

Owner's Guide and Installation Instructions



Electric Domestic Water Heater



*This water heater must be installed and serviced by a qualified person.
Please leave this guide with the householder.*

PATENTS

This water heater may be protected by one or more patents or registered designs in the name of Rheem Australia Pty Ltd.

TRADEMARKS

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Note: Every care has been taken to ensure the 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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HOUSEHOLDER - We recommend you read pages 4 to 19.

The other pages are intended for the installer
but may be of interest.

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ABOUT YOUR WATER HEATER

WATER HEATER APPLICATION

This water heater is designed for use in a single family domestic dwelling for the purpose of heating potable water. Its use in an application other than this may shorten its life.

MODEL TYPE

Vulcan[®] water heater models are available with either a single heating unit or with twin heating units (refer to “[Single Element Model](#)” on page 7 and “[Twin Element Model](#)” on page 7). A water heater with a supply cord and plug or an ‘045’ model is suitable for indoor installation only. All other water heaters can be installed indoor or outdoor.

Water is stored in a vitreous enamel lined steel cylinder and heated by the electric immersion heating unit. The thermostat controls the temperature.

Automatic safety controls are fitted to the water heater to provide safe and efficient operation.

MAINS PRESSURE

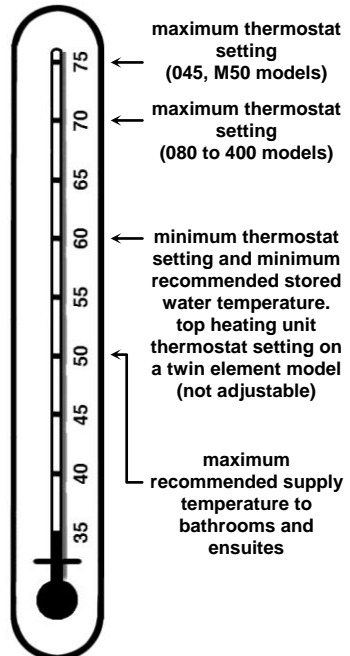
The water heater is designed to operate at mains pressure by connecting directly to the mains water supply. If the mains supply pressure in your area exceeds that [shown on page 22](#), a pressure limiting valve must be fitted. The supply pressure should be greater than 350 kPa for true mains pressure operation to be achieved.

HOW HOT SHOULD THE WATER BE?

The water heater features an adjustable thermostat, which allows you to choose the most suitable temperature for your hot water needs. Refer to “[Temperature Adjustment](#)” on page 5.

To meet the requirements of the National Plumbing Standard the temperature of the stored water must not be below 60°C.

If this water heater is installed as part of a solar water heating system, we recommend the thermostat is set at 60°C to maximise solar contribution.



HOTTER WATER INCREASES THE RISK OF SCALD INJURY

This water heater can deliver water at temperatures which can cause scalding. Check the water temperature before use, such as when entering a shower or filling a bath or basin, to ensure it is suitable for the application and will not cause scald injury.

We recommend and it may also be required by regulations that an approved temperature limiting device be fitted into the hot water pipe work to the bathroom and ensuite when this water heater is installed. This will keep the water temperature below 50°C at the bathroom and ensuite. The risk of scald injury will be reduced and still allow hotter water to the kitchen and laundry.

THERMOSTAT

The thermostat automatically controls the electricity supply to the heating unit so a constant temperature is maintained. The thermostat and its protective over temperature cut out is mounted inside the front cover of the water heater. There is no need to switch the water heater off when it is not in use, except when you are on an extended holiday. The thermostat is fully automatic and power is only used when heating is required.

TEMPERATURE ADJUSTMENT

The water heater features a tradesperson adjustable thermostat, which allows you to select the most suitable temperature for your hot water needs. This requires a licensed tradesperson to make any temperature adjustments. The thermostat has a maximum temperature setting of 70°C (75°C for 045 and M50 models) and a minimum temperature setting of 60°C.

We advise you have your electrician adjust the thermostat to the lowest temperature setting that meets your needs, especially if there are young children or elderly people in your home. Refer to [“Hotter Water Increases the Risk of Scald Injury”](#) on page 5.

 WARNING

This water heater is only intended to be operated by persons who have the experience or the knowledge and the capabilities to do so. This water heater is not intended to be operated by persons with reduced physical, sensory or mental capabilities i.e. the infirm, or by children. Children should be supervised to ensure they do not interfere with the water heater.

This water heater uses 240 V AC power for the electrically operated components. The removal of the front cover(s) will expose 240 V wiring. It must only be removed by a qualified person.


Take care not to touch the power plug on a water heater fitted with a power supply cord and plug with wet hands.

SAFETY

This water heater is supplied with a thermostat, an over-temperature cut-out, and a combination temperature pressure relief valve. These devices must not be tampered with or removed. The water heater must not be operated unless each of these devices is fitted and is in working order.

The operation of the over-temperature cut-out on the thermostat indicates a possibly dangerous situation. If the over-temperature cut-out operates, it must not be reset and the water heater must be serviced by a qualified person.

If the power supply cord, plug or electrical conduit to the water heater is damaged, it must be replaced by a qualified person in order to avoid a hazard. The power supply cord and plug must be replaced with a genuine replacement part available from Rheem. Phone Rheem Service or their nearest Accredited Service Agent to arrange for an inspection.

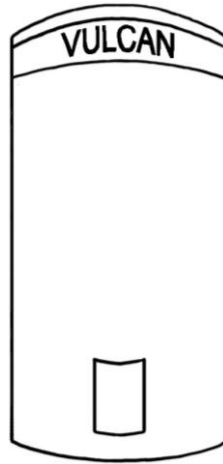
 Warning: For continued safety of this water heater it must be installed, operated and maintained in accordance with the Owner's Guide and Installation Instructions.

The Vulcan warranty may not cover faults if relief valves or other safety devices are tampered with or if the installation is not in accordance with these instructions.

SINGLE ELEMENT MODEL

This type of water heater has one heating unit with its own thermostat. The heating unit is at the base of the water heater.

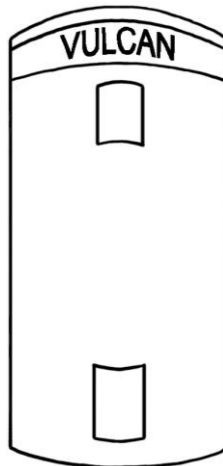
- **Continuous electricity supply**
This type of connection is suited to where the storage capacity is less than the normal daily usage.
- **Off-Peak electricity supply**
This type of connection will only allow heating to occur during set hours. A volume of water sufficient for the day's total use is heated and stored. This type of heating will be more economical due to reduced tariffs by the electricity authority.



TWIN ELEMENT MODEL

This type of water heater has two heating units, each with its own thermostat. One heating unit is at the base of the water heater and the other near the top.

- **Bottom heating unit**
During normal operation this heating unit supplies all the hot water.
- **Top heating unit (Booster)**
This heating unit only operates during periods of high demand to provide an additional supply of heated water.
- **Electrical connection**
The two heating units are wired for non-simultaneous operation, so that only one heating unit can operate at a time. The bottom heating unit is usually connected to an Off-Peak (overnight) or time controlled electricity supply and the top heating unit to a continuous supply. Some electricity suppliers allow both heating units to be metered at the Off-Peak or controlled tariff.



NOTE: Power must be available to the top heating unit circuit at all times for this water heater to operate as designed.

PRECAUTIONS

Where damage to property can occur in the event of the water heater leaking, the water heater must be installed in a safe tray. Construction, installation and draining of a safe tray must comply with AS/NZS 3500.4 and all local codes and regulatory authority requirements.

The water heater must be maintained in accordance with the Owner's Guide and Installation Instructions. Refer to "[Regular Care](#)" on page 10 and to "[Anode Inspection and Replacement](#)" on page 14.

If this water heater is to be used where an uninterrupted hot water supply is necessary for your application or business you should ensure that you have back up redundancy within the hot water system design. This should ensure the continuity of hot water supply in the event that this water heater were to become inoperable for any reason. We recommend you seek advice from your plumber or specifier about your needs and building back up redundancy into your hot water supply system.

TO TURN OFF THE WATER HEATER

If you plan to be away from home for only a few nights, we suggest you leave the water heater switched on.

If it is necessary to turn off the water heater:

- Switch off the electrical supply at the isolating switch to the water heater.
- Unplug the power supply cord from the power outlet (power supply cord model only).
- Close the cold water isolation valve at the inlet to the water heater.

