

# *Owner's Guide and Installation Instructions*



## *Solar Hiline<sup>®</sup> Water Heater 52D Series Open Circuit*



### **WARNING: Plumber – Be Aware**

**Use copper pipe ONLY. Plastic pipe MUST NOT be used.**

It is a requirement of a solar water heater installation that all pipe work be in copper and not plastic, due to the effects of high water temperatures and pressures.

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



## WARNING: Plumber – Be Aware

- The solar hot and solar cold pipe work between the solar Hiline storage tank and the solar collectors are supplied in the pipe kit. The supplied copper solar hot and solar cold pipes **MUST BE** used.
- If the solar water heater is installed either on a metal roof or in a trafficable area, such as on an accessible roof, then the solar hot and solar cold pipes must be insulated. The solar hot and solar cold pipes may be required to be insulated to comply with local regulations.

If insulation is required, the full length of the solar hot and solar cold pipes **MUST BE** insulated.

The insulation must:

- be of a closed cell type or equivalent, suitable for a solar water heating application and capable of withstanding the temperature of the water generated by the solar collectors under stagnation conditions

The specification of the chosen insulation material should be checked with the insulation manufacturer prior to installation as different materials may vary in temperature tolerance

- be at least 13 mm thick
- be weatherproof and UV resistant
- be fitted up to and cover the connections on both the solar storage tank and the solar collectors.

The insulation will offer protection to a metal roof against corrosion due to water running off the copper pipes, assist in avoiding accidental contact with the solar pipe work as very high temperature water can flow from the solar collectors to the solar storage tank, and also reduce pipe heat losses.

- Plastic pipe **MUST NOT** be used, as it will not withstand the temperature and pressure of the water generated by the solar collectors under stagnation conditions. Extremely high water temperatures and extremely high water pressures can be generated under these conditions. Plastic pipe cannot withstand these temperatures and pressures and **MUST NOT** be used. Failure of plastic pipe can lead to the release of high temperature water and cause severe water damage and flooding.
- There **MUST BE a continuous fall of a minimum 10°** in the pipe work from the solar Hiline storage tank to the solar collectors. The highest point of the solar cold pipe and solar hot pipe must be where they connect to the solar Hiline storage tank, otherwise thermosiphoning will not occur.
- A non-return valve **MUST BE** installed on the cold water line to the solar storage tank **AFTER** the cold water branch to a temperature limiting device.
- The solar water heater, including the collector circuit, is to be isolated during the testing and commissioning of the heated water reticulation system in a building in accordance with Clause 9.3 (a) of AS/NZS 3500.4:2018. The collector circuit includes the solar hot and solar cold pipes and solar collectors.

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An electronic copy of these Owner's Guide and Installation Instructions can be downloaded from [rheem.com.au](http://rheem.com.au).

### PATENTS

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

### TRADE MARKS

® Registered trademark of Rheem Australia Pty Ltd.

™ Trademark of Rheem Australia Pty Ltd.

Colorbond® is a registered trademark of BlueScope Steel Limited.

**Note:** 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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# CONTENTS

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## HOUSEHOLDER

This booklet contains important information about your new water heater, including terms of the Rheem warranty.

We recommend you read pages 7 to 21,  
and the terms of the Rheem warranty on pages 4 to 6.

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

<b>Warranty</b> .....	<b>4</b>
<b>Safety, Warnings, Installation Notes</b> .....	<b>7</b>
<b>About Your Water Heater</b> .....	<b>10</b>
<b>Maintenance Requirements</b> .....	<b>14</b>
<b>Water Supplies</b> .....	<b>16</b>
<b>Save A Service Call</b> .....	<b>19</b>
<b>Installation – Solar Storage Tank</b> .....	<b>22</b>
<b>Installation – Solar Collectors</b> .....	<b>32</b>
<b>System Assembly</b> .....	<b>35</b>
<b>Connections – Plumbing</b> .....	<b>47</b>
<b>Connections – Electrical</b> .....	<b>50</b>
<b>Multiple Installations</b> .....	<b>52</b>
<b>Commissioning</b> .....	<b>54</b>
<b>Draining And Flushing The Water Heater</b> .....	<b>56</b>

**RHEEM AUSTRALIA PTY LTD**, A.B.N. 21 098 823 511, [www.rheem.com.au](http://www.rheem.com.au)  
For Service Telephone 131 031 AUSTRALIA

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# **RHEEM SOLAR HILINE WATER HEATER WARRANTY – AUSTRALIA ONLY –**

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## **SOLAR HILINE WATER HEATER MODELS 52D180, 52D300**

### **1. THE RHEEM 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.
- 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 Rheem warranty. Rheem Service, in addition can provide preventative maintenance and advice on the operation of your water heater. The Rheem Service contact number is 131031, with Contact Centre personnel available 24 hours, 7 days a week to take your call and if necessary to arrange a service call for during normal working hours Monday to Friday (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](mailto:warrantyenquiry@rheem.com.au) (not for service bookings).
- 1.4 The terms of this warranty and what is covered by it are set out in sections 2 and 3 and apply to water heaters manufactured from 1st October 2019.
- 1.5 If a subsequent version of this warranty is published, the terms of that warranty and what is covered by it will apply to water heaters manufactured after the date specified in the subsequent version.

### **2. TERMS OF THE RHEEM 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 Rheem 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 Rheem 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 Rheem water heater in its original installed location and any genuine Rheem replacement parts.
- 2.7 The Rheem 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.
  - 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.

# RHEEM SOLAR HILINE WATER HEATER WARRANTY – AUSTRALIA ONLY –

## SOLAR HILINE WATER HEATER MODELS 52D180, 52D300

- 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.
  - k) Breakage of collector glass for any reason including hail damage (we suggest that the collector glass be covered by your home insurance policy).
  - l) Ice formation in the waterways of an open circuit thermosiphon system.
- 2.8 Rheem may reject a claim under this warranty in its sole discretion if a third party solar diverter is connected to the water heater.
- 2.9 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.
- 2.10 If the water heater is not sized to supply the hot water demand in accordance with the guidelines in the Rheem water heater literature, any resultant fault will not be covered by the Rheem warranty.

### 3. WHAT IS COVERED BY THE RHEEM 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 from the date of installation in which the fault must appear in order to be covered	What coverage you receive
<b>All components</b>	Year 1	Repair and/or replacement of the faulty component, free of charge, including labour.
<b>The cylinder</b> (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.
<b>The cylinder</b> (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.
<b>The solar collector</b> (all installations)	Years 2 to 5	Replacement solar collector, free of charge. Installation and repair labour costs are the responsibility of the owner.

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# **RHEEM SOLAR HILINE WATER HEATER WARRANTY – AUSTRALIA ONLY –**

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## **SOLAR HILINE WATER HEATER MODELS 52D180, 52D300**

### **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 Rheem warranty (set out above) is in addition to any rights and remedies that you may have under the Australian Consumer Law.

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## SAFETY, WARNINGS, INSTALLATION NOTES

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It is important you read the following safety and warnings information.

### SAFETY AND WARNINGS

- 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.
- If the electrical conduit to the solar storage tank is damaged, it must be replaced by a qualified person in order to avoid a hazard. Phone Rheem Service or their nearest Accredited Service Agent to arrange for an inspection.
- This water heater uses 220 V - 240 V a.c. electrical power for operation of the control systems and the electrically operated components. The removal of the side cover will expose 220 V - 240 V a.c. wiring. It must only be removed by a qualified person.
- This water heater is supplied with a thermostat, 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 Rheem 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.**

- **DANGER:** The operation of the over-temperature cut-out on a 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.
- Do not touch any exposed pipe work or fittings connecting the solar storage tank and the solar collectors, as this may result in a burn injury. Very high temperature hot water and in some circumstances high temperature steam can be generated by the solar collectors under certain conditions and this flows through the pipe work from the solar collectors to the solar storage tank.

**Note:** Any exposed pipe work or fittings in the collector circuit where the installation is in a trafficable area, such as on an accessible roof, should be attended to and covered with insulation. Phone Rheem Service or their nearest Accredited Service Agent to arrange for an inspection.

- The water heater under normal use and summer solar conditions should heat the water in the solar storage tank to 60°C to 75°C. This water temperature can be exceeded and reach up to 95°C during periods of high solar radiation conditions and reduced hot usage. During times of low solar energy gain or if boosting of the water temperature is required, an electric heating unit will heat the water temperature to 60°C or up to 70°C depending upon the thermostat setting.

Refer to “Solar Operation” on page 10 and to “How Hot Should The Water Be?” on page 11.

- For continued safety of this water heater it must be installed, operated and maintained in accordance with the Owner’s Guide and Installation Instructions.
- Servicing of a water heater must only be carried out by qualified personnel. Phone Rheem Service or their nearest Accredited Service Agent.
- The lever on the temperature pressure relief valve and expansion control valve requires to be operated every six (6) months to clear any deposits and to ensure the valve and its drain line are not blocked.

Refer to “Relief Valves” on page 8 and “Minor Maintenance Every Six Months” on page 14.

- Only a person qualified to install or service a water heater can drain the water heater, if this is required.
- Do not modify this water heater.
- This open circuit system does not have freeze protection. The system is not suitable for installation in areas subject to frost or freeze conditions.

## RELIEF VALVES

### Temperature Pressure Relief Valve

This water heater incorporates a temperature pressure relief valve located near the top of the solar storage tank. This valve is essential for the water heater's safe operation.

It is possible for the valve to discharge a quantity of water through the drain line during each heating period. This quantity should be equal to approximately 1/50 of the hot water used, as water expands by this volume when heated.

### Expansion Control Valve

In many areas, including South Australia, Western Australia and scaling water areas, it is mandatory an expansion control valve is fitted to the cold water line to the water heater.

The expansion control valve will discharge the quantity of water from its drain line during the heating period instead of the temperature pressure relief valve as it has a lower pressure rating.

### Valve Operation

Continuous leakage of water from either valve and its drain line may indicate a problem with the water heater. Refer to ["Temperature Pressure Relief Valve or Expansion Control Valve Running"](#) on page 20.

**⚠ Warning:** Never block the outlet of either valve or their drain lines for any reason. A relief valve drain must be left open to atmosphere, and be installed in a continuously downward direction.

In locations where water pipes are prone to freezing, the relief valve drain line must be insulated and not exceed 300 mm in length before discharging into a tundish through an air gap.

The easing lever on the temperature pressure relief valve and expansion control valve should be operated once every six (6) months to clear any deposits and ensure the valve and its drain line are not blocked. **It is very important the lever is raised and lowered gently.** Refer to ["Minor Maintenance Every Six Months"](#) on page 14.

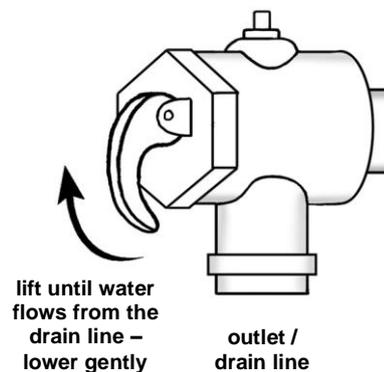
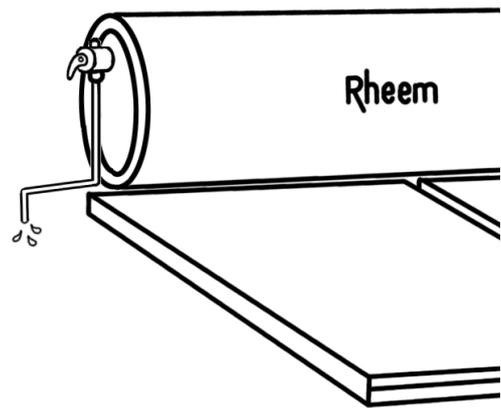
If the relief valve easing lever is not readily and safely accessible, contact Rheem Service or their nearest Accredited Service Agent. Do not attempt to climb onto a non-trafficable roof to operate the relief valve lever.

**⚠ Warning:** Water discharged from the temperature pressure relief valve drain line will be hot. Exercise care to avoid any splashing of water by standing clear of the drain line's point of discharge when operating either valve's easing lever.

**⚠ DANGER:** Failure to operate the easing lever on the relief valve once every six (6) months may result in the solar storage tank cylinder failing, or under certain circumstances, exploding.

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 five (5) years and the expansion control valve should be checked for performance or replaced at intervals not exceeding five (5) years. The checking of the valves performance or replacement should occur more frequently in areas where there is a high incidence of water deposits. Refer to ["Water Supplies"](#) on page 16.



**INSTALLATION NOTES**

This water heater must be installed:

- by a qualified person,
- in accordance with the installation instructions,
- in compliance with the Plumbing Code of Australia (PCA) and Plumbing Standard AS/NZS 3500.4,
  - This water heater is designed for outdoor installation.
  - This water heater is intended to be permanently connected to the water mains and not connected by a hose-set. A braided flexible hose or semi-flexible connector may be used for connection to the water heater, where permitted by AS/NZS 3500.4.
- in compliance with the Australian / New Zealand Wiring Rules AS/NZS 3000,
  - Isolation switches must be installed in the electrical circuit to the water heater in accordance with the Wiring Rules, so the water heater can be switched off.
  - The power supply wires are to be directly connected to the terminal block and earth tab connection, with no excess wire loops inside the front cover. The temperature rating of the power supply wires insulation must suit this application, or the wiring protected by insulating sleeving with an appropriate temperature rating if it can make contact with the internal storage cylinder. The temperature of the internal storage cylinder can reach 95°C during its operation.
- in compliance with all local codes and regulatory authority requirements.

Installation and commissioning requirements and details for the installing plumber and licensed electrical worker are contained on [pages 22 to 55](#).

**Mains pressure water supply**

The water heater is designed to operate at mains pressure by connecting directly to the mains water supply.

The water heater is supplied with a temperature pressure relief valve with a pressure rating of 1000 kPa and an expansion control valve with a pressure rating of 850 kPa.

The maximum mains water supply pressure for the water heater is 680 kPa when an expansion control valve is installed. If the mains supply pressure in your area exceeds this value, a pressure limiting valve must be installed.

The supply pressure should be greater than 350 kPa for true mains pressure operation to be achieved.

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## ABOUT YOUR WATER HEATER

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### 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

Your Rheem® solar Hiline™ water heater is designed for both the solar collectors and the solar storage tank to be roof mounted. The solar storage tank has a Colorbond® jacket and is suitable for installation with Rheem NPT 200 solar collectors.

A 52D series system does not have freeze protection. The system is not suitable for installation in areas subject to frost or freeze conditions. Freeze conditions occur below 6°C. The system has NO WARRANTY for freeze damage. Refer to “[Terms of the Rheem Warranty](#)” on page 4.

This water heater is designed to be installed as an electric boosted solar water heater with its booster heating unit connected to a power supply, however it may be installed with an in-series continuous flow or storage booster water heater.

If this water heater is installed with an in-series booster, then the electric booster heating unit will not be connected to a power supply and the references to the electric booster heating unit, thermostat and boosting controls in this Guide will not be applicable to the installation. For information relating to the function and operation of the in-series booster, refer to the Owners Guide and Installation Instructions supplied with the booster water heater.

### SOLAR OPERATION

The solar water heater uses the thermosiphon principle, without the need for a pump, circulator or sensors. It works on the simple scientific fact that hot fluid rises. The solar collector's low-iron content solar glass allows more solar energy from the sun to pass through and be used to heat the collector's absorber plate than conventional glass. This solar energy heats the water in the absorber plate which is then transferred to the storage tank.

