On completion, sign and leave this guide with the responsible officer.

### **Responsible Officer(s)**

It is recommended that you read through Chapters 1, 7 and 8, the rest of the manual is intended for the installer however it may be of interest.

### **Installer(s)**

Please take the time to read and understand the complete installation requirements as this will ensure a successful and trouble free installation. If you have any questions regarding the installation process, please contact your Apricus Relationship Manager.

### **For Repairs and Service, Call:**

1300 APRICUS (1300 277 428)

### **Notes**

Specifications and materials are subject to change without notice. Images are for illustrative purposes only.

This manual is effective for heavy-duty electric water heaters manufactured and sold after 1 November 2015.

Every care has been taken to ensure accuracy in preparation of this publication. No liability can be accepted for any consequences, which may arise as a result of its application.

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# 1. Warnings and Precautions

## Installer Requirements

Installation of a system must be completed by a licensed plumber and in accordance with the requirements listed below, as well as any relevant local standards and regulations.

- AS/NZS 3500 - National Plumbing and Drainage Code
- AS/NZS 3000 Electrical Installations/ Wiring Rules

<b>IMPORTANT</b>
Use only qualified trades people or Apricus Australia nominated service technicians for installation and repairs. Installations must have electrical and plumbing compliance certificates.

## Occupational Health and Safety

The installer must adhere to occupational health and safety guidelines and other relevant industry associations. Under no circumstances should any installer attempt to install a water heater without reading and understanding this installation manual. For any queries Apricus staff may be contacted on 1300 277 428.

## Over Pressure and Temperature Protection Pressure Temperature Relief Valve (PTRV)

Any system design must allow a means of pressure release at no more than 850kPa, using a PTRV. The PTRV must be mounted in the marked socket and its outlet vented to atmosphere, copper-piped continuously downward in a frost free environment. This ensures that any expelled hot water or air is directed to a safe, frost free and appropriate drainage location.

From time to time the PTRV may discharge small amounts of water under normal operations, this can be up to 10% of tank capacity. If the tank is installed indoors, a safe-tray must be installed

beneath the hot water tank to safely collect any water expelled from the PTRV. The safe operation of this valve prevents the water heater exploding if there is a serious fault.

## Mains Pressure Control

The water heater is designed to operate at mains pressure by connecting directly to the mains water supply. Where the mains pressure supply can exceed or fluctuate beyond the pressure of 500kPa, a pressure-limiting valve must be fitted to the cold mains line. The device is installed after the duo valve (isolation valve and check valve) and should have a pressure limit of 500kPa. Refer to Table 1 for the maximum mains water supply pressures.

Table 1 – Maximum mains water supply pressures

Models	Units	AP315GL336 AP315GL348
PTRV Setting	kPa	850
ECV Setting*	kPa	700
Max Mains Supply Pressure (with ECV)	kPa	580
Max Mains Supply Pressure (without ECV)	kPa	680
Pressure Limiting Valve	kPa	500

\*ECV is not supplied with water heater.

In some states it is a mandatory requirement that an expansion control valve be fitted on the cold mains line to provide a form of pressure relief. A separate drain line must be run for this relief valve (as per AS/NZS 3500). If unsure please check with the local authority.

## Water Quality

Water quality is an important aspect of system lifetime. For the system to be warranted, the water used in the system must meet the water quality requirements as per Table 2.

Table 2 – Water Quality Thresholds

Water Quality	Maximum Allowable Levels
Total hardness	<= 200 mg/litre or ppm
Total dissolved solids	<= 600 mg/litre or ppm
Electrical conductivity	<= 850 $\mu$ S/cm
Chloride	<= 250 mg/litre or ppm
Magnesium	<= 10 mg/litre or ppm
Sodium	<= 150 mg/litre or ppm
pH	Min 6.5 to Max 8.5

If in doubt contact your local water authority or have a water test completed. In areas of poor water quality all major components will have a reduced life due to the hardness of the water.

In areas with "hard water" (>200mg/L or ppm), it is advised to install a water softening device to ensure the long term efficient operation of the system is met. It is also advisable that a glass-lined tank is used as opposed to a stainless steel tank, since the glass-lined tank has a sacrificial anode to protect from corrosion.