TO TURN ON THE WATER HEATER

- Open the cold water isolation valve fully on the cold water line to the water heater.
- Plug in the power supply cord at the power outlet (power supply cord model only).
- Switch on the electrical supply at the isolating switch to the water heater.

GOING ON HOLIDAY?

If you plan to be away from home for one or two nights, we suggest you leave the water heater switched on. However, if you plan to stay away more than a few nights, conserve energy by switching the water heater off at either the switchboard or isolating switch.

HOW DO I KNOW IF THE WATER HEATER IS INSTALLED CORRECTLY?

Installation requirements are shown on [pages 20 to 27](#). The water heater must be installed:

- by a qualified person, and
- in accordance the installation instructions, and
- in compliance with Standards AS/NZS 3500.4, AS/NZS 3000 and all local codes and regulatory authority requirements.

In New Zealand the installation must also conform with the New Zealand Building Code.

VICTORIAN CUSTOMERS

Notice to Victorian Customers from the Victorian Plumbing Industry Commission. This water heater must be installed by a licensed person as required by the Victorian Building Act 1993.

Only a licensed person will give you a Compliance Certificate, showing that the work complies with all the relevant Standards. Only a licensed person will have insurance protecting their workmanship for 6 years. Make sure you use a licensed person to install this water heater and ask for your Compliance Certificate.

DOES THE WATER CHEMISTRY AFFECT THE WATER HEATER?

The water heater is suitable for most public water supplies, however some water chemistries may have detrimental effects on the water heater, its components and fittings. Refer to [“Water Supplies”](#) on page 13.

If you are in a known harsh water area or you are not sure of your water chemistry, have your water checked against the conditions [described on pages 13 to 16](#).

HOW LONG WILL THE WATER HEATER LAST?

The water heater is supported by a manufacturer’s warranty ([refer to page 38](#)). There are a number of factors that will affect the length of service the water heater will provide. These include but are not limited to the water chemistry, the water pressure, the water temperature (inlet and outlet) and the water usage pattern. Refer to [“Precautions”](#) on page 8.

REGULAR CARE

MAJOR FIVE YEAR SERVICE

It is recommended a major five year service be conducted on the water heater. The service must be conducted by a qualified person. Phone Rheem Service or their nearest Accredited Service Agent.

Note: The five year service and routine replacement of any components, such as the anode and relief valve(s), are not included in the Vulcan warranty. A charge will be made for this work. Only genuine replacement parts should be used on this water heater.

The major service includes the following actions:

- Replace the temperature pressure relief valve.
- Inspect and flush the expansion control valve (if fitted). If required, replace the valve.
- Inspect and if required, replace the anode.
If the anode is not replaced, it should be replaced within three years of this service (refer to [“Anode Inspection and Replacement”](#) on page 14).
- Check the electric heating unit for excessive calcium build up or corrosion and replace if necessary.
- Visually check the unit for any potential problems.
- Inspect all connections.
- Check the drain line from the safe tray (if one is installed) is not blocked.


Note: The water heater may need to be drained during this service. After the completion of the service, the water heater will take some time to reheat the water. Depending upon the power supply connection, hot water may not be available until the next day.

MINOR SIX MONTH MAINTENANCE

It is recommended minor maintenance be performed every six months by the dwelling occupant.

The minor maintenance includes:

- Operate the easing lever on the temperature pressure relief valve. It is very important you raise and lower the lever gently. Refer to “[Temperature Pressure Relief Valve](#)” on page 12.

 **Warning:** Exercise care to avoid any splashing of water, as water discharged from the drain line will be hot. Stand clear of the drain line’s point of discharge when operating the valve’s lever.

- Operate the easing lever on the expansion control valve (if fitted). It is very important you raise and lower the lever gently. Refer to “[Expansion Control Valve](#)” on page 11.
- Check the drain line from the safe tray (if one is installed) is not blocked.

EXPANSION CONTROL VALVE

In many areas, including South Australia, Western Australia and scaling water areas, an expansion control valve is fitted to the cold water line to the water heater. The expansion control valve may discharge a small quantity of water from its drain line during the heating period instead of the temperature pressure relief valve on the water heater.

Operate the easing lever on the expansion control valve once every six months. **It is very important you raise and lower the lever gently.** The expansion control valve should be checked for performance or replaced at intervals not exceeding 5 years, or more frequently in areas where there is a high incidence of water deposits.

TEMPERATURE PRESSURE RELIEF VALVE

This valve is near the top of the water heater and is essential for its safe operation. It is possible for the valve to release a little water through the drain line during each heating period. This occurs as the water is heated and expands by approximately 1/50 of its volume.

Continuous leakage of water from the valve and its drain line may indicate a problem with the water heater (refer to “[Temperature Pressure Relief Valve Running](#)” on page 18).

⚠ Warning: Never block the outlet of this valve or its drain line for any reason.

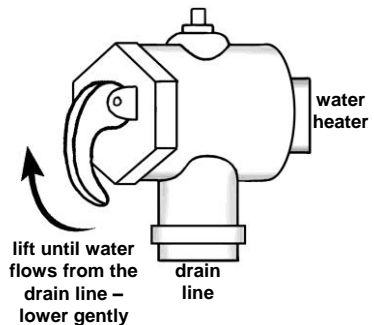
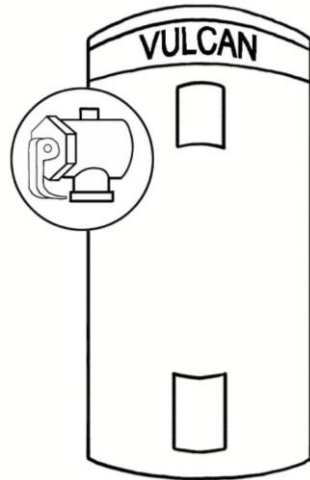
Operate the easing lever on the temperature pressure relief valve once every six months. **It is very important you raise and lower the lever gently.**

⚠ DANGER: Failure to do this may result in the water heater cylinder failing, or under certain circumstances, exploding.

⚠ Warning: Exercise care to avoid any splashing of water, as water discharged from the drain line will be hot. Stand clear of the drain line’s point of discharge when operating the valve’s lever.

If water does not flow freely from the drain line when the lever is lifted, then the water heater must be checked. Phone Rheem Service or their nearest Accredited Service Agent to arrange for an inspection.

The temperature pressure relief valve should be replaced at intervals not exceeding 5 years, or more frequently in areas where there is a high incidence of water deposits (refer to “[Water Supplies](#)” on page 13).



WATER SUPPLIES

This water heater must be installed in accordance with this advice to be covered by the Vulcan warranty.

This water heater is manufactured to suit the water conditions of most public reticulated water supplies. However, there are some known water chemistries which can have detrimental effects on the water heater and its operation and / or life expectancy. If you are unsure of your water chemistry, you may be able to obtain information from your local water supply authority. This water heater should only be connected to a water supply which complies with these guidelines for the Vulcan warranty to apply.

ANODE

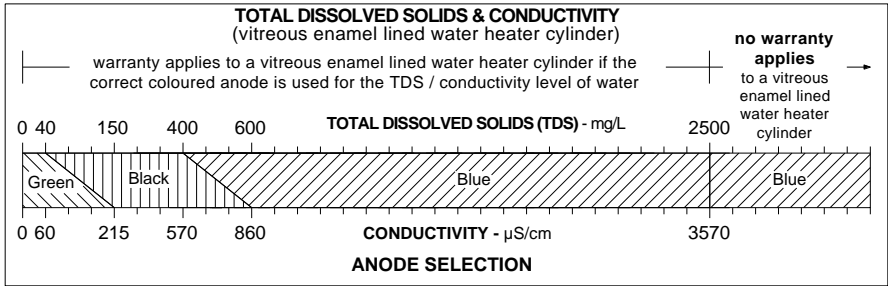
The vitreous enamel lined cylinder of the water heater is only covered by the Vulcan warranty when the total dissolved solids (TDS) content in the water is less than 2500 mg/L and when the correct colour coded anode is used. If an incorrect colour coded anode is used in the water heater, any resultant faults will not be covered by the Vulcan warranty. In addition, the use of an incorrect colour coded anode may shorten the life of the water heater cylinder.

The correct colour coded anode must be selected and fitted to the water heater in accordance with the following advice and the [Anode Selection chart](#) on page 14 for the Vulcan warranty to apply to the water heater cylinder.