The Rheem Hiline 52D series system is an open circuit solar water heater with its vitreous enamel lined solar storage tank installed on the roof directly coupled to the solar collectors. An open circuit system has a collector circuit which is directly connected to the potable water in the solar storage tank by copper pipe work.



As the water in the solar collector gains the solar energy from the absorber, the increase in temperature causes the water to rise through the collector and the solar hot pipe into the solar storage tank. As the heated water enters the storage tank, cooler water from the bottom of the solar storage tank flows down the solar cold pipe into the solar collectors to be heated by the solar energy. This process continues while solar energy is available and the water in the solar storage tank requires heating.

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

### ELECTRIC BOOSTING

Water stored in the solar storage tank can be heated by an electric booster heating unit. The booster heating unit is for heating the water at times of low solar energy gain, such as during very cloudy or rainy weather, or during the colder months.

The amount of water heated by the raised booster heating unit of the solar Hiline storage tank will be 180 litres (300 litre model), or 90 litres (180 litre model).

The water heater is more suited for the booster heating unit to be connected to either a continuous, or a time of use, or an extended Off-Peak (overnight and day) electricity supply. A timer can also be used to control the boosting periods and help maximise solar savings. Refer to “[Booster Control](#)” on page 12.

The booster heating unit may be connected to an Off-Peak (overnight) electricity supply, however this will only allow the booster to heat the water overnight. If this type of connection is considered, care must be taken to ensure there is sufficient boost capacity to meet the household's full day and night hot water supply during periods of no or low solar gain, particularly in cold weather. **Temperature Redistribution** (refer to page 20) is more evident with this type of electricity supply connection.

The booster heating unit is controlled by an electric thermostat. The thermostat and its over temperature energy cut out are mounted on the solar storage tank behind the side cover. If required, the water is heated automatically to the thermostat setting by the booster heating unit when power is available.

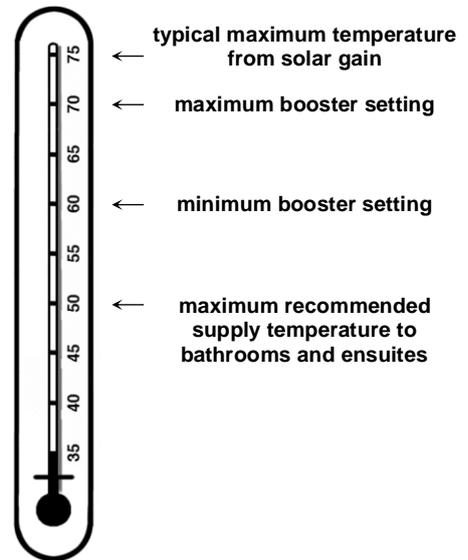
**HOW HOT SHOULD THE WATER BE?**

The temperature the system will achieve under solar heating depends on many factors, including the level of solar radiation available, orientation and inclination of the solar collectors, incoming cold water temperature and volume of hot water used.

Under normal household use and average operating conditions, the system may achieve a water temperature of approximately twice the maximum daily outside air temperature.

During periods of low solar energy gain, the water temperature can be boosted by the thermostatically controlled electric booster heating unit. Refer to **"Booster Control"** on page 12. Rheem recommends the thermostat is set at 60°C to maximise solar contribution.

**Note:** AS 3498 requires that a water heater provides the means to inhibit the growth of Legionella bacteria in potable water. This water heater can satisfy this AS 3498 requirement provided the electric booster is energised for a sufficient period each day and the electric booster thermostat setting is 60°C or higher.



If this water heater is installed with an in-series continuous flow gas booster, then this requirement of AS 3498 can be satisfied provided the booster is energised, its preset outlet temperature setting is 70°C or higher and a remote temperature controller is not used.

If this water heater is installed with an in-series storage booster, then this requirement of AS 3498 can be satisfied provided the storage booster is energised and its thermostat setting is 60°C or higher.

**HOTTER WATER INCREASES THE RISK OF SCALD INJURY**

This water heater can deliver hot water at temperatures which on occasion could exceed 75°C, sufficiently hot to cause severe scalding. Water at this temperature may have been plumbed to fixtures where water hotter than 50°C is allowed, such as the kitchen and laundry.

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.

**TEMPERATURE ADJUSTMENT**

The water heater features a tradesperson adjustable thermostat. This requires a licensed electrical worker to make any temperature adjustments. The thermostat has a maximum temperature setting of 70°C, a minimum temperature setting of 60°C and is factory set at 60°C.

We advise you to have a licensed electrical worker adjust the thermostat to the lowest setting which meets your needs, especially if there are young children or elderly people in the home. Refer to **"Hotter Water Increases the Risk of Scald Injury"** on page 11.

### BOOSTER CONTROL

An isolating switch is installed in the electrical meter box for the solar storage tank. This should be left switched on to allow the booster heating unit to operate if required. The booster heating unit is for heating the water at times of low solar energy gain, such as during very cloudy or rainy weather, or during the colder months. The booster heating unit will only activate if heating is required and power is available from the switchboard. When the water is below the thermostat setting, the booster heating unit will turn on and heat the water. The booster heating unit will automatically turn off when the temperature of the water reaches the thermostat setting.

Leaving the isolating switch switched on will also provide a sufficient period of time each day for the booster heating unit to operate, if required, to satisfy the requirements of AS 3498.

The amount of water heated by the raised booster heating unit of the solar Hiline storage tank will be 180 litres (300 litre model), or 90 litres (180 litre model).

### Timer Control Switch

A suitably rated timer control switch can be installed and will help maximise energy savings with an electrically boosted solar water heater connected to a **continuous, time of use or extended Off-Peak (overnight and day)** electricity supply. Further information for a licenced electrical worker on the recommended methods of wiring the timer are outlined in **“Booster Control”** on page 51.

#### *Programming the Timer*

Power must be available to the timer control switch before the booster heating unit can be activated. The timer control switch should be programmed:

- to suit the hot water consumption pattern of the household,
- with the end of the period to coincide with the commencement of the evening hot water usage,  
A second period, such as prior to the morning hot water usage, may be necessary.
- to enable a boosting period of not less than the recommended continuous length of time for boosting, and
- for a period when power will be available to the timer.

**Note:** When daylight saving time applies, you may consider resetting the timer accordingly.

The recommended continuous length of time for boosting is:

Model	Minimum winter cold water temperature		Temperature rise	Booster heating unit size		
				2.4 kW	3.6 kW	4.8 kW
180	Cool / temperate climate	10°C	50°C	2 ¼ hours	1 ½ hours	1 ¼ hour
	Temperate / sub tropical climate	15°C	45°C	2 hours	1 ½ hours	1 hour
	Tropical climate	20°C	40°C	2 hours	1 ¼ hours	1 hour
300	Cool / temperate climate	10°C	50°C	3 ¾ hours	2 ½ hours	2 hours
	Temperate / sub tropical climate	15°C	45°C	3 ½ hours	2 ¼ hours	1 ¾ hours
	Tropical climate	20°C	40°C	3 hours	2 hours	1 ½ hours

The recommended boosting periods are sufficient to allow the booster heating unit to heat up the boost volume of the solar storage tank to 60°C where the winter cold water temperatures do not fall below those shown. This may be necessary during periods of very low solar energy gain through the solar collectors, such as during constant rain or extremely cloudy weather, particularly in winter when the incoming cold water temperature is lower. The period will also provide a sufficient heat up time for the electric booster to operate, if required, to satisfy the requirements of AS 3498.

The booster heating unit will only activate if heating is required and power is available from the timer. When the water is below the thermostat setting, the booster heating unit will turn on and heat the water. The booster heating unit will automatically turn off either when the temperature of the water reaches the thermostat setting or at the end of the timer period, whichever comes first.

**PRECAUTIONS**

The water heater must be maintained in accordance with the Owner's Guide and Installation Instructions. Refer to ["Maintenance Requirements"](#) on page 14 and to ["Anode Inspection and Replacement"](#) on page 17.

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 a 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 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 water heater isolating switch(s) on the switchboard.
- 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 at the inlet to the water heater.
- Switch on the electrical supply at the water heater isolating switch(s) on the switchboard.
- Check and if required reset the timer, if one is installed.

**GOING ON HOLIDAYS**

If you plan to be away from home, conserve energy by switching the booster switch "OFF". Refer to ["To Turn Off The Water Heater"](#) on page 13. Also if the system is not used for a period in excess of four (4) weeks it is recommended the solar collectors be covered.

Care should be taken when returning from holidays and the collectors have not been covered. The water in the solar storage tank can be very hot.

**VICTORIAN CUSTOMERS**

Notice to Victorian Customers from the Victorian Building Authority. 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 16.

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 16 to 18](#).

**HOW LONG WILL THE WATER HEATER LAST?**

The water heater is supported by a manufacturer's warranty ([refer to page 4](#)). 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 13.

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# MAINTENANCE REQUIREMENTS

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## MINOR MAINTENANCE EVERY SIX MONTHS

It is recommended minor maintenance be performed every six (6) months. Minor maintenance can be performed by the dwelling occupant.

The minor maintenance includes:

- If readily and safely accessible, operate the easing lever on the temperature pressure relief valve. **It is very important the lever is raised and lowered gently.** Refer to “Relief Valves” on page 8.

If the relief valve lever is not readily and safely accessible, contact Rheem Service or their nearest Accredited Service Agent. Do not attempt to climb onto a non-trafficable roof to operate the relief valve lever.

**⚠ Warning:** Water discharged from the temperature pressure relief valve drain line will be hot. Exercise care to avoid any splashing of water by standing clear of the drain line's point of discharge when operating the valve's easing lever.

- If readily and safely accessible, operate the easing lever on the expansion control valve. **It is very important the lever is raised and lowered gently.** Refer to “Relief Valves” on page 8.

If the relief valve lever is not readily and safely accessible, contact Rheem Service or their nearest Accredited Service Agent. Do not attempt to climb onto a non trafficable roof to operate the relief valve lever.

## MAJOR SERVICE EVERY FIVE YEARS

It is recommended a major service be conducted on the water heater every five (5) years. If an anode replacement is conducted sooner than a major service, then the major service should coincide with the replacement.

**⚠ Warning:** Servicing of a water heater must only be carried out by a qualified person. Phone Rheem Service or their nearest Accredited Service Agent.

**Note:** The major service and routine replacement of any components, such as the anode and relief valves, are not included in the Rheem 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 required, replace the valve.
- Inspect and if required, replace the anode.

If the anode is not replaced, it should be replaced within three (3) years of this service. Refer to “Anode Inspection and Replacement” on page 17.

- Drain and flush the solar storage tank of sediment build-up if required.
  - Flush the solar collectors.
  - Check the booster heating unit for excessive calcium build-up or corrosion and replace if necessary.
  - Visually check the unit for any potential problems, e.g. broken glass, excessive dust and dirt build-up, shading.
  - Clean the collector glass.
  - Check the condition of the pipe insulation, if fitted, on the solar hot and solar cold pipes. Replace or make good if required.
  - Inspect all connections.
-

**Note:** The solar storage tank may need to be drained during this service. After the completion of the service, the solar storage tank will take some time to reheat the water by solar gain. Depending upon the power supply connection to the booster heating unit, hot water may not be available until the next day.

If a temperature limiting device, water filter or a water softener are installed, their operation should be checked at this time. These checks are not covered within the major service. Components, devices and valves which are not part of the water heater, such as a temperature limiting device, water filter and water softener are not covered by the Rheem warranty.

### **COLLECTOR GLASS**

Ensure the glass on your solar collectors is free of dust, salt spray or any other matter which may reduce the effectiveness of the solar collectors. Rainfall should keep the collector adequately clean. It is recommended the collector glass be washed clean at least every three months should adequate rain not have fallen in this period.

Collector glass can be hosed down or if the solar collectors are accessible such as on a trafficable roof, wash the collector glass with water and a soft brush when the solar collectors are cool, such as early in the morning. In extremely dusty areas extra attention may need to be given to keeping the collector glass clean.

Have any trees trimmed which may shade the solar collectors.

Rheem solar collectors have passed the AS/NZS 2712 requirements for resistance to hailstone damage, so it is not normally necessary to fit a guard to a collector. Stone Guards are available to provide a level of protection to the collectors against vandalism or accidental damage. Contact Rheem or your local Rheem Solar Water Heater Distributor for details.

### **FLUSHING THE SOLAR COLLECTORS**

It may be necessary to flush the solar collectors if there is sediment in the water supply. This should be conducted by a person qualified to do so and in the morning within three (3) hours of sunrise, when the water temperature inside the solar collectors should be lower.

**⚠ Warning:** Care must be exercised to avoid splashing of water, as water discharged from the solar collectors and solar storage tank may be of a very high temperature.

It is recommended to have the solar collectors flushed every five (5) years. This will assist in keeping the solar collectors, solar cold pipe and solar hot pipe clear of sediment.

## WATER SUPPLIES

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

### 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, a heating unit, and a solar collector in an open circuit solar water heater system.

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 Rheem warranty to apply.

### ANODE

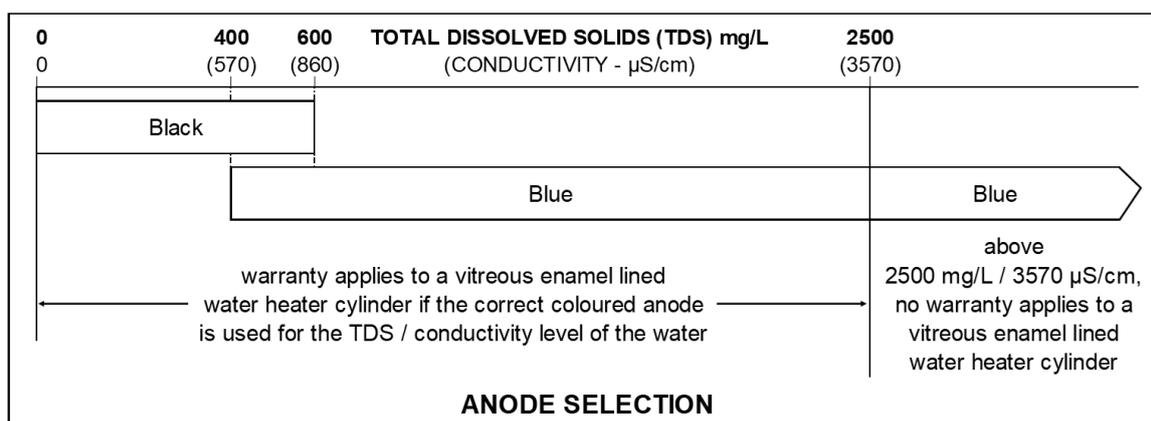
The vitreous enamel lined cylinder of the water heater is only covered by the Rheem warranty when the total dissolved solids (TDS) content in the water is less than 2500 mg/L and when the correct colour coded anode is used. If an incorrect colour coded anode is used in the water heater, any resultant faults will not be covered by the Rheem 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 16 for the Rheem warranty to apply to the water heater cylinder.

Total Dissolved Solids	Anode colour code
0 – 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 an anode 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 this water heater will slowly dissipate whilst protecting the cylinder. The life of the cylinder may be extended by replacing the anode.

For water supplies which are either softened or desalinated, or where the water supply may alternate between a water tank and a reticulated public supply or another supply, or where there is a variable supply (e.g. from a bore or public reticulated supply from various water sources), the anode must be inspected (and replaced if there is any sign of depletion) within five (5) years of its installation. For known very aggressive water supplies, the anode should be inspected within three (3) years of its installation.

For all water supplies, if the anode is not replaced during a major service (refer to “[Major Service Every Five Years](#)” on page 14) then the maximum time after installation when the anode should be replaced for this water heater is eight (8) years.