## Stagnation and No-Load Conditions

### Hydrogen Build Up

Glass lined (vitreous enamel) tanks are fitted with a Magnesium anode to provide corrosion protection for the tank from the storage water. Small quantities of hydrogen gas can be released by the anode, which generally remains dissolved in the water and flushed away as hot water is used from the tank. Depending on the water quality there may be a degree of hydrogen build-up in the tank if the water heater hasn't been used for two or more weeks.

To resolve the build-up of hydrogen within the tank "purge" the tank for approximately 30 seconds from the lever on the PTRV.

### WARNING

Ensure there are no open flames or ignition sources close to the tank.

### WARNING

This appliance is not intended for use by young children or infirm persons unless they have been adequately supervised by a responsible person to ensure that they can use the appliance safely. Young children should be supervised to ensure that they do not play with the appliance.

### WARNING

This unit can produce water hot enough to burn skin. Delivery temperatures must be controlled as per AS/NZS3500.4

## 2. Installation and Site Inspection

isolation valves are used on the water heater's inlet and outlet lines.

*This water heater is not suitable for use with pool heating applications.*

### Installation Standards

This water heater shall be installed with the following requirements:

- In accordance with the Apricus Heavy Duty Electric Water Heaters Installation Manual
- In compliance with the relevant standards AS/NZS 3500.4, AS/NZS 3000 and all local mandatory, regulatory requirements.
- Installation carried out by qualified person(s).

The water heater must be installed only after completing site inspection, refer to the sections below in this Chapter for details.

### Water Heater Application

- **Use with Potable Water**  
The heavy duty electric water heaters are designed for use with potable water, using alternative fluids may reduce the lifetime of the water heater.
- **Continuous hot water load**  
Should the site require a continuous flow of hot water, the system design must incorporate redundancy to allow for the scenario where a water heater may cease to perform as it normally should for any reason and requires servicing or maintenance. A back-up water heater can ensure the continuous supply of hot water in such cases.
- **Using the Water Heater in Circulated Flow and Return Setup**  
Should the water heater(s) need to be set up to circulate through the ring main of the building/site with flow and return, it must be verified that the water heater thermostat is set to a minimum of 60°C.
- **Using the Water Heater as an in-line booster**  
In such a setup, hot water from a hot water circuit is fed to the heavy duty electric water heater that activates to boost the water to a higher desired temperature. Ensure that

### Storage Tank Location

- **Position the Water Heater near Draw Off Points**  
The storage tank should be located as close as possible to the most frequent draw off points in the building such as the bathroom or kitchen. If the storage tank is located a long way from hot water draw points, a hot water circulation loop on a timer may be considered to reduce the time-lag for water to heat up and resultant water wastage.
- **Avoid Obstructions**  
The tank should not obstruct any windows, doors or exits and should cause minimal intrusion to the existing site (minimum clearances between the rear of the water heater and wall is 100mm). The water heater must also be easy to access for servicing and maintenance purposes (minimum of 900mm from the front of water heater), with the labels clearly visible. Should the water heater be installed outdoors, ensure that the rear side is against a solid wall with the relevant clearance.
- **Anodes**  
For glass-lined tanks, consider the requirement of anode removal and replacement maintenance.
- **Safe Trays**  
The storage tank may be installed in a safe tray that complies with AS/NZS 3500.4 and all local codes and regulatory authority requirements with regards to its construction, installation and draining. Tanks installed outside must be installed on a suitable, level concrete slab, away from pooling water.

### Transportation of Components

- When transporting boxes, note the orientation of the "THIS WAY UP" arrows.

- Ensure all boxes are strapped and secured to prevent movement during transit.
- All tanks must be transported upright. Stacking is not recommended for any tanks.
- Products should always be handled with care. Damage incurred during the transportation is not covered under product warranty.

### **Unpacking of Components**

- When unpacking, take care to ensure that the components are not damaged in the process.
- Avoid using sharp blades or knives as this can scratch the surfaces of the products particularly the tanks.
- Carefully remove all packaging and transit protection from the heater before installation. Dispose of the packaging responsibly using recycling facilities where they exist.

### **Total Dissolved Solids (TDS) and Anodes**

Heavy Duty Electric water heaters that are glass-lined are not covered by Apricus warranty if the anode used in the water heater does not match the allowable TDS. Using incorrect anodes can damage and reduce the lifetime of the water heater.