Total Dissolved Solids	Anode colour code
0 – 40 mg/L	Green
40 – 150 mg/L	Green or Black
150 – 400 mg/L	Black
400 – 600 mg/L	Black or Blue
600 – 2500 mg/L	Blue
2500 mg/L +	Blue (no cylinder warranty)

The changing of anodes must be carried out by a qualified person.

Note: Some water analysis reports may state the conductivity of the water rather than the level of total dissolved solids. Conductivity, measured in microsiemens per centimetre ($\mu\text{S} / \text{cm}$), is directly proportional to the TDS content of the water. TDS, in mg / L, is approximately 70% of the conductivity in $\mu\text{S} / \text{cm}$.



ANODE INSPECTION AND REPLACEMENT

The anode installed in your water heater will slowly dissipate whilst protecting the cylinder. The life of the cylinder may be extended by replacing the anode.

If the anode is not replaced during a five year service (refer to “Major Five Year Service” on page 10) then the maximum time after installation when the anode should be replaced for this electric water heater is 8 years.

For water supplies which are either softened, desalinated or where the water supply may alternate between a water tank and a reticulated public supply or another supply, it is recommended the anode be replaced within 5 years of installation.

CAUTION

If the water supply has a TDS greater than 150 mg/L and a green anode has not been changed to a black anode, or if the TDS is greater than 600 mg/L and the anode has not been changed to a blue anode, there is the possibility the anode may become overactive and hydrogen gas could accumulate in the top of the water heater during long periods of no use.

If, under these conditions, the water heater has not been used for two or more weeks the following procedure should be carried out before using any electrical appliances (automatic washing machines and dishwashers) which are connected to the hot water supply.

The hydrogen, which is highly flammable, should be vented safely by opening a hot tap and allowing the water to flow. There should be no smoking or naked flame near the tap whilst it is turned on. Any hydrogen gas will be dissipated. This is indicated by an unusual spurting of the water from the tap. Once the water runs freely, any hydrogen in the system will have been released.

SATURATION INDEX

The saturation index is used as a measure of the water’s corrosive or scaling properties.

In a corrosive water supply, the water can attack copper parts and cause them to fail. Where the saturation index is less than -1.0, the water is very corrosive and the Vulcan warranty does not apply to a copper sheathed heating unit. A corrosion resistant heating unit must be used for the Vulcan warranty to apply to the heating unit.

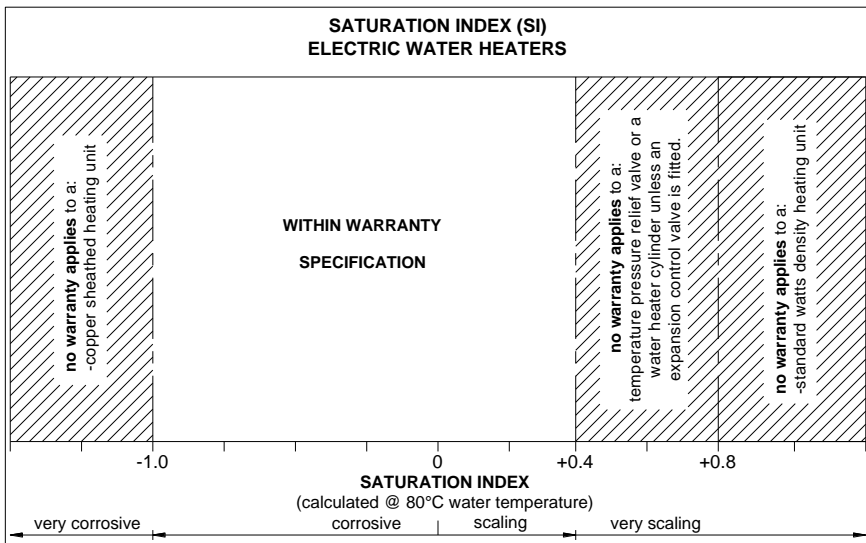
In a scaling water supply calcium carbonate is deposited out of the water onto any hot metallic surface. Where the saturation index exceeds +0.40, the water is very scaling. An expansion control valve must be fitted on the cold water line after the non-return valve to protect and for the Vulcan warranty to apply to the temperature pressure relief valve and water heater cylinder.

Where the saturation index exceeds +0.80, the Vulcan warranty does not apply to a standard watts density heating unit. A low watts density heating unit must be used for the Vulcan warranty to apply to the heating unit.

Water which is scaling may be treated with a water softening device to reduce the saturation index of the water.

Refer to the [Saturation Index chart](#) on page 15. Refer to the [cold water connection detail](#) on page 29 for the position of the expansion control valve.

Contact Rheem Service or their nearest Accredited Service Agent if a replacement heating unit is required.



CHANGE OF WATER SUPPLY

The changing or alternating from one water supply to another can have a detrimental effect on the operation and / or life expectation of a water heater cylinder, a temperature pressure relief valve and a heating unit.

Where there is a changeover from one water supply to another, e.g. a rainwater tank supply, bore water supply, desalinated water supply, public reticulated water supply or water brought in from another supply, then water chemistry information should be sought from the supplier or it should be tested to ensure the water supply meets the requirements given in these guidelines for the Vulcan warranty to apply.

SUMMARY OF WATER CHEMISTRY ADVICE AFFECTING WARRANTY

The water heater and its components are not suitable for certain water chemistries. Those chemistries are listed below. If the water heater is connected at any time to a water supply with the following water chemistry, the Vulcan warranty will not cover any resultant faults on the components listed below:

Water Chemistry	Component
Total Dissolved Solids (TDS) > 2500 mg/L	water heater cylinder
Total Dissolved Solids (TDS) not suitable for anode type	water heater cylinder
Saturation Index (SI) < -1.0	copper sheathed heating unit
Saturation Index (SI) > +0.4 (if expansion control valve is not fitted)	water heater cylinder temperature pressure relief valve
Saturation Index (SI) > +0.8	standard watts density heating unit

SAVE A SERVICE CALL

Check the items below before making a service call. You will be charged for attending to any condition or fault that is not related to the manufacture or failure of a part.

NOT ENOUGH HOT WATER (OR NO HOT WATER)

- **Is the electricity switched on?**

Inspect the isolating switch marked “HOT WATER” or “WATER HEATER” at the switchboard and the isolating switch (if one is installed) near the water heater and ensure they are turned on.

Note: Check the electricity supply to which the water heater is connected. If on an Off-Peak or time controlled electricity supply, remember heating hours are restricted (refer to [“Off-Peak Electricity Supply”](#) on page 7).



- Check the fuse marked “HOT WATER” or “WATER HEATER” at the switchboard.
- **Twin element water heaters**
A twin element non-simultaneous model must have power available to the top heating unit circuit at all times for the water heater to operate as designed.
- **Are you using more hot water than you think?**
Is one outlet (especially the shower) using more hot water than you think? Very often it is not realised the amount of hot water used, particularly when showering. Carefully review the family’s hot water usage. Have your plumber fit a flow control valve to each shower outlet to reduce water usage.
- **Temperature pressure relief valve running**
Is the relief valve discharging too much water? (Refer to [“Temperature Pressure Relief Valve Running”](#) on page 18).
- **Thermostat setting**
Ensure the thermostat setting is appropriate. You may choose to have your electrician adjust the thermostat upwards to gain additional hot water capacity. Refer to [“Temperature Adjustment”](#) on page 5.

⚠ Warning: Hotter water increases the risk of scald injury.

- **Water heater size**

Do you have the correct size water heater for your requirements? The sizing guide in the Vulcan sales literature suggests average sizes that may be needed.

TEMPERATURE PRESSURE RELIEF VALVE RUNNING

- **Normal Operation**

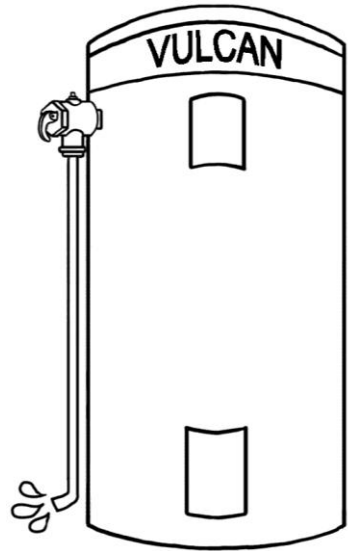
It is normal and desirable that this valve allows a small quantity of water to escape during the heating cycle. However, if it discharges more than a bucket full of water in 24 hours, there may be another problem.