## CAUTION

If the water supply has a TDS greater than 600 mg/L and the black 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. The saturation index figures stated are calculated using a water temperature of 80°C.

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 Rheem warranty does not apply to a copper sheathed heating unit or a solar collector in an open circuit solar water heater system. A corrosion resistant heating unit must be used for the Rheem 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 Rheem warranty to apply to the temperature pressure relief valve and water heater cylinder. Solar collectors in an open circuit solar water heater system should be covered when the water heater is not intended to be used for more than four (4) weeks.

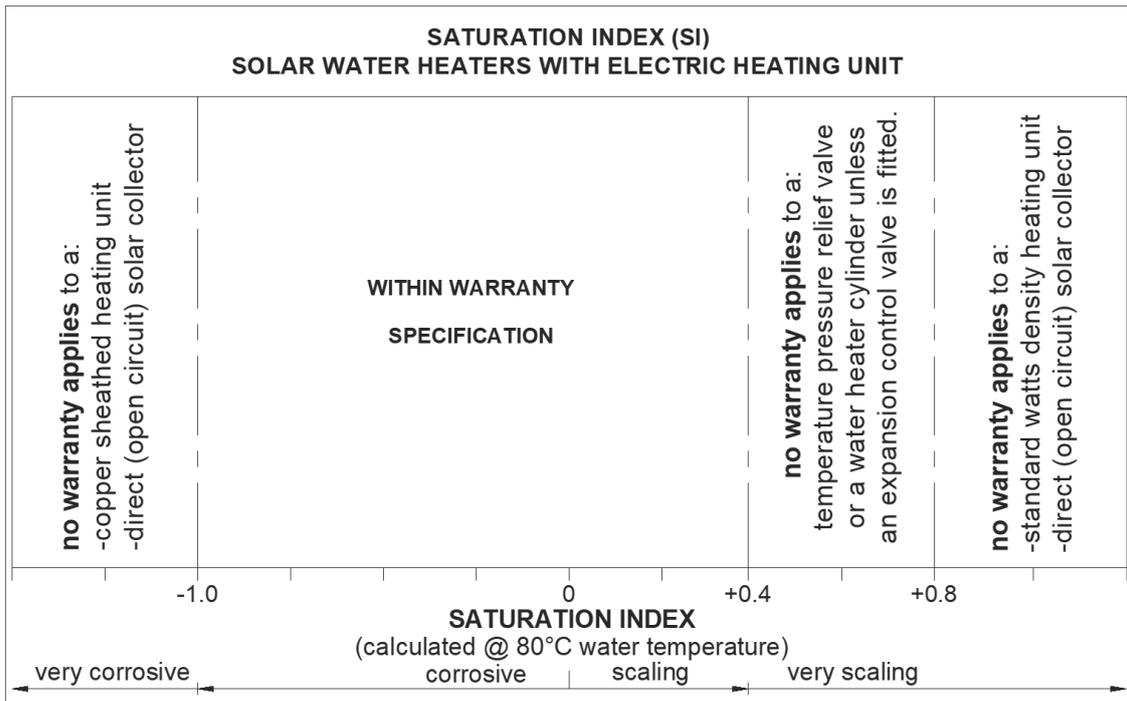
Where the saturation index exceeds  $+0.80$ , the Rheem warranty does not apply to a standard watts density heating unit or a solar collector in an open circuit solar water heater system. A low watts density heating unit must be used for the Rheem warranty to apply to the heating unit.

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 18.

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

Refer to the [cold water connection detail on page 47](#) for the position of the expansion control valve.



**SUMMARY OF WATER CHEMISTRY ADVICE AFFECTING WARRANTY**

The water heater, solar collectors and their 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 Rheem warranty will not cover any resultant faults on the components listed below:

**Water Chemistry**

- Total Dissolved Solids (TDS) > 2500 mg/L
- Total Dissolved Solids (TDS) not suitable for anode type
- Saturation Index (SI) < -1.0
- Saturation Index (SI) > +0.4  
(if an expansion control valve is not fitted)
- Saturation Index (SI) > +0.8

**Component**

- water heater cylinder
- water heater cylinder
- solar collector
- copper sheathed heating unit
- water heater cylinder
- temperature pressure relief valve
- solar collector
- standard watts density heating unit

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## SAVE A SERVICE CALL

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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 manufacture or failure of a part.

### NOT ENOUGH HOT WATER (OR NO HOT WATER)

This can occur with new installations and is normally related to some misunderstandings as to the use of the booster heating unit.

- **Insufficient sunlight**

Insufficient sunlight due to cloudy weather during hotter months or low solar energy contribution in colder months may mean the booster heating unit is required to boost more often.

Ensure the booster heating unit is being used as advised.

Refer to “[Booster Control](#)” on page 12.

- **Booster heating unit not operating**

Inspect the isolating switch marked “HOT WATER” or “WATER HEATER” at the switchboard and ensure it is turned on.

Check the timer (if one is installed) and its settings to ensure power is available to the booster heating unit.



**Note:** Check the electricity supply to which the unit is connected. If on an Off-Peak or time controlled electricity supply remember heating hours are restricted.

Check the fuse or circuit breaker marked “HOT WATER” or “WATER HEATER” at the switchboard.

- **Collectors shaded**

If trees or other objects shade the solar collectors or if the glass is dirty, the effectiveness of the solar collectors will be greatly reduced. Have the trees trimmed or the solar collectors relocated if the obstruction is permanent or clean the collector glass.

Refer to “[Collector Glass](#)” on page 15.

- **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. As you have installed an energy saving appliance, energy saving should also be practised in the home. Adjust your water usage pattern to take advantage of maximum solar gains.

Have a plumber install a flow control valve to each shower outlet to reduce water usage.

- **Relief valve running**

Is the relief valve discharging too much water?

Refer to “[Temperature Pressure Relief Valve or Expansion Control Valve Running](#)” on page 20.

- **Thermostat setting**

Ensure the thermostat setting is appropriate. You may choose to have a licensed electrical worker check and adjust the thermostat upwards to gain additional hot water capacity when boosting.

Refer to “[Temperature Adjustment](#)” on page 11.

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

- **Water heater size**

Do you have the correct size water heater for your requirements?

## WATER NOT HOT ENOUGH

You may find that due to heavy hot water usage or low solar energy gain the water temperature may be lower than normally expected. Ensure the booster is being used as advised. If a timer is installed, you will need to carefully plan your use of the booster heating unit to boost the water temperature on such occasions.

**Temperature Redistribution:** A lower water temperature may be noticed in the morning when the booster heating unit has not been energised overnight. This temperature reduction is caused by the transfer of heat energy overnight from the hot water in the upper part of the solar storage tank to the cold water in the lower part of the solar storage tank. This effect is often perceived as heat loss, but is actually the redistribution of stored heat more evenly over the entire contents of the solar storage tank. This heat is not lost to the system.

Temperature redistribution is more prevalent the more hot water is used the night before or if the booster switch or time clock is left off over-night and in particular may be experienced during periods of low solar energy gain, such as during the cooler months. Temperature redistribution can also occur during days of lower solar radiation particularly during the cooler months if power to the booster heating element is not available, or the booster switch or time clock is left off.

If higher temperature water is required, particularly in the morning, then use of the booster heating unit is necessary to raise the temperature of the water in the top section of the cylinder.

If the water heater is connected to an Off-Peak (overnight) electricity supply, then switching to an Extended Off-Peak (overnight and day) supply should be considered. If a timer is being utilised, then a timed boost period in the afternoon prior to the evening usage should be considered.

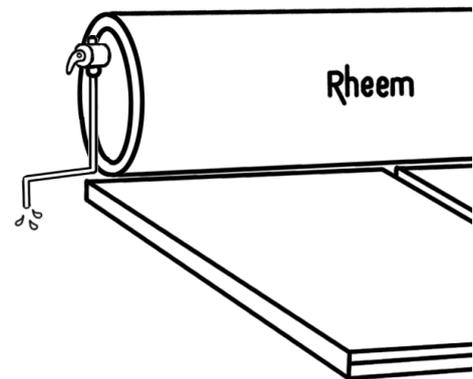
Refer also to “**Booster Control**” on page 12.

## TEMPERATURE PRESSURE RELIEF VALVE OR EXPANSION CONTROL VALVE RUNNING

- **Normal Operation**

It is normal and desirable the temperature pressure relief valve or expansion control valve allows a small quantity of water to escape during the heating cycle. This quantity should be equal to approximately 1/50 of the hot water used, as water expands by this volume when heated. However, if it discharges more than a bucket full of water in 24 hours, there may be another problem.

The expansion control valve will discharge water instead of the temperature pressure relief valve as it has a lower pressure rating. A benefit is that energy is conserved as the discharged water is cooler. This valve is installed in the cold water line to the water heater (refer to the **cold water connection diagram** on page 47).



- **Continuous dribble**

If readily and safely accessible, try gently raising the easing lever on the relief valve for a few seconds (refer to “**Relief Valves**” on page 8). This may dislodge a small particle of foreign matter and clear the fault. Release the lever gently.

If the relief valve lever is not readily and safely accessible, contact Rheem Service or their nearest Accredited Service Agent. Do not attempt to climb onto a non-trafficable roof to operate the relief valve lever.

- **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 from the temperature pressure relief valve until water heater is cold - then stops until water reheats**

If this occurs when the water heater is being boosted by the electric booster heating unit, then the water heater **must** be switched off at the isolating switch or switchboard. Phone Rheem Service or their nearest Accredited Service Agent to arrange for an inspection.

This may also occur on a water heater without an over temperature protection (OTP) system during periods of increased solar gain in the hotter months and particularly if there is a reduced level of hot water consumption. It is most likely to happen during the daytime.

One of the functions of the temperature pressure relief valve is to relieve the tank of excess energy, i.e. when water temperature increases to a high level. This higher temperature water is replaced with incoming cold water to reduce the energy level inside of the tank. The valve will close when cooler water surrounds the temperature probe of the valve. As this is a function of the temperature pressure relief valve under these conditions, it is not necessary to make a service call, however you may consider having an over temperature protection (OTP) system installed.

### COLLECTOR GLASS

The Rheem warranty **DOES NOT** cover breakage of solar collector glass. Check your household insurance policy covers collector glass breakage.

**⚠ Warning:** No attempt should be made to remove or replace broken collector glass.

The collector glass is not offered as a replacement part. Should the solar collector require replacement, contact Rheem Service or their nearest Accredited Service Agent.

### HIGHER THAN EXPECTED ELECTRICITY BILLS

With the installation of your new solar hot water system, maximum electrical energy savings can be achieved with careful planning of hot water usage. Should you at any time feel your electricity bill is higher than expected, we suggest you check the following points:

- Is the relief valve running excessively?

Refer to **“Temperature Pressure Relief Valve or Expansion Control Valve Running”** on page 20.

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

Refer to **“Not Enough Hot Water”** on page 19.

- 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 energy. Replace faulty tap washers, and have a plumber rectify any leaking pipe work.

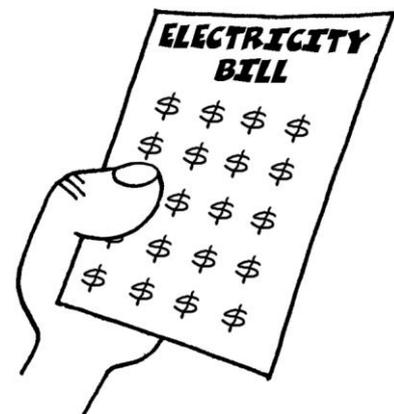
- Are you using the booster heating unit properly?

Refer to **“Booster Control”** on page 12.

- Has there been an increase in hot water usage?

An increase in hot water usage may result in an increase in booster operation.

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



### ELECTRICITY TARIFFS

The electricity hours of supply of the tariff to which your solar water heater is connected will play an important role in the overall boosting effectiveness of the system. It is important you are aware of this tariff to enable you to take full advantage of the boosting period, i.e. Domestic / Continuous or Time of Use, Extended Off-Peak (overnight and day) or extended time controlled, or Off-Peak (overnight) or time controlled. The electricity tariff will impact on the operating costs of the system. Time controlled tariffs are generally cheaper than a continuous supply tariff and result in lower running costs.

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

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## INSTALLATION – SOLAR STORAGE TANK

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### THIS WATER HEATER IS NOT SUITABLE FOR POOL HEATING.

The system is suitable for installation with Rheem NPT 200 solar collectors.

### IMPORTANT NOTES

- Working on roofs is and should always be considered a hazardous activity, particularly early in the morning, late in the evening, when the roof is wet or during and after periods of rain.
- All work must be carried out in accordance with Local, State and Federal Occupational Safety, Health and Welfare Regulations. In particular, the requirements for safety whilst manual lifting, working at heights and on roofs.
- Installers must be competently trained in:
  - Height Hazard Assessment
  - Working at Height Procedures
  - Assessment / Use / Wearing of correct height safety equipment (harnesses etc.)
  - All other relevant safety factors specific to the installation and maintenance work to be compliant with suitable Occupational, Health and Safety Regulations / Codes.
- All relevant permits shall be obtained from the regulatory authorities before commencing work to install the solar hot water system.
- All work carried out must be performed by appropriately qualified tradespeople or be suitably supervised for trades assistant duties.
- Every care must be taken to protect and warn occupants of the building and the public from personal injury which may occur from falling tools, roof materials, fittings or any other hazards of a general nature.
- Advise the occupants of any inconvenience which may occur due to disconnection of existing water and electrical supplies.
- The connection, attachment, integration or general association of other equipment or parts which either directly or indirectly affect the operation or performance of this equipment could void the Rheem warranty.
- All packaging materials must be removed from the solar storage tank prior to its installation. Refer to the **warning** on page 38 in relation to the removal of the solar collector packaging.

### INSTALLATION STANDARDS

The water heater must be installed:

- by a qualified person, and
- in accordance with the installation instructions, and
- in compliance with the Plumbing Code of Australia (PCA), Standards AS/NZS 3500.4 and AS/NZS 3000, and all local codes and regulatory authority requirements.

**⚠ Warning:** This water heater may deliver water at high temperature. Refer to the Plumbing Code of Australia, local requirements and these installation instructions to determine if additional delivery temperature control is required. Refer to **“Hot Water Delivery”** on page 25.

### NO FREEZE PROTECTION

A 52D series system does not have freeze protection. The system is not suitable for installation in areas subject to frost or freeze conditions. Freeze conditions occur below 6°C. The system has NO WARRANTY for freeze damage. Refer to **“Terms of the Rheem Warranty”** on page 4.

## 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 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 was to become inoperable for any reason. We recommend you provide advice to the system owner about their needs and building back-up redundancy into the hot water supply system.

This water heater is designed to be installed as an electric boosted solar water heater with its booster heating unit connected to a power supply, however it may be installed with an in-series continuous flow or storage booster.

If this water heater is installed with an in-series booster, then the electric booster heating unit will not be connected to a power supply and the references to the electric booster heating unit, thermostat and boosting controls in these installation instructions will not be applicable to the installation.

**Note:** AS 3498 requires that a water heater provides the means to inhibit the growth of Legionella bacteria in potable water. This water heater can satisfy this AS 3498 requirement provided the electric booster is energised for a sufficient period each day and the electric booster thermostat setting is 60°C or higher.

If this water heater is installed with an in-series continuous flow gas booster, then this requirement of AS 3498 can be satisfied provided the booster is energised, its preset outlet temperature setting is 70°C or higher and a remote temperature controller is not used.

If this water heater is installed with an in-series storage booster, then this requirement of AS 3498 can be satisfied provided the storage booster is energised and its thermostat setting is 60°C or higher.