Refer to Chapter 1 in Water Quality section for further information on water quality thresholds.

### 3. Plumbing Connections

#### Pipe Size

For commercial installations, the recommended pipe size is 1 ¼”.

Two factors affect the choice of pipe sizing, the flow rate and pressure drop. These two factors are closely related; a higher pressure drop will reduce the flow rate. Pressure drop increases with decreased pipe diameters as well as the presence of bends, elbows and other components that restrict flow.

It may be necessary for some installations with numerous pipe bends and significant pipe runs to increase the pipe diameter to reduce the pressure drop. All pipe work must be installed in accordance with AS/NZS 3500.4

#### IMPORTANT

It is necessary that all valves and fittings used are solar rated due to high temperatures that can be experienced.

#### Pipe Insulation

Insulate all pipes running to and from the manifold with insulation of at least 15mm thickness, or 25mm in cold climates. Also, ensure the insulation is tight against the all ports (minimizing the loss of heat from any exposed areas).

#### IMPORTANT

All insulation needs to be solar-rated. Any insulation exposed to sunlight must be UV-stabilized.

#### Storage Tank

The Apricus Heavy Duty Electric tanks contain three ports.

1. Inlet (Mains): Inlet line from mains water supply
2. Outlet: Outlet line to load
3. PTRV: Pressure temperature relief valve location.

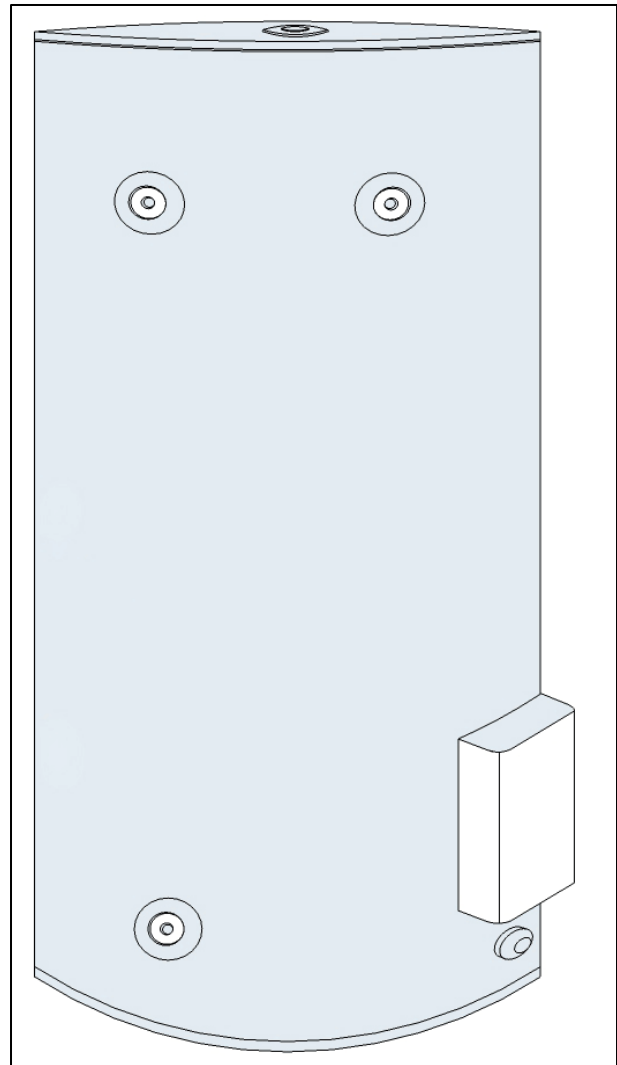


Figure 1 Apricus Heavy Duty Electric Storage Tank

All ports on an Apricus Australia Heavy Duty Glass-Lined Electric storage tank are of 32mm (1 ¼”)BSP, with the exception of PTRV port which is 20mm (3/4”) BSP.

All fittings must be sealed using thread sealing tape such as Teflon tape or any approved thread sealant. Copper olives must be used with all compression fittings.

#### IMPORTANT

Apricus tanks must be installed in accordance to AS/NZS 3500.4 as well as any other relevant local/government standards.