- **Continuous dribble**

Try gently raising the easing lever on the relief valve for a few seconds (refer to “[Temperature Pressure Relief Valve](#)” on page 12). This may dislodge a small particle of foreign matter and clear the fault. Release the lever gently.

- **Steady flows for long period (often at night)**

This may indicate the mains water pressure sometimes rises above the designed pressure of the water heater. Ask your installing plumber to fit a pressure limiting valve.



⚠ Warning: Never replace the relief valve with one of a higher pressure rating.

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

The water heater **must** be switched off at the switchboard. Phone Rheem Service or their nearest Accredited Service Agent to arrange for inspection.

EXPANSION CONTROL VALVE RUNNING

If an expansion control valve is fitted in the cold water line to the water heater ([refer to page 29](#)) it may discharge a small quantity of water instead of the temperature pressure relief valve on the water heater. The benefit is that energy is conserved as the discharged water is cooler.

HIGHER THAN EXPECTED ELECTRICITY BILLS

Should you at any time, feel your electricity account is higher than expected, we suggest you check the following points:

- Is the relief valve running excessively?

Refer to “[Temperature Pressure Relief Valve Running](#)” on page 18.

- Is one outlet (especially the shower) using more hot water than you think?

Refer to “[Not Enough Hot Water](#)” on page 17.

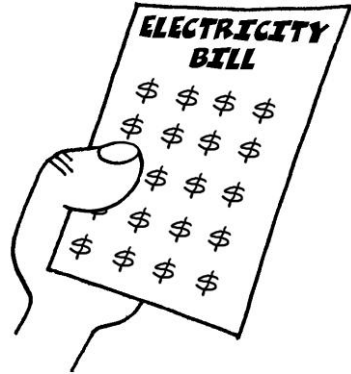
- Is there a leaking hot water pipe, dripping hot water tap, etc?

Even a small leak will waste a surprising quantity of hot water and electricity. Replace faulty tap washers, and have your plumber rectify any leaking pipe work.

- Has there been an increase in hot water usage?

An increase in hot water usage will result in an increase in water heater operation.

- Has your water heating tariff rate been increased by your electricity retailer since your previous account?



ELECTRICITY TARIFFS

The electricity tariff to which your water heater is connected will determine the overall operating cost of the system. It is important you are aware of this tariff, i.e. Off-Peak (overnight) or time controlled supply, Extended Off-Peak (overnight and day) or Extended time controlled supply, Domestic or Continuous supply. For types of tariffs, refer to “[Single Element Model](#)” on page 7 and “[Twin Element Model](#)” on page 7.

IF YOU HAVE CHECKED ALL THE FOREGOING AND STILL BELIEVE YOU NEED ASSISTANCE, PHONE RHEEM SERVICE OR THEIR NEAREST ACCREDITED SERVICE AGENT.

INSTALLATION

THIS WATER HEATER IS NOT SUITABLE FOR POOL HEATING

INSTALLATION STANDARDS

The water heater must be installed:

- by a qualified person, and
- in accordance the installation instructions, and
- in compliance with Standards AS/NZS 3500.4, AS/NZS 3000 and all local codes and regulatory authority requirements.

In New Zealand the installation must also conform with the New Zealand Building Code.

All packaging materials must be removed from the water heater prior to its installation. This includes the removal of the cardboard base of the carton from the underside of the water heater.

WATER HEATER APPLICATION

This water heater is designed for use in a single family domestic dwelling for the purpose of heating potable water. Its use in an application other than this may shorten its life.

If this water heater is to be used where an uninterrupted hot water supply is necessary for the application or business, then there should be redundancy within the hot water system design. This should ensure the continuity of hot water supply in the event that this water heater was to become inoperable for any reason. We recommend you provide advice to the system owner about their needs and building backup redundancy into the hot water supply system.

WATER HEATER LOCATION

A water heater with a supply cord and plug or an '045' model is suitable for indoor installation only. All other water heaters can be installed indoor or outdoor. Whether located outdoor or indoor, the water heater should be installed close to the most frequently used outlet and its position chosen with safety and service in mind.

Clearance must be allowed for servicing of the water heater. The water heater must be accessible without the use of a ladder or scaffold. Make sure the temperature pressure relief valve lever is accessible and the front cover, thermostat and heating unit can be removed for service.

You must be able to read the information on the rating plate. If possible leave headroom of one water heater height so the anode can be inspected or replaced. Remember you may have to take the entire water heater out later for servicing.

It is recommended the water heater be installed at ground or floor level and must stand vertically upright. The base of the water heater is made of corrosion resistant material, and it may be placed directly in contact with the supporting surface. It is not necessary to allow for free air circulation under the base of the water heater.

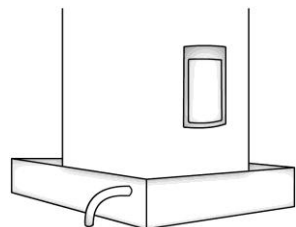


Note: The water heater should not be placed in direct contact with a concrete surface that is less than two months old and not fully cured as this may attack the metal coating of the water heater base. A moisture barrier should be used between the two surfaces in this instance.

Remember all local authorities have regulations about putting water heaters into roof spaces.

SAFE TRAY

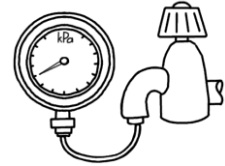
Where damage to property can occur in the event of the water heater leaking, the water heater must be installed in a safe tray. Construction, installation and draining of a safe tray must comply with AS/NZS 3500.4 and all local codes and regulatory authority requirements. AS/NZS 3500.4 also has particular requirements when a safe tray must be installed.



MAINS WATER SUPPLY

Where the mains water supply pressure exceeds that shown in the table below, an approved pressure limiting valve is required and should be fitted as shown in the installation diagram (refer to diagram on page 29).

Model	045 to 160	250 to 400
Relief valve setting	1400 kPa	1000 kPa
Expansion control valve setting*	1200 kPa	850 kPa
Max. mains supply pressure		
With expansion control valve	950 kPa	650 kPa
Without expansion control valve	1120 kPa	800 kPa



* Expansion control valve not supplied with water heater

TANK WATER SUPPLY

If the water heater is supplied with water from a tank supply and a pressure pump system is not installed, then the bottom of the supply tank must be at least 1 m above the highest point of the hot water plumbing system, including the water heater. Care must be taken to avoid air locks. The cold water line to the water heater should be adequately sized and fitted with a full flow gate valve or ball valve.

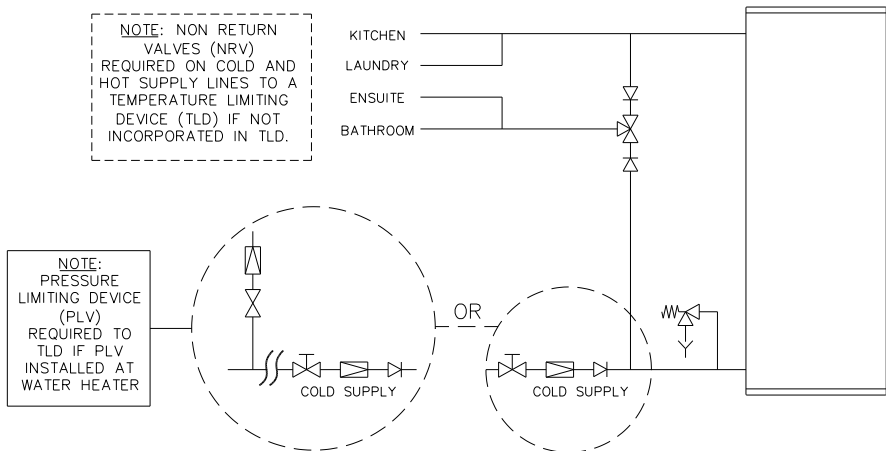
HOT WATER DELIVERY

This water heater can deliver water at temperatures which can cause scalding.

It is necessary and we recommend that a temperature limiting device be fitted between the water heater and the hot water outlets in any abluition area such as a bathroom or ensuite, to reduce the risk of scalding. The installing plumber may have a legal obligation to ensure the installation of this water heater meets the delivery water temperature requirements of AS/NZS 3500.4 so that scalding water temperatures are not delivered to a bathroom, ensuite or other abluition area.