### Installing the Water Heater as a Pre-Heater

This water heater can be used as a pre-heater to a new or existing in-series booster water heater provided:

- The in-series booster water heater is;
  - thermostatically-controlled, and
  - suitable to be used as an in-series booster water heater for a solar water heater.
- The operating pressures of the two water heaters are compatible or reduced to the lower rated of the two water heaters.
- The in-series booster water heater has sufficient thermal capacity to supply the hot water requirements of the application during periods of low or no solar gain.
- A temperature-operated bypass valve is installed prior to the in-series water heater if this water heater has either an over temperature energy cut-out which can be permanently disabled by high temperature hot water or a maximum recommended inlet supply temperature less than the temperature of water which can be supplied by this solar water heater.

It will be necessary to check with the manufacturer of the in-series water heater as to its suitability for use as an in-series booster to this solar water heater.

**SOLAR WATER HEATER STORAGE TANK LOCATION**

The solar storage tank is designed to be installed on the roof directly coupled to the solar collectors. The solar water heater should be installed close to either the most frequently used outlet or the previously installed water heater in a retrofit installation if existing pipe work is to be utilised, and its position chosen with safety and service in mind. The solar water heater should be installed with as close to a north facing aspect as possible. Refer to “Solar Collector Location” on page 32. The solar storage tank must not be installed inside the roof space.

The solar water heater system, including the interconnecting solar pipe work, must not be installed with an inclination of less than 10°, otherwise the water will not thermosiphon efficiently through the collectors.

Clearance must be allowed for servicing of the solar storage tank. Make sure the temperature pressure relief valve lever is accessible and the side cover, thermostat and booster heating unit can be removed for service. You must be able to read the information on the rating plate. If possible leave side room of one solar storage tank length so the anode can be inspected or replaced.

Remember you may have to remove the entire solar storage tank later for servicing. The solar storage tank must be capable of being removed without structural alteration to the building or major alteration to the piping.

For a single water heater installation, refer to the diagrams on pages 30 to 31. For multiple water heater installations, also refer to the instructions on pages 52 and 53.

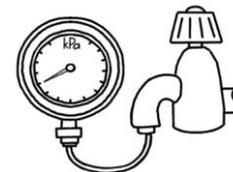


The solar storage tank must be installed horizontally level. Remember all local authorities have regulations about putting water heaters into roof spaces.

**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 cold water connection detail on page 47.

Model	180, 300
Temperature pressure relief valve setting	1000 kPa
Expansion control valve setting *	850 kPa
Maximum mains supply pressure	
With expansion control valve	680 kPa



\* Expansion control valve is supplied with the water heater installation pipe kit.

**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 one (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.

**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.

The pipe work between the solar storage tank and the solar collectors may be required to be insulated. Refer to “Warning: Plumber Be Aware” on page 34.

**HOT WATER DELIVERY**

This water heater can deliver hot water at temperatures which on occasion could exceed 75°C, sufficiently hot to cause severe scalding. Water at this temperature may be plumbed to fixtures where water hotter than 50°C is allowed, such as the kitchen and laundry.

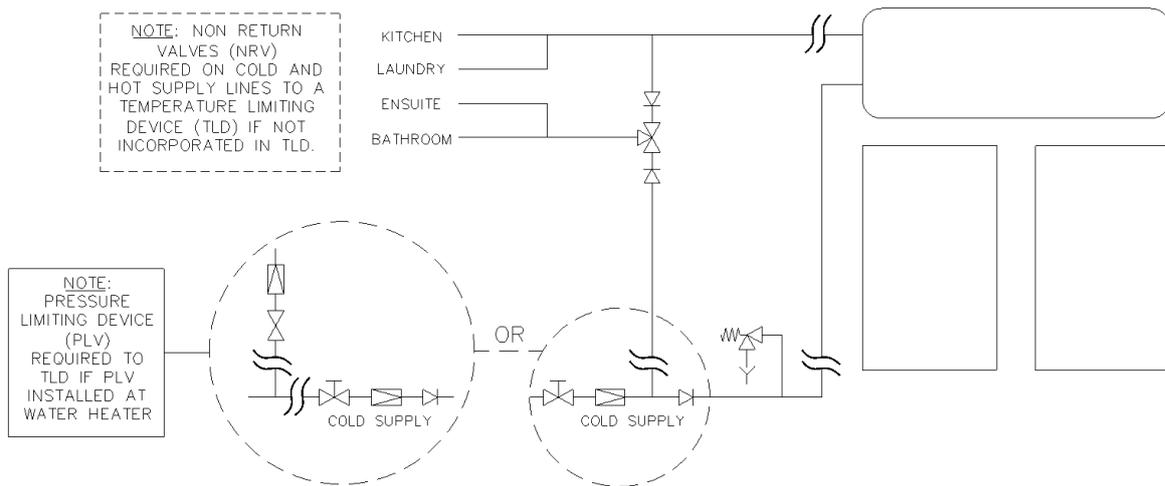
The installing plumber may have a legal obligation to ensure the installation of this water heater meets the water temperature delivery requirements of the Plumbing Code of Australia so that heated water delivered to fixtures and appliances used primarily for personal hygiene is at a temperature which is unlikely to scald.

It is necessary and we recommend that a temperature limiting device be fitted between the water heater and the fixtures and appliances used primarily for personal hygiene such as in a bathroom, ensuite, public amenities or other ablution areas, to reduce the risk of scalding.

The temperature limiting device must be of a type suitable for use with a solar water heater. Refer to the manufacturer’s specifications of the temperature limiting device.

Where a temperature limiting device is installed adjacent to the solar 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 and pressure limiting valve to the solar storage tank, but it **MUST BE** before a non-return valve. The expansion control valve must always be installed after the non-return valve and be the last valve prior to the solar storage tank.

**⚠ Warning:** A non-return valve **MUST BE** installed on the cold water line to the solar storage tank **AFTER** the cold water branch to a temperature limiting device.



**Two Temperature Zones Using a Temperature Limiting Device**

If a combination isolation valve and non-return valve (duo or trio valve) is installed on the cold water line to the solar water heater and the cold water line to the temperature limiting device branches off after this valve, then a second non-return valve must be installed between the cold water branch and the solar storage tank.

If a pressure limiting valve is installed on the cold water line to the solar 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.

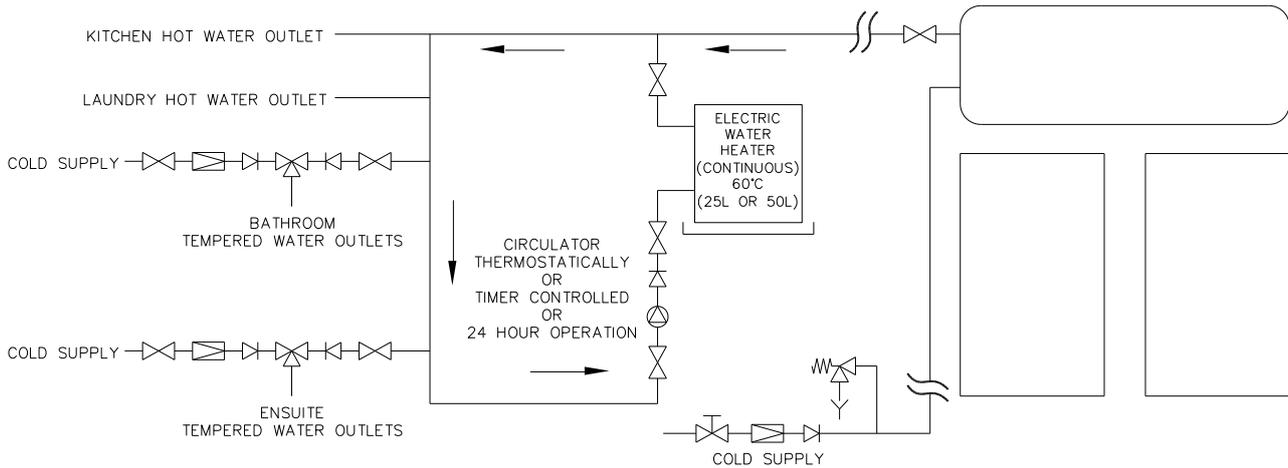
**CIRCULATED HOT WATER FLOW AND RETURN SYSTEM**

The solar storage tank of a solar water heater should not be installed as part of a circulated hot water flow and return system in a building. The benefits of solar gain will be significantly reduced.

**In-tank electric boosting**

If this solar water heater has its electric heating unit connected for in-tank boosting and a circulated flow and return system is required, it is necessary to install a secondary water heater supplied from the solar water heater. The flow and return lines connect to the secondary water heater, not the solar storage tank. The secondary water heater makes up for the pipe heat loss in the flow and return system and must be able to provide a hot water outlet temperature of at least 60°C.

Refer to the diagram [Circulated Hot Water Flow and Return System – Solar Water Heater with In-tank Boosting](#) on page 26.



**Circulated Hot Water Flow and Return System – Solar Water Heater with In-tank Boosting**

**In-series boosting**

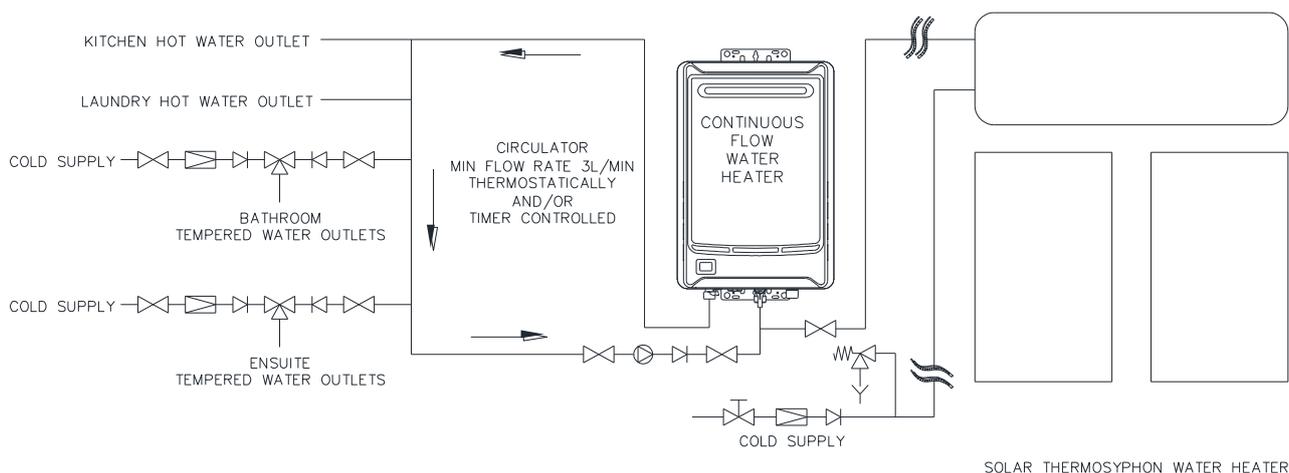
If this solar water heater does not have its electric heating unit connected for in-tank boosting and is installed as a solar pre-heater to an in-series booster water heater, then the booster water heater can be used as the secondary water heater so long as it is able to provide a minimum hot water outlet temperature of at least 60°C and it is not connected to an Off-Peak or time controlled electricity supply. It is necessary to connect the flow and return lines to the in-series booster and not to the solar storage tank.

Refer to the diagram [Circulated Hot Water Flow and Return System – Solar Water Heater with In-series Boosting](#) on page 27.

If the in-series water heater is a continuous flow water heater, the circulator must be:

- sized and set to provide a minimum flow rate of 3.0 L/min through the circulated hot water flow and return system, and
- either thermostatically and / or timer controlled.

The circulator **must not** be set to operate continuously, i.e. 24 hours per day.



**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 System – Solar Water Heater with In-series Boosting

#### Temperature Settings

- AS 3498 requires that a water heater provides the means to inhibit the growth of Legionella bacteria in potable water. To meet this requirement of AS 3498:
  - A solar storage tank with its electric heating unit connected for in-tank boosting, and the secondary water heater must always have their thermostats set to at least 60°C
  - An in-series storage water heater must always have its thermostat set to at least 60°C
  - An in-series continuous flow water heater must always have its preset outlet temperature setting set to at least 70°C
- Water should not be circulated from a water heater with a temperature setting of less than 60°C.
- The return water temperature to the water heater must not be less than 55°C.

If the water temperature decreases by more than 5°C due to heat loss from the ring main, the preset outlet temperature setting or thermostat setting of the secondary water heater or in-series water heater must be set to above 60°C to ensure the return water temperature is not less than 55°C.

#### 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.

### **BOOSTER HEATING UNIT**

The booster heating unit is for heating the water at times of low solar energy gain, such as during very cloudy or rainy weather, or during the colder months. Refer to “[Connections – Electrical](#)” on page 50 for electrical connection requirements and control options of the booster heating unit.

If this water heater is installed with an in-series booster, then the electric booster heating unit in the solar storage tank will not need to be connected to a power supply.

### **ANODE**

The vitreous enamel lined cylinder of the water heater is only covered by the Rheem 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 Rheem 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 Rheem warranty to apply to the water heater cylinder. Refer to “[Water Supplies](#)” on page 16 and the [Anode Selection table](#) on page 16. The black anode is typically fitted as standard.

If an incorrect anode is used, there is also 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 17.

### **SADDLING - PIPE WORK**

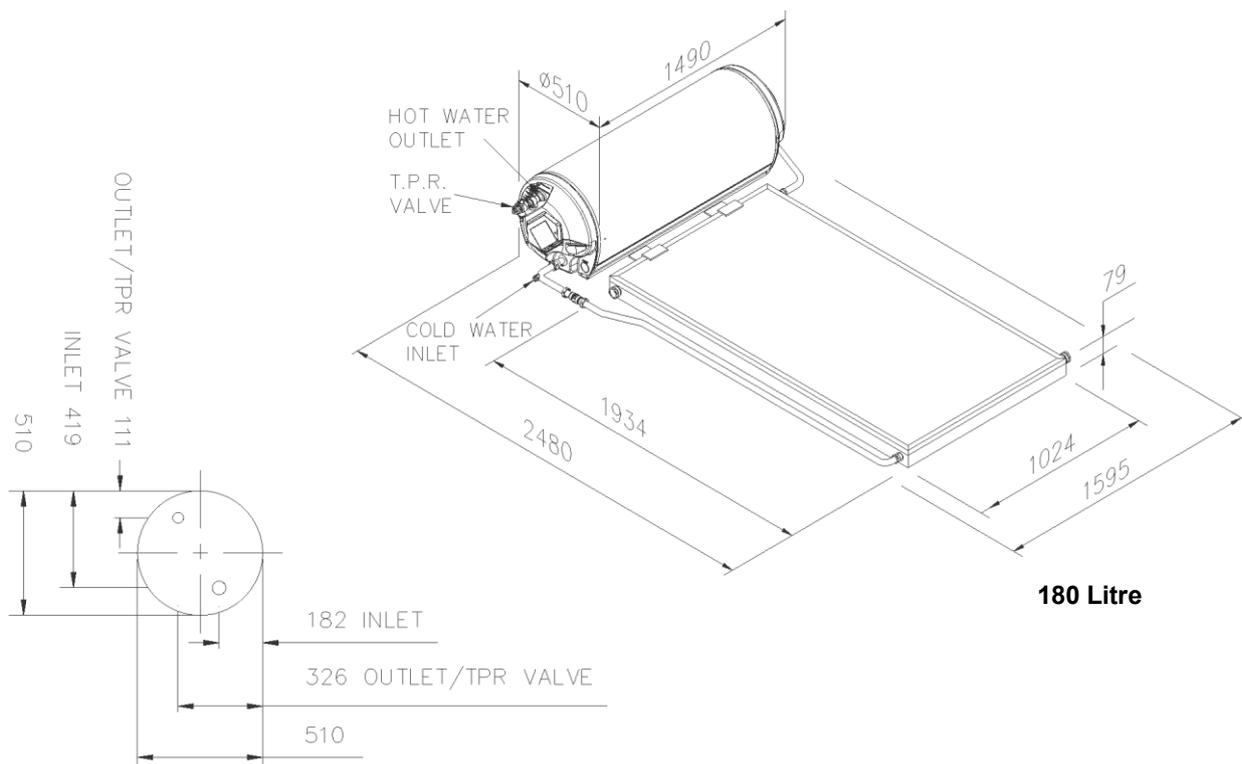
To prevent damage to the cylinder when attaching pipe clips or saddles to the solar storage tank jacket, we recommend the use of self-drilling screws with a maximum length of 13 mm. Should pre-drilling be required, extreme caution must be observed when penetrating the jacket of the solar storage tank.