## Inlet (Mains)

The mains line should consist of the following brass components when installing:

- Duo valve
- Cold Water Expansion control valve (Required by some local authorities)
- Pressure Reducing Valve
- Four-Way Cross (Required if tempering valve is used)
- Tempering Valve (Required depending on the application type)

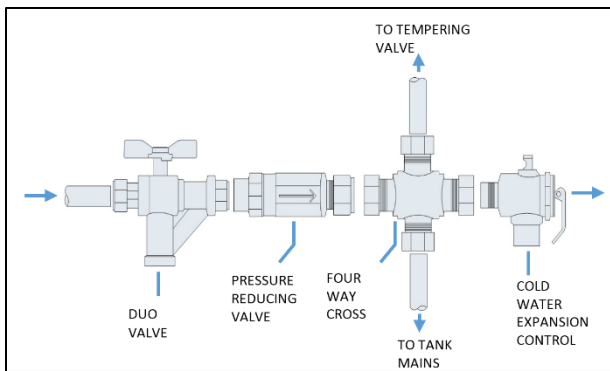


Figure 2 Mains Line Valves

The set of mains line valves can be purchased as a kit from Apricus and provides the above components with insulating jackets to streamline the installation process.

Note that the inlet pressure or maximum mains supply pressure without an ECV should not exceed 680kPa. A pressure reducing valve must be fitted to maintain the correct inlet pressure.

It is recommended that a cold water expansion relief valve is fitted to reduce pressure buildup during the heating cycle and save heating energy. All attached valves and pipes should be lagged to save energy.

### IMPORTANT

The valve or drain valve outlet pipe must not be sealed or blocked.

In order to limit the hot water to outlets for bathrooms, amenities, etc. it is recommended that a tempering valve is installed between the water

heater and the fixture in accordance with AS/NZS3500.4. Refer to the figure above for the location of the valve.

## Outlet

The outlet is where the hot water from the tank is extracted to be supplied to the load.

## PTRV Port

The PTRV port is where the tank 'pressure and temperature relief valve' is to be installed. All PTRV's must be fitted with a copper drain pipe to carry any discharge to an appropriate drain. The water heater must have a PTRV installed before it is operated.

### IMPORTANT

All storage tanks include a PTRV, which is located under a plastic cover near base of the tank packaging support.

## 4. Electrical Connections

### Boosting Explained

If the water inside the tank is not at the desired temperature, the electric elements switch on and raise the water to a suitable temperature.

### Legionella Bacteria - Importance of Boosting

It is a legal requirement that water be heated on a regular basis to kill Legionella bacteria that can lead to Legionnaires disease. The frequency that this temperature must be reached varies, and is explained in the table below.

Table 3 Minimum Heat Requirements

Type of Apricus System Installed	Minimum Heat Requirements
Bottom elements electric boosted system	Once per week to 60°C for 32 minutes

### Thermostat Setting

The water heater has an adjustable thermostat that controls the electricity supply to the electric elements automatically such that a constant water temperature is achieved in the tank. The over temperature cut out and thermostats are located on the front side of the water heater underneath a cover.

The thermostat should be set to 60°C or above as per AS/NZS 3498.

The temperature setting on thermostat can be adjusted by a licensed tradesperson only. It is recommended by Apricus that the thermostat is set to the lowest temperature setting that can meet the hot water needs at the site.

When the electric element is activated it will heat up all the water above the element to the lowest thermostat temperature setting that meets the

site's hot water needs. This heating can take as long as 2-3 hours if the tank is cold.

Note: Apricus recommends that the electric water heater is left on, or controlled by a suitable timer. The water heater should not be switched off when it is not in use as the thermostats are fully automatic and power is only drawn when heating is required.

This unit is fitted with over temperature electrical cutout, thermostat and a pressure and temperature relief valve (see Pressure Temperature Relief Valve section). Apricus advises that this water heater is not to be operated unless these features are present and in working condition.

#### WARNING

The water heater uses 240V/415V AC power for the electrically operated components. Removing the front cover exposes the wiring.

The equipment must not be interfered with and must only be serviced by a suitably qualified technician.

### Installation of Electrical Connections

The unit must be installed by a licensed tradesman in accordance with AS/NZS3000. Means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under over-voltage category III conditions must be incorporated in the fixed wiring in accordance with the wiring rules.