Where a temperature limiting device is installed adjacent to the water heater, the cold water line to the temperature limiting device can be branched off the cold water line either before or after the isolation valve, pressure limiting valve and non return valve to the water heater. If an expansion control valve is required, it must always be installed after the non return valve and be the last valve prior to the water heater.

If a pressure limiting valve is installed on the cold water line to the water heater and the cold water line to a temperature limiting device branches off before this valve or from another cold water line in the premises, then a pressure limiting valve of an equal pressure setting may be required prior to the temperature limiting device.



Two Temperature Zones Using a Temperature Limiting Device

CIRCULATED HOT WATER FLOW AND RETURN SYSTEM

If a Vulcan water heater is to be installed as part of a circulated hot water flow and return system, a storage water heater able to provide a hot water outlet temperature of at least 60°C must be used. **Note:** The thermostat must always be set to at least 60°C. Refer to the [diagram on page 24](#).

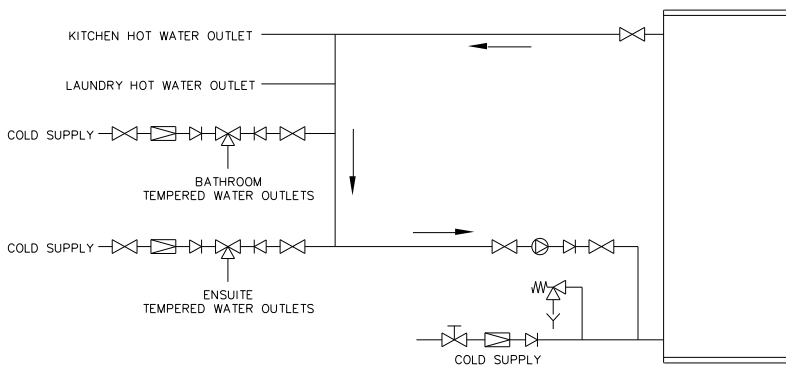
Temperature Limiting Device

A temperature limiting device cannot be installed in circulated hot water flow and return pipe work. The tempered water from a temperature limiting device cannot be circulated. Where a circulated hot water flow and return system is required in a building, a temperature limiting device can only be installed on a dead leg, branching off the circulated hot water flow and return pipe.

If circulated tempered water were to be returned back to the water heater, depending on the location of the return line connection on the water supply line to the water heater, then either:

- water will be supplied to the cold water inlet of the temperature limiting device at a temperature exceeding the maximum recommended water supply temperature, or
- when the hot taps are closed no water will be supplied to the cold water inlet of the temperature limiting device whilst hot water will continue to be supplied to the hot water inlet of the temperature limiting device.

These conditions may result in either water at a temperature exceeding the requirements of AS/NZS 3500.4 being delivered to the hot water outlets in the ablution areas, or the device closing completely and not delivering water at all, or the device failing. Under either condition, the operation and performance of the device cannot be guaranteed.

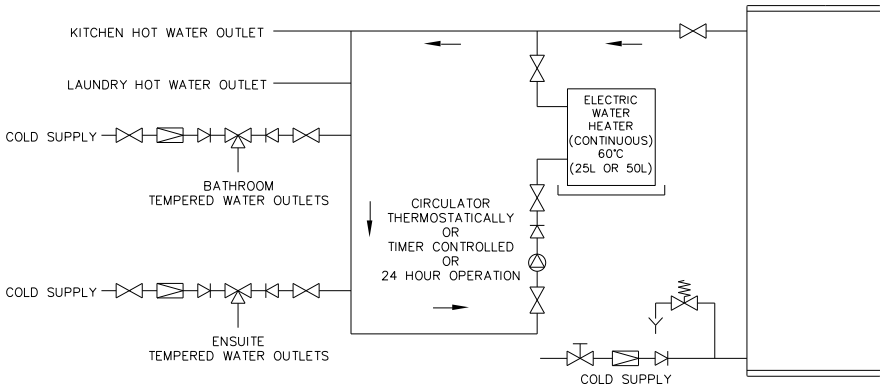


**Circulated Hot Water Flow and Return
Continuous Electric Water Heater**

Off-Peak or Time Controlled Electricity Supply

A single or twin element electric water heater connected to an Off-Peak electricity supply should not be installed as part of a circulated hot water flow and return system in a building. The benefits of the Off-Peak electricity supply will be significantly reduced.

If a circulated flow and return system is required, it is necessary to bypass the Off-Peak electric water heater and install a secondary water heater connected to the hot water flow and return line and supplied from the Off-Peak electric water heater. Refer to the [diagram on page 25](#).



NOTE: A PLV IS REQUIRED TO BE INSTALLED ON THE COLD SUPPLY LINE TO THE TEMPERING VALVE IF A PLV IS INSTALLED ON THE COLD SUPPLY LINE TO THE WATER HEATER.

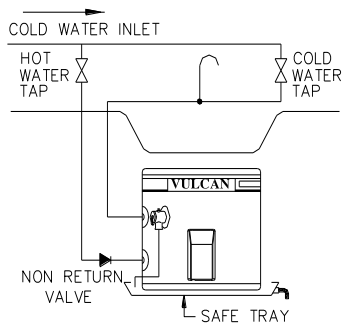
Circulated Hot Water Flow and Return Off-Peak Electric Water Heater

REDUCING HEAT LOSSES

The cold water line to and the hot water line from the water heater must be insulated in accordance with the requirements of AS/NZS 3500.4. The insulation must be weatherproof and UV resistant if exposed.

PUSH THROUGH (FREE OUTLET) INSTALLATION

It can be advantageous to plumb the water heater as a Push Through water heater in some cases. These installations can supply a single point only and normally use an 045 or M50 model electric water heater. The temperature pressure relief valve supplied with this heater **must** be fitted to the water heater.



ANODE

The vitreous enamel lined cylinder of the water heater is only covered by Vulcan warranty when the total dissolved solids (TDS) content in the water is less than 2500 mg/L and when the correct colour coded anode is used. If an incorrect colour coded anode is used in the water heater, any resultant faults will not be covered by the Vulcan warranty. In addition, the use of an incorrect colour coded anode may shorten the life of the water heater cylinder.

The correct colour coded anode for the water supply being used must be selected and fitted to the water heater for the Vulcan warranty to apply to the water heater cylinder (refer to “[Water Supplies](#)” on page 13 and the [Anode Selection chart](#) on page 14). The black anode is typically fitted as standard.

Total Dissolved Solids	Anode colour code
0 – 40 mg/L	Green
40 – 150 mg/L	Green or Black
150 – 400 mg/L	Black
400 – 600 mg/L	Black or Blue
600 – 2500 mg/L	Blue
2500 mg/L +	Blue (no cylinder warranty)

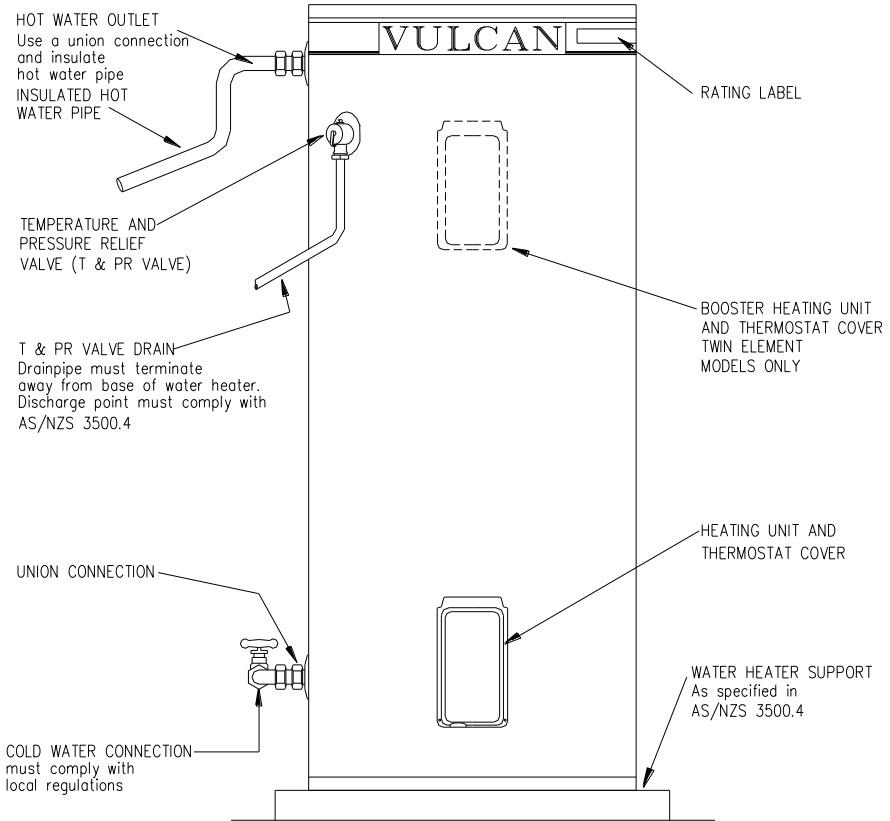
If the water supply has a TDS greater than 150 mg/L and a green anode has not been changed to a black anode, or if the TDS is greater than 600 mg/L and the anode has not been changed to a blue anode, there is the possibility the anode may become overactive and hydrogen gas could accumulate in the top of the water heater during long periods of no use. In areas where this is likely to occur, the installer should instruct the householder on how to dissipate the gas safely (refer to “[Caution](#)” on page 14).