**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 Rheem warranty.**

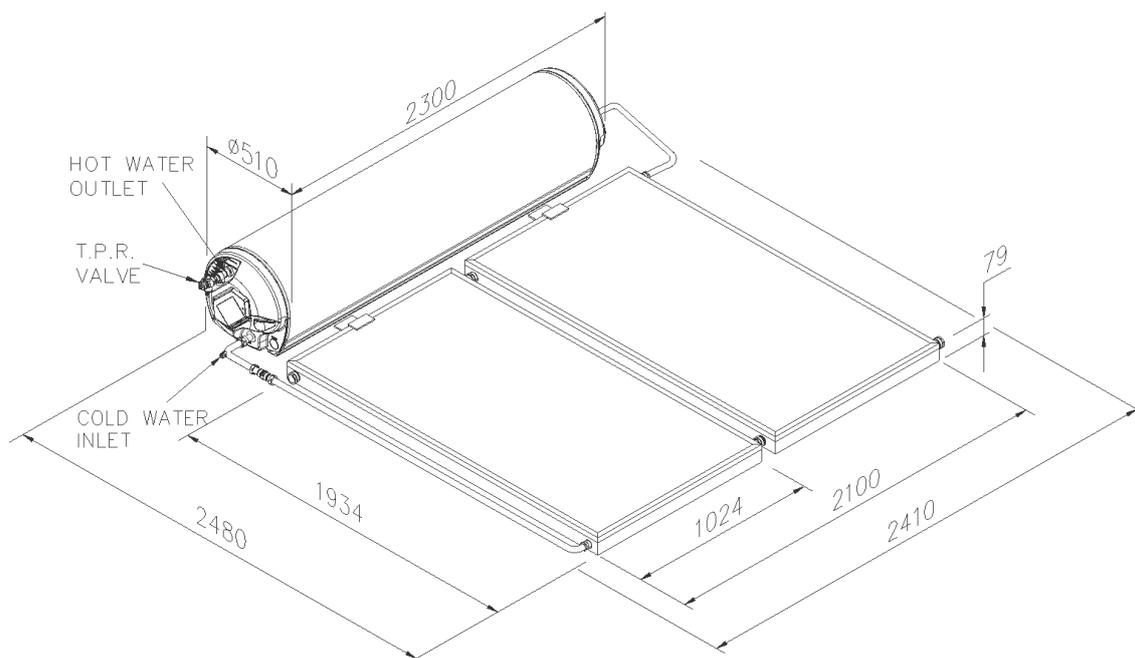
### **TANK REPLACEMENT**

If replacing a tank, the replacement tank must be fitted with a new temperature pressure relief valve and expansion control valve. These valves are not supplied with the tank.

**DIMENSIONS AND TECHNICAL DATA**



**180 Litre**

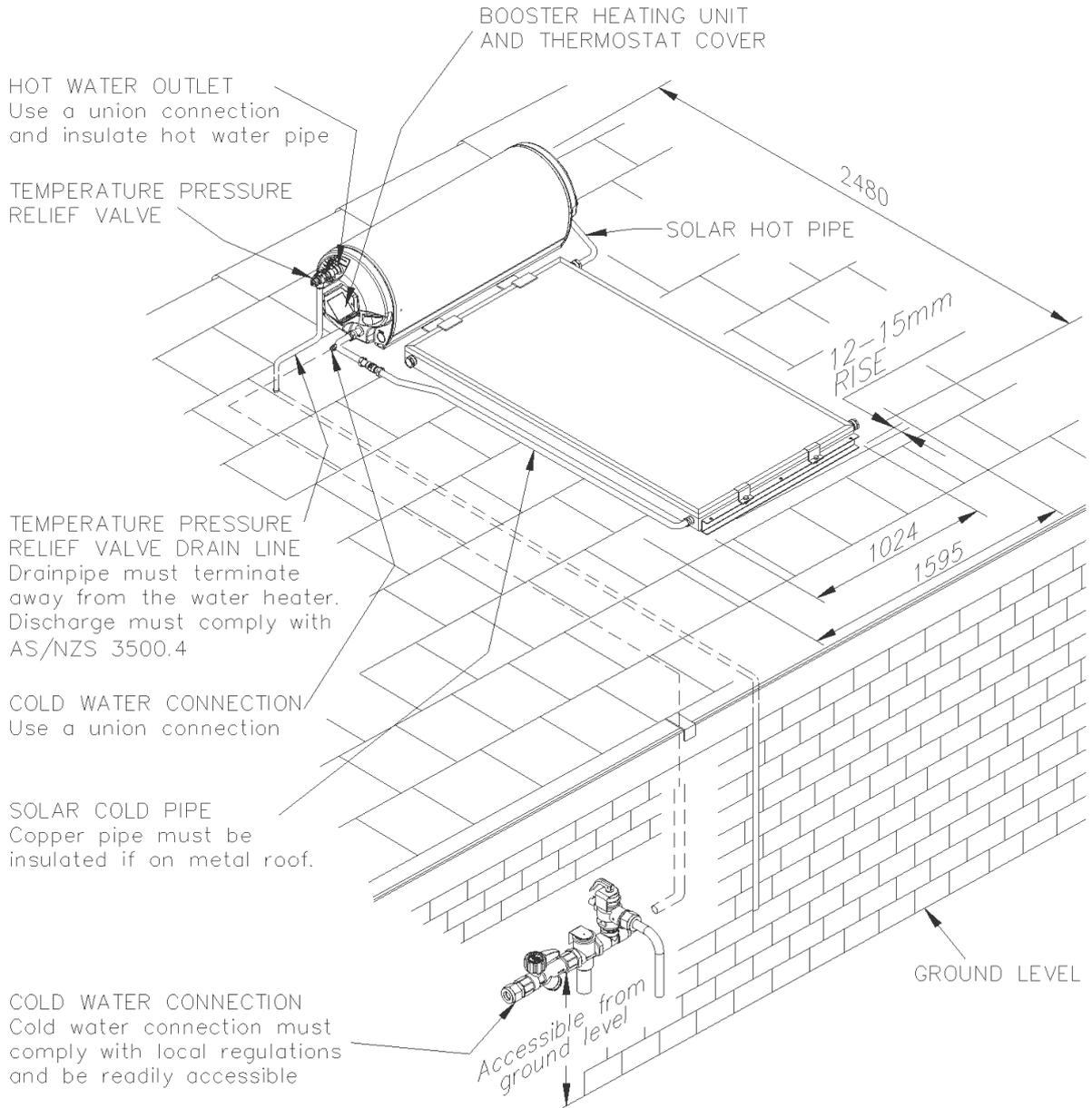


**300 Litre**

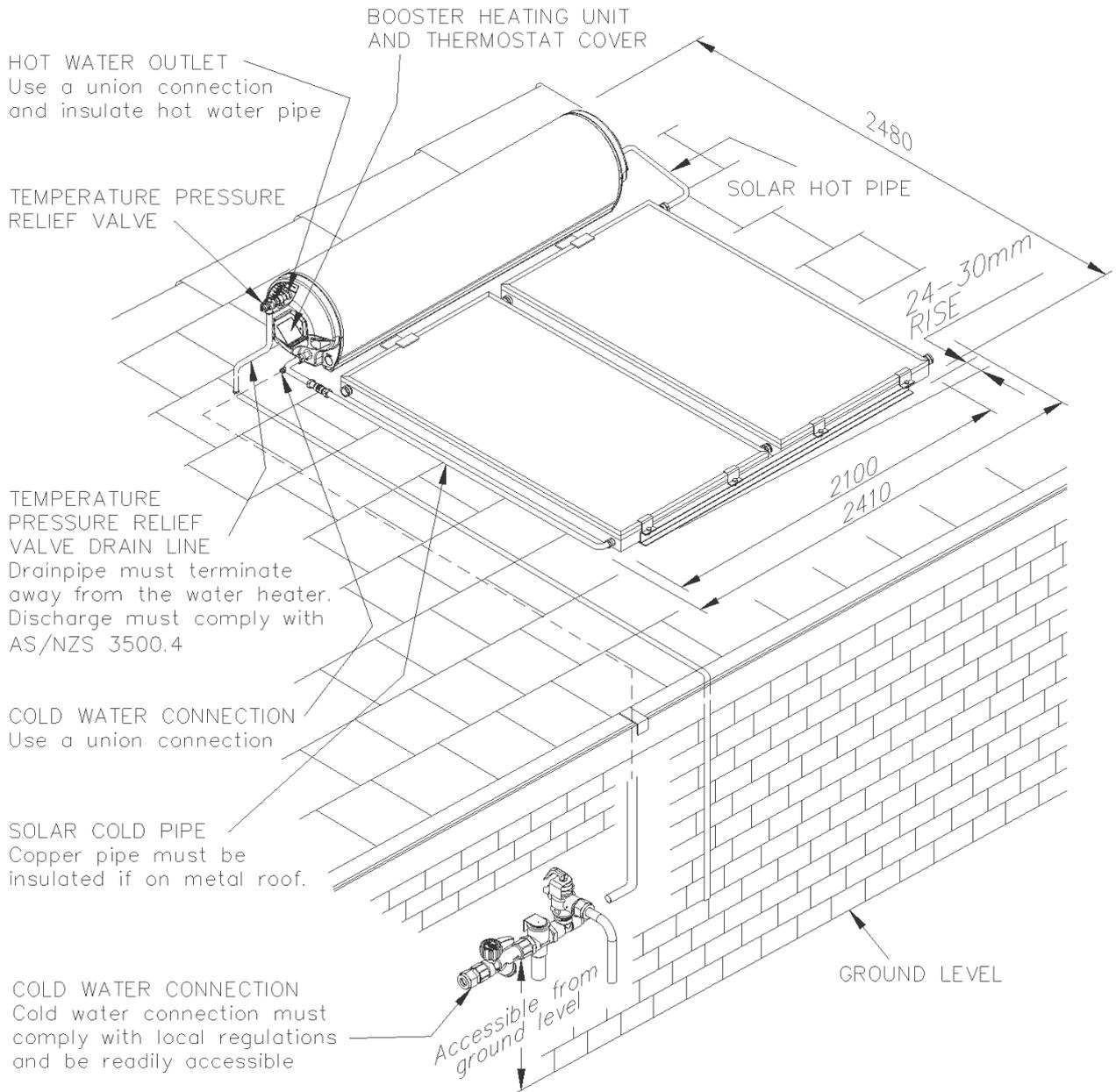
Solar Storage Tank (kg)				Solar Collectors (kg)				Pipe Kit (kg)	System (kg)
Model	Capacity	Empty	Full	Model	Qty	Empty	Full	-	Full
52D180	180 litre	60	240	NPT200	1	36	38	7	286
52D300	300 litre	92	392	NPT200	2	72	75	8	476

Tank model number has a two digit suffix to denote the heating unit size, where R5 = 2.4kW, R7 = 3.6kW  
 Technical data is subject to change.

TYPICAL INSTALLATION – SOLAR HILINE 180



**TYPICAL INSTALLATION – SOLAR HILINE 300**



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## INSTALLATION – SOLAR COLLECTORS

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### SOLAR COLLECTOR LOCATION

The solar collectors must be installed in a shade free position. The surrounds should be checked for higher buildings or trees which may cause shade at other times of the year and for small trees which may grow and shade the solar collectors in the future.

The installation must comply with the requirements of AS/NZS 3500.4 and all local codes and regulatory authority requirements.

### ROOF STRENGTH

The installer must ensure the structural integrity of the building is not compromised by the solar water heater installation and the roof structure is suitable to carry the full weight of the solar storage tank, solar collectors and frame (if one is installed). If in any doubt of the construction or the condition of the roof, the roof should be suitably strengthened. Consult a structural engineer.

The solar storage tanks, when full of water, weigh approximately 240 kg (180 litre) and 392 kg (300 litre). Each NPT200 solar collector and its fittings weigh approximately 42 kg when full of water.

### ROOF AREA FOR INSTALLATION

The roof area required for the solar storage tank and solar collectors is (excluding service and access space):

180 litre x 1 collector – 1.6 m wide x 2.5 m deep Weight (full) – 286 kg approx.

300 litre x 2 collectors – 2.5 m wide x 2.5 m deep Weight (full) – 476 kg approx.

Sufficient space should be left around the thermosiphon solar water heater to allow for safe service access.

A distance equal to the length of the tank should be left at the water supply connections end of the tank to any wall or obstruction so that the anode can be removed and replaced during a service. In addition, a minimum of one (1) metre clearance is recommended to be left around the solar storage tank and solar collectors on the other three sides for safe service access.

### ORIENTATION OF SOLAR COLLECTORS

The optimum orientation of solar collectors, to maximise system performance, is facing true north (in the southern hemisphere) or true south (in the northern hemisphere).

However, the optimum orientation of solar collectors is not always practical or achievable. If it is not possible to achieve the optimum orientation, then it is recommended to install the solar collectors as close to the optimum orientation as possible.

Solar collectors may be installed up to 90° from the optimum orientation, however solar system performance will be reduced. The system owner needs to be made aware of, understand and accept that solar system performance will be reduced and increased boosting may be required to meet their hot water requirements.

The total solar radiation received by solar collectors will reduce by approximately 4% to 5% when facing 45° from the optimum orientation and approximately 10% to 15% when facing 90° from the optimum orientation.

Where the collectors may be installed at a similar angle either east or west of the optimal orientation, then the hot water load and usage pattern may need to be considered. If the majority of hot water usage is before 2:00 PM favour an easterly bias. If the majority of hot water usage is after 2:00 PM favour a westerly bias.

**Note:** Always check for true north or true south using a compass or other suitable device.

**INCLINATION OF SOLAR COLLECTORS**

To help maximise system performance, solar collectors should be installed with an optimum inclination. This is equal to 90% to 100% of the local latitude angle when collectors are oriented within 60° of true north or true south, and generally between 10° and 20° when the collectors are oriented between 60° and 90° from the optimum orientation.

Generally, improved summer performance is obtained from an angle of inclination less than the optimum angle and improved winter performance is obtained by an angle of inclination greater than the optimum angle. If the angle of inclination varies by 20° from the optimum angle, the solar collectors will receive about 10% less total annual solar radiation. The [latitude of some Australian cities](#) are listed on page 33.

AS/NZS 3500.4 states that solar collectors shall be installed at an angle within 20° of the local latitude angle.

However, the optimum inclination of solar collectors is not always practical or achievable. A thermosiphon solar water heater may be installed at the roof angle for simplicity of installation and appearance, but must never be less than 10° from the horizontal.