#### IMPORTANT

All electrical connections must be completed by an authorized and licensed person.

The electrical elements will be required to be directly connected to a 240V AC 50Hz mains power supply or three phase 415V AC star supply with one element per phase for the triple element heavy duty water heaters.

See wiring diagram below.

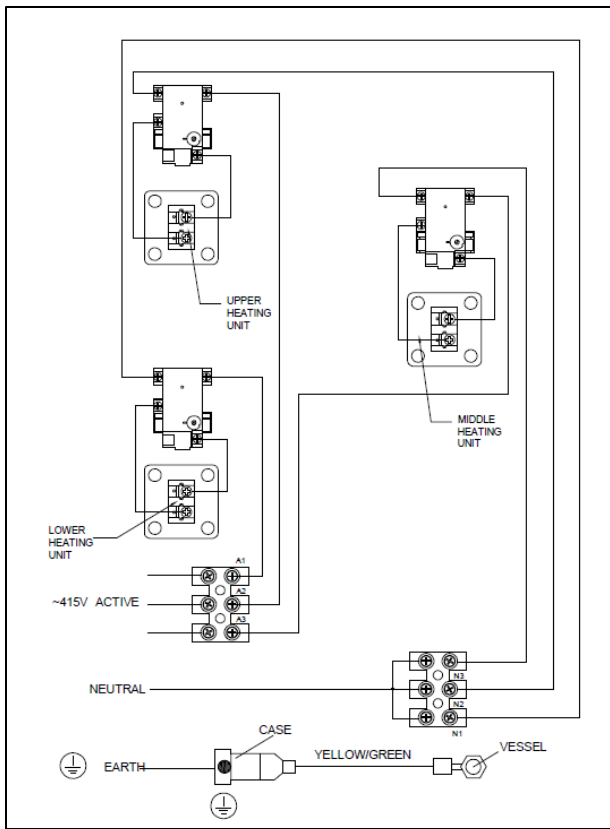


Figure 3 Electric Element Wiring with Thermostat for triple element models.

Flexible conduit is required to enclose any exposed electrical cables to the storage unit.

## 5. Commissioning

### Filling and Air Purging

#### IMPORTANT

Power Supply to the electric water heater must be off until the water heater is filled with water and a satisfactory megger reading is obtained.

To fill the water heater:

1. Open the cold mains line and fill up the tank, then open the hot water outlet or hot water taps in the building (including any showers, supply cocks and valves in the system).
2. This includes opening the isolation valves fully on the cold and hot water lines to the water heater(s) installed in a bank and opening the cold water isolation valve on the cold water line to the water heater(s).
3. Filling is completed once there is a constant stream of water exiting from the taps as air is forced out.
4. Close all hot water taps in the building.
5. Inspect the piping to ensure there are no leakages.
6. Electricity supply to the water heater(s) isolating switch should be switched on at this point.
7. Once the system reaches its working temperature, the pipework needs to be inspected again for leakages.
8. The operation and functions of the water heater must be explained to the end user or responsible officer.
9. Once the system is installed and commissioned completely, the end user or responsible officer must have a copy of this guide left with them.

### Turning off the Water Heater

Following the completion of installation and commissioning it may be necessary to turn off the

water heater in cases where the building premises are vacant.

To turn off the water heater:

1. Electricity supply to the water heater(s) isolating switch should be switched off.
2. The cold water isolation valve on the cold water line to the water heater(s) must be closed in order to stop the system. Otherwise; closing the isolation valves on the cold and hot water branches to shut down an individual water heater(s) in a bank.

## 6. Post Installation

To ensure optimal operation and to maintain the integrity of Apricus solar hot water systems, the post installation checklist involves important tasks that must be completed. Ensure that each of the following processes is carried out prior to leaving the site.

### Checklist Prior to Leaving Installation Site

- System check: Check all connections for leaks and that all components are installed as per this manual.
- Take photos of all system components for warranty purposes. This should include photos of the plumbing lines to and from the tank.
- Note down the Tank Serial Number
- Fill out the installation record form supplied for heavy duty electric water heater warranty and service issues. This is located in the back of this manual following the warranty policy.
- Submit your Installation Record Form via Email: [warranty@apricus.com.au](mailto:warranty@apricus.com.au)  
In the subject heading, please enter 'Heavy Duty Electric Tank – Installation Record Form'

## 7. Maintenance

Please refer to the manufacturer's documentation for any non-Apricus components for maintenance guidelines.