SADDLING PIPE WORK

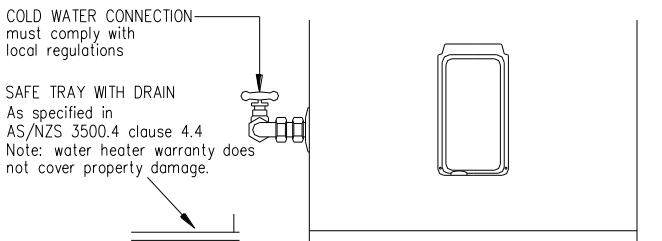
To prevent damage to the cylinder when attaching pipe clips or saddles to the water heater jacket, we recommend the use of self drilling screws with a maximum length of 13 mm. Should pre drilling be required, extreme caution must be observed when penetrating the jacket of the water heater.

Note: If the cylinder is damaged as a result of attaching pipe clips or saddles to the jacket, any resultant faults will not be covered by the Vulcan warranty.

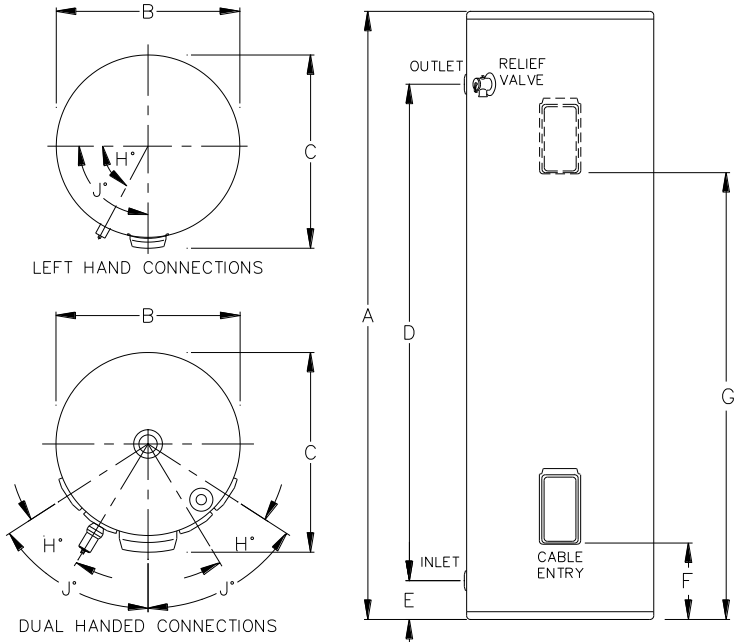
TYPICAL INSTALLATION – OUTDOOR LOCATION



TYPICAL INSTALLATION – INDOOR LOCATION



DIMENSIONS AND TECHNICAL DATA



Single Element		691045	691M50	661080	661125	661160	661250	661315	661400	
Twin Element		-	-	-	-	-	-	662315	662400	
Hot Water Delivery	Litres	46	50	80	125	160	250	315	400	
Boost Capacity	Litres	-	-	-	-	-	50	50	90	
Dimensions	A	mm	668	695	940	1340	1610	1395	1640	1840
	B	mm	393	400	480	480	480	640	640	690
	C	mm	429	436	515	515	515	680	680	730
	D	mm	346	397	702	1102	1332	1117	1317	1479
	E	mm	142	142	64	64	104	73	113	121
	F	mm	80	80	84	84	84	128	128	129
	G	mm	-	-	-	-	-	1005	1255	1346
	H	degrees	26	26	23	23	23	32	32	30
J	degrees	59	59	58	58	58	88	88	83	
Weight empty	kg	22	29	35	46	54	71	97	117	

Note: A 691045 model or a water heater with a supply cord and plug is suitable for indoor installation only.

661 and 662 models have left hand connections.

691 models have left and right hand (dual handed) connections and are available in 46 and 50 litre delivery capacities only.

Single element models with right hand water connections only are available in 80 and 125 litre delivery capacities and have a 671 prefix.

Technical data is subject to change.

CONNECTIONS – PLUMBING

All plumbing work must be carried out by a qualified person and in accordance with the Standard AS/NZS 3500.4 and all local codes and regulatory authority requirements. In New Zealand the installation must also conform with the New Zealand Building Code.

CONNECTION SIZES

- Hot water connection: RP ¾/20.
- Cold water connection: RP ¾/20.
- Relief valve connection: RP ½/15.

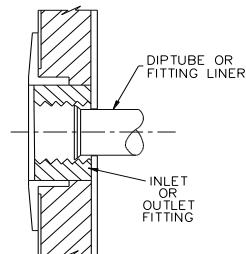
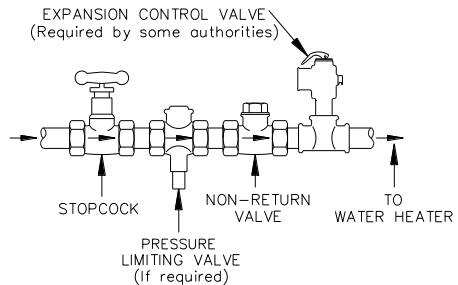
WATER INLET AND OUTLET

All pipe work must be cleared of foreign matter before connection and purged before attempting to operate the water heater. All olive compression fittings must use brass or copper olives. Use thread sealing tape or approved thread sealant on all fittings.

An isolation valve and non-return valve must be installed on the cold water line to the water heater. An acceptable arrangement is shown in the diagram. Refer also to “Hot Water Delivery” on page 23 and to “Mains Water Supply” on page 22.

A disconnection union must always be provided at the cold water inlet and hot water outlet on the water heater to allow for disconnection of the water heater.

This water heater has either a plastic dip tube or fitting liner in the inlet and outlet fittings (see diagram). These must be in place for the water heater to function properly. Do not remove or damage them by using heat nearby. They will be pushed into the correct position as the fitting is screwed in.



LEFT AND RIGHT HAND SIDE WATER CONNECTIONS

The cold water supply, hot water supply and temperature pressure relief valve can be connected to either side of a water heater with both left and right hand side water connections. A kit is supplied with the water heater to plug off the unused cold, hot and temperature pressure relief valve fittings.

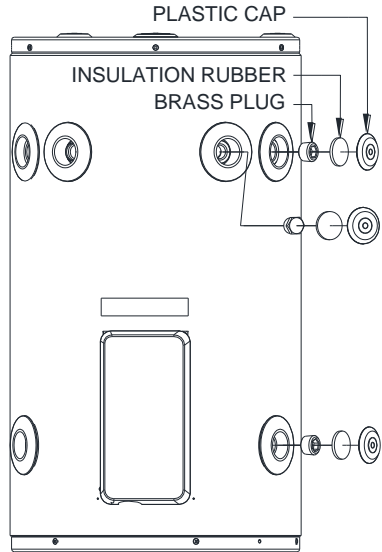
The kit contains:

Models 045 and M50

- 2 x 3/4" brass plugs (with internal hex)
- 1 x 1/2" brass plug
- 3 x plastic caps (M50 models)
- 3 x insulation rubber disks (M50 models)
(pre-fitted into plastic caps)
- 1 x allen key

Plugging Off Unused Connections – 045 and M50 models

- Apply approved sealing tape or compound to the thread of each plug.
- Fit a 3/4" plug to each of the unused cold water and hot water fittings. Tighten the plugs with the allen key supplied.
- Fit the 1/2" plug to the unused TPR valve fitting. Tighten the plug.
- Fit a plastic cap with its insulation rubber disk over each plug (M50 models).