The water heater, when installed with the supplied mounting system, is suitable for installations with an inclination of up to 30°. Where the solar water heater is installed at inclinations greater than 30°, a With-Pitch frame is necessary. Contact Rheem or your local Rheem Solar Water Heater Distributor for details.

A Variable-Pitch frame can be installed to increase the angle of inclination of the thermosiphon solar water heater. This type of frame should be used if the roof pitch is less than 10° or is more than 20° below the optimum angle. Contact Rheem or your local Rheem Solar Water Heater Distributor for details.

The use of a Variable-Pitch frame should be discussed with the system owner. If this option is neither possible nor acceptable to the system owner, then the system owner needs to be made aware of, understand and accept that solar system performance will be reduced and increased boosting may be required to meet their hot water requirements.

**CYCLONIC OR HIGH WIND AREAS**

For an installation of a thermosiphon solar water heater on a roof in a cyclonic or high wind area, a suitable frame is required. Contact Rheem or your local Rheem Solar Water Heater Distributor for details.

The installation of this solar water heater on a suitable frame, subject to the frame’s design criteria not being exceeded:

- may be suitable for installation in geographic locations up to and within Wind Region D (With-Pitch frame) or up to and within Wind Region C (Variable-Pitch frame), as defined in Volume 2 of the National Construction Code, AS 4055 and AS/NZS 1170.2, or equivalent locations, and
- may provide an acceptable method of installation where it is necessary to satisfy the requirements of the National Construction Code for high wind areas, or equivalent requirements.

**LATITUDE OF SOME AUSTRALIAN CITIES**

Adelaide	35°S	Cairns	17°S	Hobart	42°S	Port Hedland	20°S
Alice Springs	24°S	Canberra	35°S	Mildura	34°S	Rockhampton	24°S
Brisbane	27°S	Darwin	12°S	Melbourne	38°S	Sydney	34°S
Broken Hill	31°S	Geraldton	28°S	Perth	32°S	Townsville	19°S



## WARNING: Plumber – Be Aware

- The solar hot and solar cold pipe work between the solar Hiline storage tank and the solar collectors are supplied in the pipe kit. The supplied copper solar hot and solar cold pipes **MUST BE** used.
- If the solar water heater is installed either on a metal roof or in a trafficable area, such as on an accessible roof, then the solar hot and solar cold pipes must be insulated. The solar hot and solar cold pipes may be required to be insulated to comply with local regulations.

If insulation is required, the full length of the solar hot and solar cold pipes **MUST BE** insulated.

The insulation must:

- be of a closed cell type or equivalent, suitable for a solar water heating application and capable of withstanding the temperature of the water generated by the solar collectors under stagnation conditions

The specification of the chosen insulation material should be checked with the insulation manufacturer prior to installation as different materials may vary in temperature tolerance.

- be at least 13 mm thick
- be weatherproof and UV resistant
- be fitted up to and cover the connections on both the solar storage tank and the solar collectors.

The insulation will offer protection to a metal roof against corrosion due to water running off the copper pipes, assist in avoiding accidental contact with the solar pipe work as very high temperature water can flow from the solar collectors to the solar storage tank, and also reduce pipe heat losses.

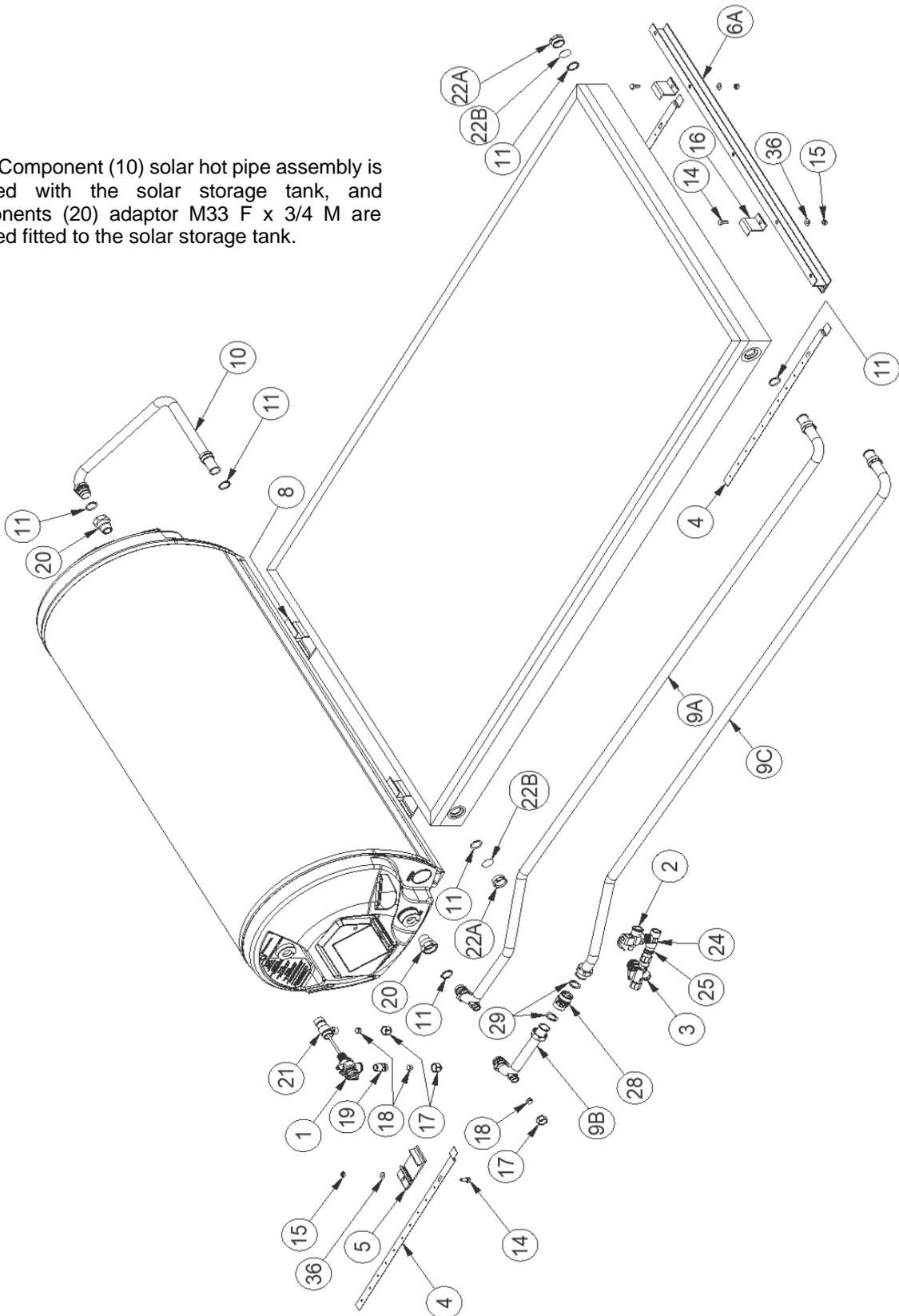
- Plastic pipe **MUST NOT** be used, as it will not withstand the temperature and pressure of the water generated by the solar collectors under stagnation conditions. Extremely high water temperatures and extremely high water pressures can be generated under these conditions. Plastic pipe cannot withstand these temperatures and pressures and **MUST NOT** be used. Failure of plastic pipe can lead to the release of high temperature water and cause severe water damage and flooding.
- There **MUST BE a continuous fall of a minimum 10°** in the pipe work from the solar Hiline storage tank to the solar collectors. The highest point of the solar cold pipe and solar hot pipe must be where they connect to the solar Hiline storage tank, otherwise thermosiphoning will not occur.
- A non-return valve **MUST BE** installed on the cold water line to the solar storage tank **AFTER** the cold water branch to a temperature limiting device.
- The solar water heater, including the collector circuit, is to be isolated during the testing and commissioning of the heated water reticulation system in a building in accordance with Clause 9.3 (a) of AS/NZS 3500.4:2018. The collector circuit includes the solar hot and solar cold pipes and solar collectors.

## SYSTEM ASSEMBLY

The numbered components in the exploded view diagrams are listed in the table of components in "Components and Kit Contents" on page 37.

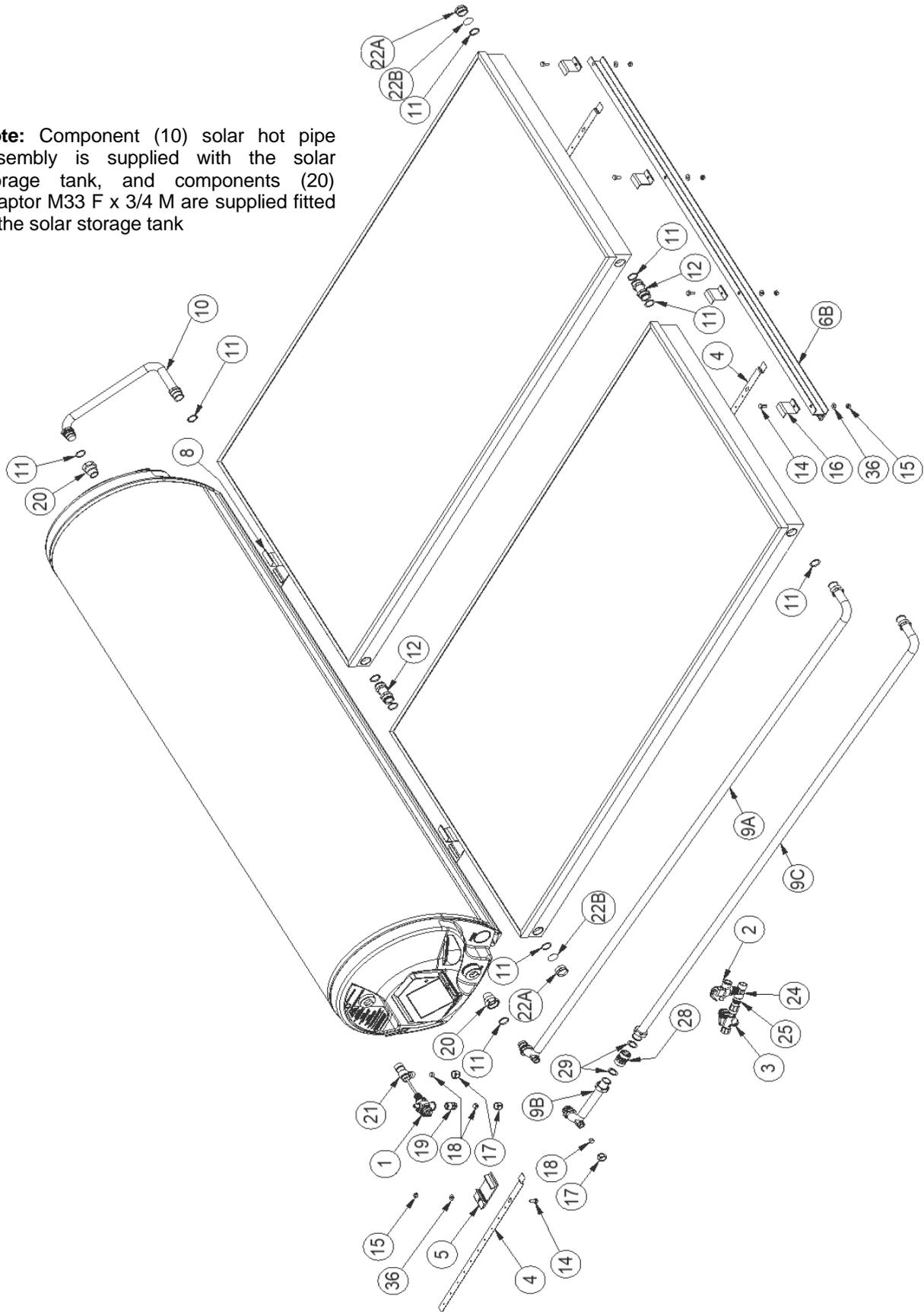
### 52D180 TANK WITH 1 X NPT200 COLLECTOR – EXPLODED VIEW

**Note:** Component (10) solar hot pipe assembly is supplied with the solar storage tank, and components (20) adaptor M33 F x 3/4 M are supplied fitted to the solar storage tank.



52D300 TANK WITH 2 X NPT200 COLLECTORS – EXPLODED VIEW

**Note:** Component (10) solar hot pipe assembly is supplied with the solar storage tank, and components (20) adaptor M33 F x 3/4 M are supplied fitted to the solar storage tank



**COMPONENTS AND KIT CONTENTS**

The thermosiphon solar water heater is supplied with a pipe kit, which contains the components required to assemble the solar storage tank and solar collectors together.

Pipe kits are available for a system installation with or without a thermosiphon restrictor valve (TRV). The thermosiphon restrictor valve is installed in the solar cold pipe.

The thermosiphon pipe kits and the systems they are suitable for are:

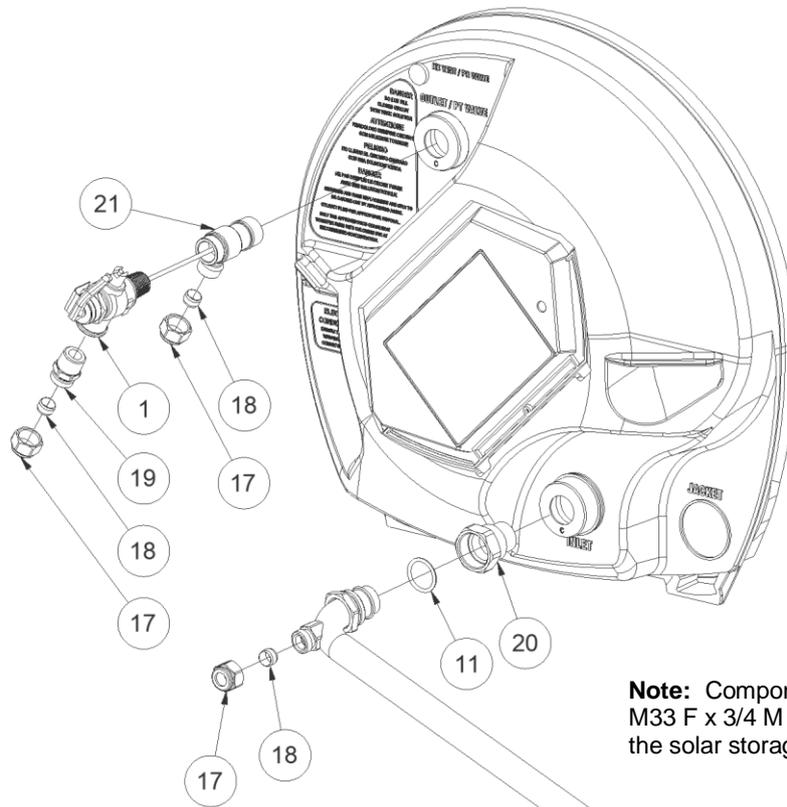
52D180/1NPT	52D180 tank with <b>one NPT200</b> solar collector	using kit	12104779 (with TRV)
		or kit	12104220 (without TRV)
52D300/2NPT	52D300 tank with <b>two NPT200</b> solar collectors	using kit	12104781 (with TRV)
		or kit	12104266 (without TRV)