Maintenance and servicing should only be completed by a certified plumber, with experience in heavy duty electric water heaters.

The following regular care is recommended to maintain the tank. The responsible officer is recommended to carry out the following minor maintenances every six months.

### Draining the Water Heater

The unit should be isolated at the stop cock and also electrically. Depressurize the unit with the pressure and temperature relief valve by gently lifting and hold the valve lever open while draining the unit. Remove inlet pipe fitting to drain water, again gently lifting the lever to break the vacuum. Failure to hold the pressure and temperature relief valve open during draining may result in a vacuum implosion, which will void the warranty.

To drain the water heater:

1. Follow the instructions in the section 'Turning off the water heater'.
2. Close all hot water taps in the building.
3. Gently lift the PTRV lever to release the pressure in the water heater.

#### IMPORTANT

Water released through the PTRV may be of a very high temperature, care must be exercised to gently lift and lower the lever.

4. The cold water inlet union must be undone, and a hose attached in its place at the water heater cold inlet. The opposite end of the hose must be placed near a drain.
5. Release the PTRV lever again to allow air to enter the tank and water to drain through the hose.

### Over Pressure Protection Maintenance

The lever on the PTRV should be carefully lifted and placed down once every 6 months to remove any debris of scale build up and verify the valve is not blocked. It is important to slowly and gently lift and release the lever to avoid damaging the valve. Water should flow out. If the valve is always leaking water, or does not flow when the lever is pulled, it must be repaired by a licensed tradesman. The valve should be replaced every 5 years or sooner in hard water areas.

#### WARNING

Exercise caution and stand clear of the valve to avoid hot water relieved from the PTRV from splashing.

This should be similarly done for the expansion control valve on the cold mains line (if there is one installed). Ensure that the lever is lifted and lowered gently.

### Safe Tray Drain Line

Check that the drain line from the safe tray (if there is one installed) is not blocked.

### Magnesium Anode Replacement

Glass lined storage tanks have a magnesium anode inserted into the tank. The anode prevents internal corrosion that will otherwise drastically shorten storage tank life. Apricus recommends the anode be inspected at least every three (3) years, and serviced as required.

A qualified person must be used to change the anode.

## 8. Troubleshooting

The points below must be confirmed prior to contacting Apricus regarding a service call. Unless the fault is related to manufacture or failure of a component, you will be charged.

Therefore Apricus urges you to run through the following points.

## Not enough or No Hot Water

- **Is your Electricity Supply switched on?**  
Check that the electricity supply is switched on by verifying that both isolating switches, at the switchboard (marked 'HOT WATER' or 'WATER HEATER') and near the water heater (if it is present) are at the 'ON' position.

It is important to note that in the case where an off-peak or timer is used with the electricity supply it dictates the hours in the day that the electricity supply is switched 'ON' for.

Inspect the fuse at the switchboard marked 'HOT WATER' or 'WATER HEATER'.

- **Are you using more hot water than you think?**  
It may be possible that at the points of hot water use (particularly at fixtures such as showers), more hot water than what is assumed to be used may be used.

You may reduce water usage by having a plumber install flow control valves to each shower rose to minimize the hot water usage.

- **Is the PTRV discharging too much hot water?**  
Refer to the chapter 1 in the PTRV section.
- **How can I minimize the amount of hot water being discharged at the PTRV?**  
Installing a cold water expansion valve can significantly reduce the amount of hot water being discharged at the PTRV. Read more about it in Chapter 3 in the plumbing connections on the cold mains line section.
- **Is the Thermostat setting correct?**  
Ensure that the appropriate setting is used for the thermostat. Refer to Chapter 4 in Thermostat Settings section for further information.

A qualified person may increase the setting on the thermostat if the end user requires a greater hot water capacity than the minimum required.

### WARNING

Exercise caution as higher temperature water can cause a greater risk of scald injuries.

- **No water from the hot outlet taps**  
If no hot water is available from hot water outlets, it may be an indication that the cold water supply to the water heater has failed or been restricted.