PIPE SIZES

To achieve true mains pressure operation, the cold water line to the water heater should be the same size or bigger than the hot water line from the water heater.

The pipe sizing for hot water supply systems should be carried out by persons competent to do so, choosing the most suitable pipe size for each individual application. Reference to the technical specifications of the water heater and local regulatory authority requirements must be made.

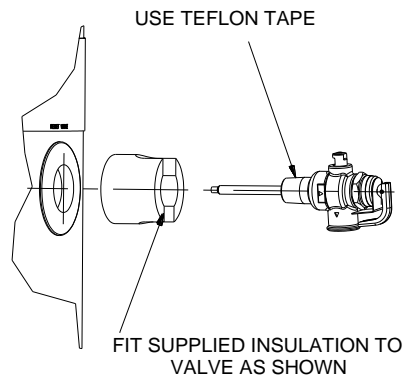
TEMPERATURE PRESSURE RELIEF VALVE

The temperature pressure relief valve is shipped either under the top flap of the water heater carton or behind the front cover or in a plastic bag attached to the water heater. The temperature pressure relief valve must be fitted before the water heater is operated. Before fitting the relief valve, make sure the probe has not been bent. Seal the thread with Teflon tape - never hemp. Make sure the tape does not hang over the end of the thread.

Screw the valve into the correct opening ([refer to the installation diagram on page 27](#)) leaving the valve outlet pointing downwards. Do not use a wrench on the valve body - use the spanner flats provided. A copper drain line must be fitted to the temperature pressure relief valve ([refer to "Relief Valve Drain" on page 32](#)).

The valve must be insulated with closed cell polymer insulation or similar (minimum thickness 9 mm) and the insulation installed so as not to impede the operation of the valve. The insulation must be weatherproof and UV resistant if exposed.

Where an insulation collar is supplied with the temperature pressure relief valve, this must be placed over the body of the valve, prior to fitting the valve to the water heater ([refer to the diagram on page 31](#)).



EXPANSION CONTROL VALVE

Local regulations may make it mandatory to install an expansion control valve (ECV) in the cold water line to the water heater. In other areas, an ECV is required if the saturation index is greater than +0.4 ([refer to "Water Supplies" on page 13](#)).

The expansion control valve must always be installed after the non return valve and be the last valve installed prior to the water heater ([refer to diagram on page 29](#)). A copper drain line must be fitted to the expansion control valve ([refer to "Relief Valve Drain" on page 32](#)).

The valve must be insulated with closed cell polymer insulation or similar (minimum thickness 9 mm) and the insulation installed so as not to impede the operation of the valve. The insulation must be weatherproof and UV resistant if exposed.

RELIEF VALVE DRAIN

DN15 copper drain lines must be fitted to the temperature pressure relief valve and expansion control valve (if one is installed) to carry the discharge clear of the water heater. Connect the drain lines to the valves using disconnection unions. The drain line from the valve to the point of discharge should be as short as possible, have a continuous fall all the way from the water heater to the discharge outlet and have no tap, valves or other restrictions in the pipe work. A drain line from a relief valve must comply with the requirements of AS/NZS 3500.4.

A drain line must be no longer than 9 metres with no more than three bends greater than 45° before discharging at an outlet or air break. The maximum length of 9 metres for a drain line is reduced by 1 metre for each additional bend required of greater than 45°, up to a maximum of three additional bends. Where the distance to the point of final discharge exceeds this length, the drain line can discharge into a tundish.

Subject to local regulatory authority approval, the drain lines from the temperature pressure relief valve and expansion control valve from an individual water heater may be interconnected.

The outlet of a drain line must be in such a position that flow out of the pipe can be easily seen, but arranged so discharge will not cause injury, damage or nuisance. The termination point of a drain line must comply with the requirements of AS/NZS 3500.4. Drain lines must not discharge into a safe tray.

In locations where water pipes are prone to freezing, drain lines must be insulated, must not exceed 300 mm in length and are to discharge into a tundish through an air gap of between 75 mm and 150 mm.

If a drain line discharges into a tundish, the drain line from the tundish must be not less than DN20. The drain line from a tundish must meet the same requirements as for a drain line from a relief valve.

Warning: As the function of the temperature pressure relief valve on this water heater is to discharge high temperature water under certain conditions, it is strongly recommended the pipe work downstream of the relief valve be capable of carrying water exceeding 93°C. Failure to observe this precaution may result in damage to pipe work and property.

CONNECTIONS – ELECTRICAL

The power supply to the water heater must not be switched on until the water heater is filled with water and a satisfactory megger reading is obtained.

All electrical work and permanent wiring must be carried out by a qualified person and in accordance with the Wiring Rules AS/NZS 3000 and all local codes and regulatory authority requirements.

WATER HEATER

A water heater not fitted with a supply cord and plug must be directly connected to a 240 V AC, 50 Hz mains power supply with an isolating switch installed at the switchboard.

The power supply to a **twin element model** should be Off-Peak (overnight) to the **bottom heating unit** and continuous to the **top heating unit**. The power supply to a **single element model** can be either an **Off-Peak (overnight)**, **Extended Off-Peak (overnight and day)** or **continuous** electricity supply, depending upon the size of the water heater. Check with the local electricity supply authority as to their requirements. An Off-Peak (overnight) power supply will provide the maximum financial savings. Discuss the power supply requirements with the householder.

A flexible 20 mm conduit is required for the electrical cable to the water heater. The conduit is to be connected to the unit with a 20 mm terminator. Connect the power supply wires directly to the terminal block and earth tab connection, ensuring there are no excess wire loops inside the front cover. The temperature rating of the power supply wires insulation must suit this application.

A water heater fitted with a supply cord and plug must be plugged into a switched 240 V AC, 50 Hz mains power outlet rated at 10 A.

THERMOSTAT SETTING

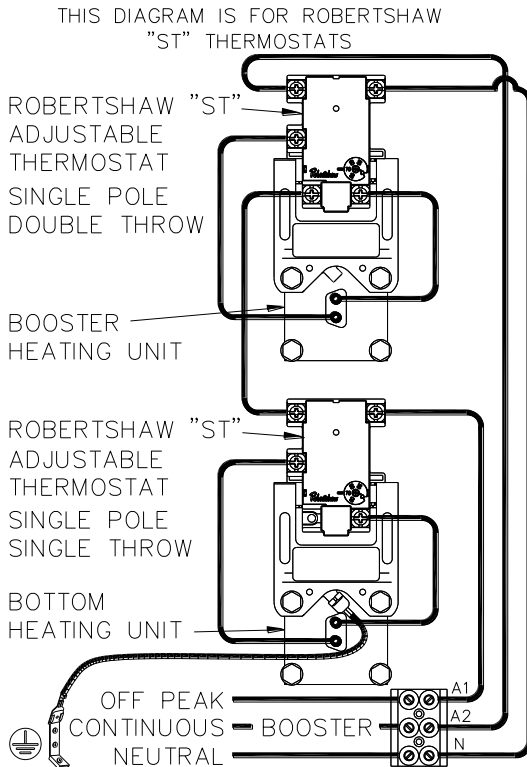
The thermostat is adjustable from 60°C to 70°C (60°C to 75°C on 045 and M50 models). The thermostat is adjusted by turning the adjuster anticlockwise to decrease the temperature setting and clockwise to increase the temperature setting. Only adjust the thermostat setting when the isolating switch is switched off at the switchboard. The top thermostat on a twin element model is fixed at 60°C.

For reasons of safety and economy, we advise the thermostat be set at the lowest temperature that will provide sufficient hot water. Dishwasher running costs can be adversely affected if the thermostat is set below 65°C. Discuss the thermostat setting requirements with the householder.

If this water heater is installed as part of a solar water heating system:

- the solar control system must be of a design to limit solar contribution so the water temperature in the tank does not exceed 80°C. This is necessary to ensure the solar input does not cause the thermostat's over-temperature cut-out to operate.
- we recommend the water heater thermostat is set at 60°C to maximise solar contribution.

**WIRING DIAGRAM TWIN ELEMENT ELECTRIC WATER HEATERS
NON-SIMULTANEOUS OPERATION, OFF-PEAK CONNECTION**



**Electrical Circuit for Twin Element Models
Robertshaw "ST" Thermostats**

The active from the continuous supply must be connected to the top heating unit circuit and the active from the Off-Peak or time controlled supply must be connected to the bottom heating unit circuit.