Item	Description	52D180/1NPT with TRV		52D180/1NPT without TRV		52D300/2NPT with TRV		52D300/2NPT without TRV	
		Kit 12104779	Kit 12104220	Kit 12104781	Kit 12104266	Part No.	Qty	Part No.	Qty
	<b>Supplied in pipe kit</b>	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty
1	Valve HT55 1000kPa EHW	451104	1	451104	1	451104	1	451104	1
2	Valve H50 850kPa EHW	451103	1	451103	1	451103	1	451103	1
3	Valve Trio BVNRI50S	203701	1	203701	1	203701	1	203701	1
4	Strap Roof Fixing S/S	204600	4	204600	4	204600	4	204600	4
5	Clamp Tank	330872	2	330872	2	330872	2	330872	2
6A	Collector Rail Std 1 Col	331847	1	331847	1	-	-	-	-
6B	Collector Rail Std 2 Col	-	-	-	-	331846	1	331846	1
8	Tank Collector Spacer	337144	2	337144	2	337144	2	337144	2
9A	Cold Pipe Assy	-	-	331661	1	-	-	331662	1
9B	Cold Pipe Assy TRV Assy Upper	344640	1	-	-	344640	1	-	-
9C	Cold Pipe Assy TRV Lower Screwed	344654	1	-	-	344641	1	-	-
11	O'ring 25MM diam	330171	7	330171	7	330171	11	330171	11
12	Union L Screwed Fitting	-	-	-	-	330695	2	330695	2
14	Set Screw Hex M8 x 1.25 x 20 SS	209130	4	209130	4	209130	6	209130	6
15	Nut M8 x 1.25 SS G304 A2-70	209118	4	209118	4	209118	6	209118	6
16	Collector Clamp	331928	2	331928	2	331928	4	331928	4
17	Nut Compression DN15	331655	6	331655	6	331655	6	331655	6
18	Olive DN15	331656	6	331656	6	331656	6	331656	6
19	Union Body R1/2 M x DN15 Olive	331657	4	331657	4	331657	4	331657	4
21	Tee R3/4 M x RP1/2 F x DN15 Olive	331663	1	331663	1	331663	1	331663	1
22A	Gland Nut L Collector M33 M	330600	2	330600	2	330600	2	330600	2
22B	Blanking Disc L	330606	2	330606	2	330606	2	330606	2
24	Tee RP1/2	331666	1	331666	1	331666	1	331666	1
25	Nipple R1/2 M x R1/2 M	334046	1	334046	1	334046	1	334046	1
28	Valve Thermosiphon Restrictor	344391	1	-	-	344391	1	-	-
29	Silicone Rubber Washer 31 x 22.5 x 2.0	345096	3	-	-	345096	3	-	-
36	Washer Flat 8 x 16 x 1.6mm S/S A2 (304)	209124	4	209124	4	209124	6	209124	6

**Supplied with tank (not in pipe kit)**

10	Hot Pipe Assy	330663	1	330663	1	330706	1	330706	1
20	Adaptor M33 F x 3/4 M	330602	2	330602	2	330602	2	330602	2

## WATER CONNECTIONS END – EXPLODED VIEW



**Note:** Component (20), adaptor M33 F x 3/4 M is supplied fitted to the solar storage tank.

## PREASSEMBLY NOTES

- These solar collectors have passed the AS/NZS 2712 requirements for resistance to hailstone damage, so it is not normally necessary to fit a guard to a collector. Stone Guards are available to provide a level of protection to the collectors against vandalism or accidental damage. Contact Rheem or your local Rheem Solar Water Heater Distributor for details.
- The Rheem warranty **DOES NOT** cover breakage of solar collector glass. Check your insurance policy covers collector glass breakage.

**⚠ Warning:** No attempt should be made to remove or replace broken collector glass.

The collector glass is not offered as a replacement part. Should the solar collector require replacement, contact Rheem or your local Rheem Solar Water Heater Distributor for details.

- **⚠ Warning:** Do not remove the solar collector packaging completely, prior to the installation as the solar collector surface can become very hot. Remove only sufficient packaging material to enable the installation of the solar collectors.

Upon completion of the installation of the solar water heater the packaging material may be removed from the NPT 200 solar collectors, whether or not the solar water heater is commissioned.

The solar collector packaging must be removed completely prior to the permanent operation of the water heater.

- All connectors, end plugs, O'rings, brass fittings, roof straps, and collector rail required for the installation are included with the pipe kit.

Suitable screws or anchors will be required to fix the roof straps to the rafters for a pitched roof installation.

**⚠ Warning:** Where roof straps, frames, etc. are secured to roof members, all fixings must be of an appropriate type to suit the type of member. Inadequate or inappropriate fixings may result in the roof straps becoming unsecured and the installation of the solar hot water system becoming unsafe.

- If the solar storage tank is being installed with existing solar collectors, then utilise the existing fittings and pipes used on the installation. A new temperature pressure relief valve and expansion control valve must be installed. These valves are not supplied with the tank.

**ASSEMBLY PROCEDURE**

Refer to the [52D180/1NPT exploded view diagram](#) on page 35 and the [52D300/2NPT exploded view diagram](#) on page 36 for the location and position of components.

**DO NOT MODIFY THESE PARTS IN ANY WAY.**

1. **Roof Condition:** Check the condition of the roof and advise the client of any broken tiles or damaged roof sheeting before commencing the installation.
2. **Solar Frame:** If a solar frame is to be installed, determine the location of the frame. Refer to "[Solar Water Heater Storage Tank Location](#)" on page 24 and "[Solar Collector Location](#)" on page 32 and the installation instructions provided with the frame.

Assemble and fix the frame to the roof, in accordance with the installation instructions provided with the frame.

Depending upon the positioning of the frame on the roof and any minor fall the roof may have, ensure the collector rail is either horizontal or is higher on the hot outlet side of the solar collectors. If in doubt use a spirit level.

Proceed to step 6.

3. **Water Heater Location:** if a solar frame is not installed, select a suitable position for the solar water heater.

Refer to "[Solar Water Heater Storage Tank Location](#)" on page 24 and "[Solar Collector Location](#)" on page 32.

4. **Position of Tank:** Select the position of the solar storage tank so the front of the foot is above a roof batten toward the nose of an even row of tiles or even metal roof sheet. The rear of the foot may be seated over the nose of the tiles on the next row behind. Where possible, the tank should be positioned at least three tiles from the ridge capping to prevent disturbance of the ridge.
5. **Collector Rail:** Determine the location of the collector rail (6). Measure down the roof 2030 mm from the position of the front foot of the solar storage tank to determine the location of the collector rail (6).

**Note:** The roof straps are to be fitted to the collector rail (6) before fixing the straps to the rafters.

Determine which slots in the collector rail (6) will be used for the roof straps (4) after locating the rafters and taking note of the rafter spacing. Hook two roof straps (4) to the collector rail (6). Refer to "[Hooking Roof Strap to Collector Rail](#)" on page 43 and [Detail A](#) on page 43.

Hook the two roof straps (4) to the collector rail (6). The roof straps (4) are to be fitted to the collector rail (6) before fixing the straps to the rafters.

**Note:** The solar collectors must be installed at an angle from the horizontal. This is to ensure a sufficient angle rise across the collectors from left to right to assist in optimum thermosiphon operation and solar performance.

Use a spirit level to determine the horizontal. Ensure the end of the collector rail (6) at the hot outlet side (right hand side) of the solar collectors is between:

- 12 – 15 mm (for one solar collector), or
- 24 – 30 mm (for two solar collectors)

higher up the roof from the horizontal than the left hand end of the collector rail (6) at the inlet side of the solar collectors.

If the roof material is not even where the collectors are to be installed, then it may be necessary to add 10 mm for each collector in the array to the above distances. It is important that the solar hot outlet is the highest point in the collector waterway so the system functions efficiently.

**Note:** AS/NZS 3500.4 states a minimum of three (3) screws 40 mm long be used per fixing strap. Longer screws or anchors may be required to achieve a 40 mm minimum embedment into rafters for a metal roof. Additional screws or anchors may be required.

*Tile Roof:* Remove the tiles on the next row above the position of the collector rail (6) to expose the rafters. Ensure the collector rail (6) is at the correct angle from the horizontal. Once in position, fix the roof straps (4) directly to the rafters. Replace the tiles.

*Metal Roof:* Ensure the collector rail (6) is at the correct angle from the horizontal. Once in position, fix the roof straps (4) to the rafters through the metal roofing material. Care should be taken not to mark Colorbond or other metal roof sheet with a marking pen and to remove all swarf from the metal roof as these can cause deterioration of the metal roofing material.

**Note:** Fixings must penetrate only through the high point in the roof material profile.

- Solar Collectors:** Using a lifting device, lift the first solar collector onto the roof and place it carefully in the correct configuration with the lower end seated in the collector rail (6). Prior to positioning the next solar collector (for a two collector installation), firmly clamp (two collector clamps per collector) to the collector rail (6) using the collector clamps (16), hex screws (14), washers (36) and nuts (15) provided.

Repeat this procedure for a second collector, firmly clamping the collector to the collector rail (6) with two clamps (16).

For a single collector installation ensure the solar collector is correctly positioned, centred and well seated in the collector rail (6). Firmly clamp the solar collector (two collector clamps per collector) to the collector rail (6) using the collector clamps (16), hex screws (14), washers (36) and nuts (15) provided.

**Note:** Firmly clamping each solar collector to the collector rail (6) as it is placed in position reduces the possibility of the collectors accidentally moving or sliding off the collector rail (6).

Refer to “Clamping Collector to Collector Rail” on page 44.

Remove the red transit plugs from all collector sockets.

- Collector Unions:** For a 300 litre model with two solar collectors, couple the solar collectors together using the collector unions (12) and O’rings (11) supplied in the pipe kit.

Refer to “Coupling Collector to Collector – Screwed Fittings” on page 45.

**Note:** It will be necessary to loosen the collector clamps (16) on a collector prior to it being coupled to its adjacent collector.

For a two collector installation ensure the solar collectors are correctly positioned, centred and well seated in the collector rail (6). Firmly clamp the solar collectors to the collector rail (6), using the collector clamps (16), hex screws (14), washers (36) and nuts (15) provided.

- Tank Flashing, Tank to Collector Spacers:** (not required if the installation is on a solar frame)

*Tile Roof:* If used, fit the tank flashing sheet (not shown) under the top of the solar collectors and extend up the roof to the top of the solar storage tank location. Lift the roof tiles immediately above the solar storage tank location and secure the flashing sheet to the roofing members. Ensure the flashing sheet makes the section of roof under the tank waterproof.

*Metal and Tile Roof:* Locate the Tank to Collector spacers (8) against and under the top end of the solar collectors (one per collector for a two collector system). These should be located 200 mm from the sides of the collector for a one collector system or 200 mm from the ends of the tank for a two collector system, and on the top of the tile or metal roof profile.

- Storage Tank:** Using a lifting device, lift the tank onto the roof. Position the storage tank in place above the solar collectors, locating central to the solar collectors before sliding it down onto the tank to collector spacers (8) or the tank / collector rail (not shown) if the installation is on a solar frame.

Remove the red transport plugs from the connection fittings on the tank.

- End Plugs:** Fit the M33 gland nut end plugs (22A) to the top left and bottom right connections of the solar collectors using the O’rings (11) and blanking discs (22B) provided. The blanking disc (22B) should be installed with the smooth edge facing into the collector.

Refer to “End Plug Assembly – Screwed Fittings” on page 45.

11. **Tank to Collector Connections of Pipe Work:** Connect the solar hot pipe (10) and the solar cold pipe (9) to the solar collectors, using the O’rings (11) provided.

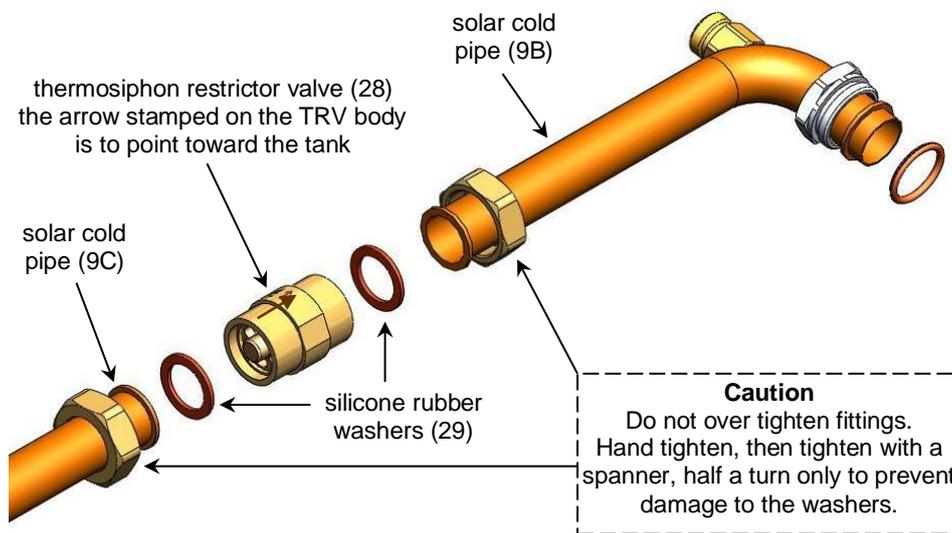
Connect the solar hot pipe (10) (short pipe) supplied to the fitting adaptor connection on the right hand end of the solar storage tank and to the top right connection of the solar collectors.

Connect the solar cold pipe (9) (long pipe) supplied, to the cold water connection on the left hand end of the solar storage tank and to the bottom left connection of the solar collectors.

Refer also to the [Water Connections End – Exploded View diagram](#) on page 38 for the location and position of the solar cold pipe (9) connection to the solar storage tank.

Where supplied, a thermosiphon restrictor valve (28) is to be fitted into the solar cold pipe (9B, 9C).

- The shorter solar cold pipe (9B) connects to the solar storage tank. The longer solar cold pipe (9C) connects to the solar collector.
- Position the thermosiphon restrictor valve (28) between the two solar cold pipes, orientating the valve with the marked arrow pointing toward the tank, and fit a flat silicone rubber washer (29) on either side of the valve against the flared pipe ends.
- Hand tighten the fittings on the solar cold pipes to secure the thermosiphon restrictor valve (28) in position, then tighten with a spanner, half a turn only to prevent damage to the washers.



Refer to [“Coupling Cold and Hot Pipes to Collector – Screwed Fittings”](#) on page 46.

After connecting the tank to collector pipe work, check and tighten the nuts (15) on the collector clamps (16) if required at the collector rail (6) to secure the solar collectors.

12. **Tank Clamps and Roof Straps:** On a pitched roof installation, insert a roof strap (4) into a tank clamp (5) and then loosely attach the tank clamp (5) to the rear foot of the tank base. Attach the upper part of the tank clamp (5) and secure with the hex screw (14), washer (36) and nut (15) provided. There are two tank clamps (5) per tank. Ensure the hex screw heads fit into the valley of the roof material profile.

Refer to [“Hooking Roof Strap to Tank Clamp”](#) and diagrams on page 44.

**Note:** AS/NZS 3500.4 states a minimum of three (3) screws 40 mm long be used per roof strap. Longer screws or anchors may be required to achieve a 40 mm minimum embedment into rafters for a metal roof. Additional screws or anchors may be required.

*Tile Roof:* Remove the tiles on the next row above the position of the storage tank to expose the rafters. Once in position, fix the roof straps (4) directly to the rafters. Replace the tiles.

*Metal Roof:* Once in position, fix the roof straps (4) to the rafters, through the metal roofing material.

**Note:** Fixings must penetrate only through the high point in the roof material profile.

13. **Hot Water Outlet and Temperature Pressure Relief Valve:** Fit the R3/4 M x RP1/2F x G1/2 M olive hot water Tee (21) to the tank hot water outlet connection.

Screw the temperature pressure relief valve (1) into the hot water Tee (21) at the hot water outlet.

Refer to “[Temperature Pressure Relief Valve](#)” on page 48 for additional details on the temperature pressure relief valve and its installation.