Observe the water flow at other taps at the site and that the cold water isolation valve is fully open.

- **Is your water not hot enough?**  
Heavy hot water usage can lead to lower than normally expected hot water. Your water heater may not be appropriately sized to meet your hot water requirements in such a scenario.

Apricus has a sizing guide to suggest average sizes that may be required for different hot water applications. The Apricus sales literature and guide can be found on the website ([www.apricus.com.au](http://www.apricus.com.au)).

## Pressure Temperature Relief Valve

The PTRV is expected to release hot water. The levels of hot water discharged can be observed as fitting within the following categories:

- **Normal Operation**  
Small quantities (less than 2% of hot water used) released by the valve during the heating cycle is considered normal operation. Any more than this much hot water being released can be considered excessive and may be an indicator of another problem.

- **Continuous Dribble**

Continuously dribbling hot water at the PTRV may be caused by foreign matter being lodged within the valve. Refer to Chapter 8 in Over Pressure Protection Maintenance section for instruction on how to remove any debris.

- ***Steady Flows for Prolonged Periods (often at night)***

It is likely that the mains water pressure is being exceeded at times above the pressure that the water heater is designed for. A pressure limiting valve can be fitted on the cold-mains line to reduce the pressure of the system.

**WARNING**

Never replace a PTRV with a higher pressure rated PTRV.

- ***Heavy flows of hot water until water heater is cold, then stops until water reheats.***

The water heater must be switched off at the isolating switch or switchboard. Contact Apricus or their nearest Accredited Service Agent to arrange for an inspection.

### Expansion Control Valve (ECV) Running

- ***Why is the ECV running and discharging cold water instead of the PTRV?***

The ECV is functioning under normal operation, where it relieves the increase in pressure caused by water expansion during the normal heating cycle. The ECV will relieve cold water, not hot water, so that there is some energy saving and the PTRV's lifetime is increased. Refer to Chapter 3 in Inlet Mains section for the location of the ECV on the cold mains line.

### Higher than Expected Electricity Bills

- ***What could be the reason behind higher than expected electricity bills?***

Should you find that you feel as though your electricity bills are much higher than you might expect, it is important to run through the following points:

- **Is the PTRV running excessively?**

Refer to Chapter 8 in PTRV section.

- **Are the hot water outlets using more hot water than you might think?**

Refer to Chapter 8 in Not Enough or No Hot Water section.

- **Is there a leaking hot water pipe, dripping hot water tap or anything, etc.?**

Inspect all pipework to ensure there are no leaks as even a small leak can lead to significant wastage of hot water and electricity. Have your plumber fix any leakages and replace any faulty outlet fixtures at the site.

- **Has hot water usage increased at the site?**

If hot water usage increased at the site, then the water heater operation also increases.

- **Has your electricity retailer increased the electricity tariff since your previous account?**

The electricity tariff to which your water heater is connected to will determine the overall operating cost of the system. Ensure that you are aware of the tariff being used, whether it continuous or is a time controlled supply. Contact your electricity retailer/supplier for more information relating to your water heater tariff rate.

If you have checked the above points and still believe that you may need assistance, contact Apricus or their nearest Accredited Service Agent.



## 9. Warranty

The Heavy Duty Glass Lined Electric Water Heaters have a 7 year warranty period, conditional upon the maintenance requirements as per the Apricus Australia commercial warranty policy.

For the range of Heavy Duty Electric Glass-lined water heaters, the warranty periods are conditional upon the type of component and perceived issue of that component.

- i. Inner Cylinder leakage warranty period is 7 years for parts only, 1 year for parts and labour;
- ii. Water heater casing undergoing corrosion and/or paint peeling warranty period is 3 years for parts only, 1 year for parts and labour.
- iii. Heating element failure warranty period is 1 year for parts only and parts and labour.
- iv. PTRV failure and leaking warranty period is 1 year for parts only and parts and labour.
- v. Thermostat failure warranty period if 1 year for parts only and parts and labour.

Note that the warranty period shall begin from the date of installation, where there is no record of this, the warranty period shall begin 60 days from the date of manufacture.

Refer to the Apricus commercial warranty policy document for full terms and conditions.

[www.apricus.com.au](http://www.apricus.com.au)

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