COMMISSIONING

TO FILL AND TURN ON THE WATER HEATER

The power supply to the water heater must not be switched on until the water heater is filled with water and a satisfactory megger reading is obtained.

- Open all of the hot water taps in the house (don't forget the shower).
- Open the cold water isolation valve fully on the cold water line to the water heater.
Air will be forced out of the taps.
- Close each tap as water flows freely from it.
- Check the pipe work for leaks.
- Plug in the power supply cord at the power outlet (power supply cord model only).
- Switch on the electrical supply at the isolating switch to the water heater.


Explain to the householder or a responsible officer the functions and operation of the water heater. Upon completion of the installation and commissioning of the water heater, leave this guide with the householder or a responsible officer.

TO TURN OFF THE WATER HEATER

If it is necessary to turn off the water heater on completion of the installation, such as on a building site or where the premises is vacant, then;

- Switch off the electrical supply at the isolating switch to the water heater.
- Unplug the power supply cord from the power outlet (power supply cord model only).
- Close the cold water isolation valve at the inlet to the water heater.

DRAINING THE WATER HEATER

 **Warning:** Exercise care, as water discharged from the water heater may be of a very high temperature.

To drain the water heater:

- Turn off the water heater (refer to [“To Turn Off the Water Heater”](#) on page 35).
- Close all hot water taps.
- Operate the relief valve release lever - do not let the lever snap back or you will damage the valve seat.

Operating the lever will release the pressure in the water heater.

- Undo the union at the cold water inlet to the water heater and attach a hose to the water heater side of the union.

Let the other end of the hose go to a drain.

- Operate the relief valve again.

This will let air into the water heater and allow the water to drain through the hose.

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VULCAN ELECTRIC MAINS PRESSURE WATER HEATER WARRANTY - AUSTRALIA ONLY

ELECTRIC WATER HEATERS 661, 662, 671, 691 SERIES

1. THE VULCAN WARRANTY – GENERAL

- 1.1 This warranty is given by Rheem Australia Pty Limited ABN 21 098 823 511 of 1 Alan Street, Rydalmere New South Wales, the manufacturer of Vulcan mains pressure water heaters.
- 1.2 Rheem offer a trained and qualified national service network who will repair or replace components at the address of the water heater subject to the terms of the Vulcan warranty. Rheem Service, in addition can provide preventative maintenance and advice on the operation of your water heater. The Rheem Service contact number is available 7 days a week on 131031 with Service personnel available to take your call from 8am to 8pm daily (hours subject to change).
- 1.3 For details about this warranty, you can contact us on 131031 or by email at warrantyenquiry@rheem.com.au (not for service bookings).
- 1.4 The terms of this warranty are set out in section 2 and apply to water heaters manufactured after 1st December 2011.
- 1.5 If a subsequent version of this warranty is published, the terms of that warranty will apply to water heaters manufactured after the date specified in the subsequent version.

2. TERMS OF THE VULCAN WARRANTY AND EXCLUSIONS TO IT

- 2.1 The decision of whether to repair or replace a faulty component is at Rheem's sole discretion.
- 2.2 If you require a call out and we find that the fault is not covered by the Vulcan warranty, you are responsible for our standard call out charge. If you wish to have the relevant component repaired or replaced by Rheem, that service will be at your cost.
- 2.3 Where a failed component or cylinder is replaced under this warranty, the balance of the original warranty period will remain effective. The replacement does not carry a new Vulcan warranty.
- 2.4 Where the water heater is installed outside the boundaries of a metropolitan area as defined by Rheem or further than 25 km from either a regional Rheem branch office or an Accredited Rheem Service Agent's office, the cost of transport, insurance and travelling between the nearest branch office or Rheem Accredited Service Agent's office and the installed site shall be the owner's responsibility.
- 2.5 Where the water heater is installed in a position that does not allow safe or ready access, the cost of that access, including the cost of additional materials handling and/or safety equipment, shall be the owner's responsibility. In other words, the cost of dismantling or removing cupboards, doors or walls and the cost of any special equipment to bring the water heater to floor or ground level or to a serviceable position is not covered by this warranty.
- 2.6 This warranty only applies to the original and genuine Vulcan water heater in its original installed location and any genuine Vulcan replacement parts.
- 2.7 The Vulcan warranty does not cover faults that are a result of:
 - a) Accidental damage to the water heater or any component (for example: (i) Acts of God such as floods, storms, fires, lightning strikes and the like; and (ii) third party acts or omissions).
 - b) Misuse or abnormal use of the water heater.

VULCAN ELECTRIC MAINS PRESSURE WATER HEATER WARRANTY - AUSTRALIA ONLY

- c) Installation not in accordance with the Owner's Guide and Installation Instructions or with relevant statutory and local requirements in the State or Territory in which the water heater is installed.
 - d) Connection at any time to a water supply that does not comply with the water supply guidelines as outlined in the Owner's Guide and Installation Instructions.
 - e) Repairs, attempts to repair or modifications to the water heater by a person other than Rheem Service or a Rheem Accredited Service Agent.
 - f) Faulty plumbing or faulty power supply.
 - g) Failure to maintain the water heater in accordance with the Owner's Guide and Installation Instructions.
 - h) Transport damage.
 - i) Fair wear and tear from adverse conditions (for example, corrosion).
 - j) Cosmetic defects.
- 2.8 Subject to any statutory provisions to the contrary, this warranty excludes any and all claims for damage to furniture, carpet, walls, foundations or any other consequential loss either directly or indirectly due to leakage from the water heater, or due to leakage from fittings and/ or pipe work of metal, plastic or other materials caused by water temperature, workmanship or other modes of failure.
- 2.9 If the water heater is not sized to supply the hot water demand in accordance with the guidelines in the Vulcan water heater literature, any resultant fault will not be covered by the Vulcan warranty.

3. WHAT IS COVERED BY THE VULCAN WARRANTY FOR THE WATER HEATERS DETAILED IN THIS DOCUMENT

- 3.1 Rheem will repair or replace a faulty component of your water heater if it fails to operate in accordance with its specifications as follows:

What components are covered	The period in which the fault must appear in order to be covered	What coverage you receive
All components	Year 1	Repair and/or replacement of the faulty component, free of charge, including labour.
The cylinder (if the water heater is installed in a single-family domestic dwelling)	Years 2 & 3	Repair and / or replacement of the cylinder, free of charge, including labour.
	Years 4 & 5	Replacement cylinder, free of charge. Installation and repair labour costs are the responsibility of the owner.
The cylinder (if the water heater is <u>not</u> installed in a single-family domestic dwelling)	Years 2 & 3	Replacement cylinder, free of charge. Installation and repair labour costs are the responsibility of the owner.

VULCAN ELECTRIC MAINS PRESSURE WATER HEATER WARRANTY - AUSTRALIA ONLY

ELECTRIC WATER HEATERS 661, 662, 671, 691 SERIES

4. ENTITLEMENT TO MAKE A CLAIM UNDER THIS WARRANTY

- 4.1 To be entitled to make a claim under this warranty you need to:
- a) Be the owner of the water heater or have consent of the owner to act on their behalf
 - b) Contact Rheem Service without undue delay after detection of the defect and, in any event, within the applicable warranty period.
- 4.2 You are not entitled to make a claim under this warranty if your water heater:
- a) Does not have its original serial numbers or rating labels.
 - b) Is not installed in Australia.

5. HOW TO MAKE A CLAIM UNDER THIS WARRANTY

- 5.1 If you wish to make a claim under this warranty, you need to:
- a) Contact Rheem on 131031 and provide owner's details, address of the water heater, a contact number and date of installation of the water heater or if that's unavailable, the date of manufacture and serial number (from the rating label on the water heater)
 - b) Rheem will arrange for the water heater to be tested and assessed on-site.
 - c) If Rheem determines that you have a valid warranty claim, Rheem will repair or replace the water heater in accordance with this warranty
- 5.2 Any expenses incurred in the making of a claim under this warranty will be borne by you.

6. THE AUSTRALIAN CONSUMER LAW

- 6.1 Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.
- 6.2 The Vulcan warranty (set out above) is in addition to any rights and remedies that you may have under the Australian Consumer Law.

RHEEM AUSTRALIA PTY LTD A.B.N. 21 098 823 511 www.rheem.com.au
For Service Telephone 131 031 AUSTRALIA 0800 657 335 NEW ZEALAND