Orientate the outlets of the hot water Tee (21) and temperature pressure relief valve (1) toward the rear of the tank and away from the electrical cover. The hot water pipe work and drain line from the hot water Tee (21) and temperature pressure relief valve (1) **must not** be installed in front of or prevent access to the electrical cover of the water heater.

A union (19), olive (18) and compression nut (17) are supplied for the connection of the drain line to the temperature pressure relief valve (1). Refer to “[Relief Valve Drain](#)” on page 49 for the installation requirements of the drain line.

Olives (18) and compression nuts (17) are supplied for the connection of the hot water pipe to the hot water Tee (21) and for the connection of the cold water pipe to the fitting on the shoulder of the solar cold pipe.

Refer also to the [Water Connections End – Exploded View diagram](#) on page 38 for the location and position of components.

14. **Plumbing and Electrical Connections:** Refer to “[Connections – Plumbing](#)” on page 47 for details on the cold water and hot water plumbing and “[Connections – Electrical](#)” on page 50 for details on the electrical connection.

Refer to “[Installation Check List](#)” on page 42.

#### Notes

- Penetrations through the roofing material are to be:
  - at the high point of the roof tile or metal sheet;
  - made neatly and kept as small as practicable;
  - waterproofed upon installation of the hot and cold pipes.
- Exposed pipe work between the solar storage tank and the penetrations through the roofing material should be kept to a minimum to maintain the aesthetics of the installation.

#### INSTALLATION CHECK LIST

Once the installation is completed and before the system is full of water, it is important to check the following:

- The solar hot and solar cold pipes grade downwards with a continuous fall of not less than 10° from the solar storage tank to the solar collectors. If in doubt use a spirit level.
- On a pitched roof installation without a frame;
  - the right hand outlet side of the collector array is between,
    - 12 – 15 mm (for one solar collector), or
    - 24 – 30 mm (for two solar collectors)
  - higher up the roof from the horizontal than the left hand end of the collector rail at the inlet side of the solar collectors. If in doubt use a spirit level.
- On a frame installation, depending upon the positioning of the frame on the roof and any minor fall the roof may have, ensure the collector rail is either horizontal or is higher on the hot outlet side of the solar collectors. If in doubt use a spirit level.

**ASSEMBLY DRAWINGS**

**Hooking Roof Strap to Collector Rail**

1. Determine which slots in the collector rail (6) will be used for the roof straps (4) after locating the rafters and taking note of the rafter spacing.

**Note:** The roof straps (4) are to be fitted to the collector rail (6) before fixing the straps to the rafters.

Rafter spacing	Recommended slots	
	One collector (1 x one collector rail)	Two collectors (1 x two collector rail)
300 mm (12")	1, 4 or 2, 3	1, 6 or 2, 5
400 mm (16")	1, 4	1, 5 or 2, 6
450 mm (18")	1, 4	2, 5
500 mm (20")	1, 4	1, 6 or 2, 5
600 mm (24")	2, 3	1, 5 or 2, 6
900 mm (36")	1, 4	2, 5



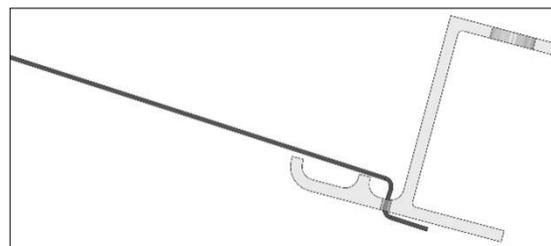
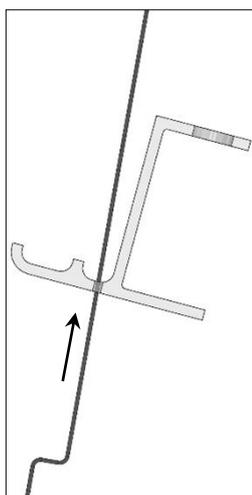
**collector rail – one collector**



**collector rail – two collectors**

2. Noting the orientation of the roof strap's folded end, slide the long straight end of the roof strap (4) through the appropriate slot from the underside of the collector rail (6) (refer to **Detail A**).

Pull the roof strap (4) through until the first bend in the strap slips into the slot in the collector rail (6). The roof strap (4) will engage with the collector rail (6).



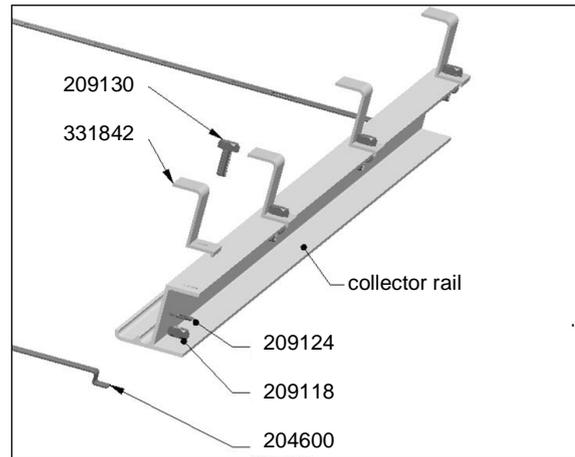
**DETAIL A**

**Bottom Collector Rail – Roof Strap Orientation**

### Clamping Collector To Collector Rail

Refer to exploded view diagrams on pages 35 and 36 for position and to Detail B.

1. Position the collector clamp (16) over the hole in the collector rail (6) with the top lip of the clamp (16) over the collector trim.
2. Insert the hex screw (14) through the hole in the collector clamp (16) and collector rail (6), place the washer (36) and nut (15) on the hex screw (14) and screw the nut (15) until it seats firmly against the lip of the collector rail (6), applying medium pressure with a spanner to tighten.



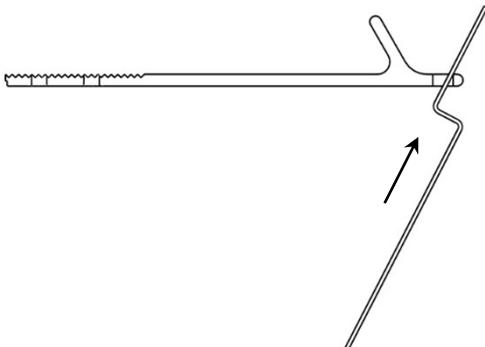
**DETAIL B**  
**Collector Rail Collector Clamp Installation**

### Hooking Roof Strap to Tank Clamp

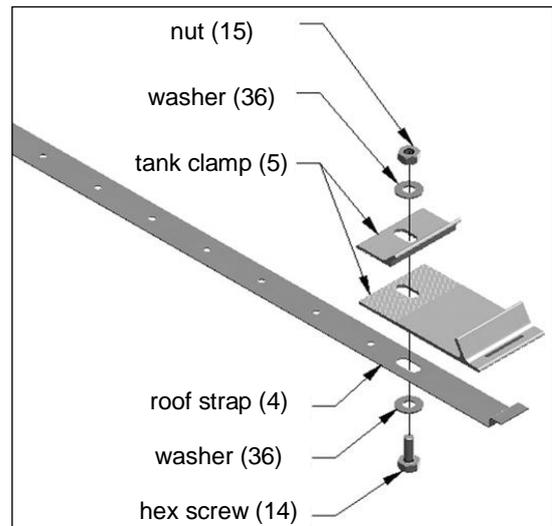
1. The tank clamp (5) is supplied as a single extruded part and must be snapped into two. Snap by bending the clamp on the groove location.
2. Noting the orientation of the roof strap's folded end, slide the short end of the roof strap (4) through the slot from the underside of the tank clamp (5).
3. Push the roof strap (4) end through the tank clamp (5) and make sure it is correctly orientated as illustrated.
4. Loosely pre-assemble the hex screw (14), washer (36) and nut (15) as shown. Ensure the hex screw head fits into the valley of the tile or roof sheet profile.



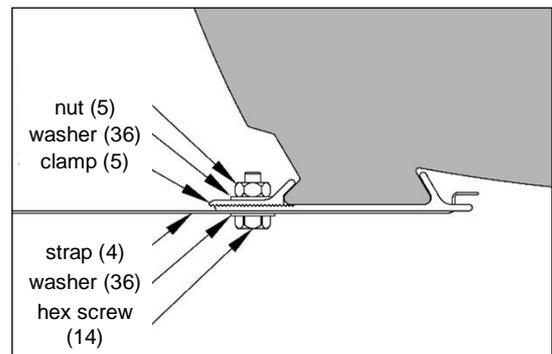
2. Noting the orientation of the roof strap's folded end, slide the short end of the roof strap (4) through the slot from the underside of the tank clamp (5).



3. Push the roof strap (4) end through the tank clamp (5) and make sure it is correctly orientated as illustrated.



**Tank Rail Fixing**

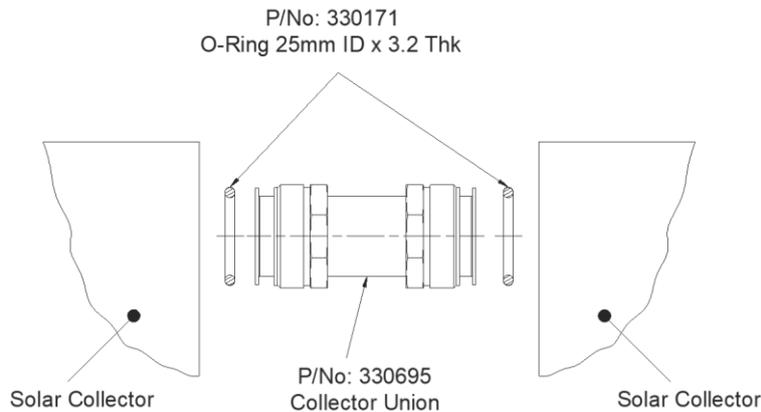


**Tank Clamp Assembly**  
**DETAIL C**

### Coupling Collector To Collector – Screwed Fittings

Refer to the [exploded view diagram](#) on page 36 for position and [Detail D](#) on page 45.

1. Seat an O’ring (11) into each of the collector connections to be joined.
2. Fit a collector union (12) to each collector connection of the first solar collector to receive the second solar collector and screw in the unions until they seat firmly against their O’ring (11) in the collector connection. Hand tighten only so the solar collectors can be shifted and centred.
3. Place the collector unions (12) into the collector connections on the second solar collector and screw in the unions until they seat firmly against their O’ring (11) the collector connection. Hand tighten only so the solar collectors can be shifted and centred.
4. After the solar collectors are centred on the collector angle, tighten each collector union (12) with a spanner applying medium pressure.

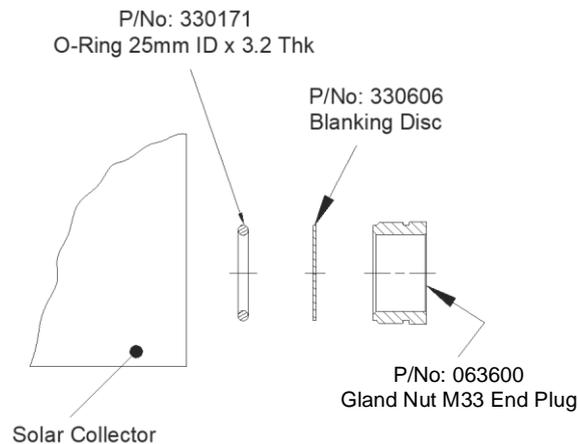


**DETAIL D**  
**Collector Union Assembly**

### End Plug Assembly – Screwed Fittings

Refer to the [exploded view diagrams](#) on pages 35 and 36 for position and [Detail E](#) on page 45.

1. Seat an O’ring (11) into the collector connection.
2. Place a blanking disc (22B) over the seated O’ring (11). The blanking disc (22B) should be installed with the smooth edge facing into the collector.
3. Place the end plug into the collector connection and screw in until it seats firmly against the blanking disc (22B), applying medium pressure with a spanner to tighten.

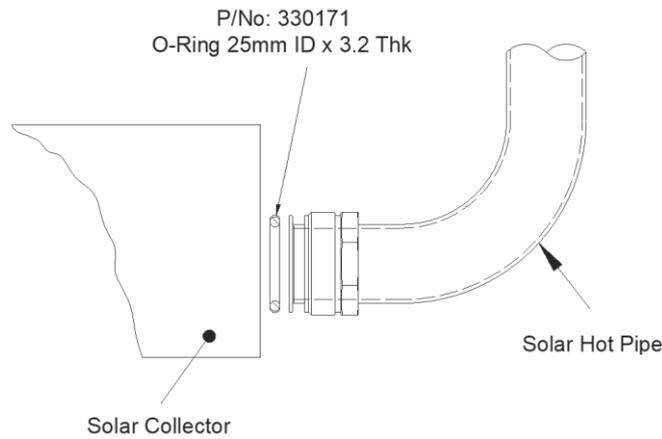


**DETAIL E**  
**End Plug Assembly**

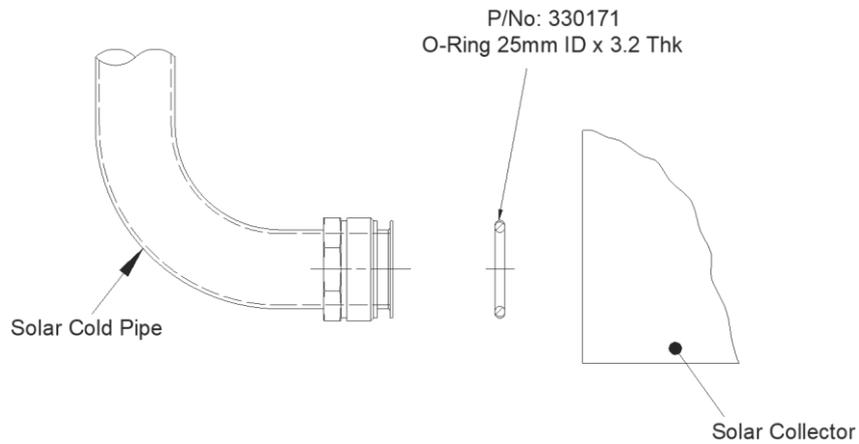
**Coupling Cold And Hot Pipes To Collector – Screwed Fittings**

Refer to the exploded view diagrams on pages 35 and 36 for position and Detail F on page 46 and Detail G on page 46.

1. Seat an O’ring (11) into the collector connection.
2. Place the end of the solar hot pipe into the collector connection and screw in the union until it seats firmly against the O’ring (11), applying medium pressure with a spanner to tighten.
3. Repeat this procedure to couple the solar cold pipe to the solar collector.



**DETAIL F**  
**Hot Pipe to Collector Assembly**



**DETAIL G**  
**Cold Pipe to Collector Assembly**

# CONNECTIONS – PLUMBING

All plumbing work must be carried out by a qualified person and in accordance with the requirements of Standards AS/NZS 3500.4 and all local codes and regulatory authority requirements.

**⚠ Warning:** Certain types of plastic pipe, such as polybutylene pipe, are not suitable to be used as a hot water pipe between:

- this water heater and a temperature limiting device, and
- this water heater and a hot water outlet if a temperature limiting device is not installed.

This water heater can produce water at a temperature and pressure which can exceed the performance limits of these types of pipe. This may result in pipe failure leading to severe water damage to the property. If one of these types of plastic pipe is used as a hot water pipe in the property, then a temperature limiting device must be installed between the water heater and this pipe work.

**Note:** The solar storage tank of a solar water heater should not be installed as part of a circulated hot water flow and return system in a building. The benefits of solar gain will be significantly reduced. If a circulated flow and return system is required, refer to **“Circulated Hot Water Flow and Return System”** on page 26.

### CONNECTION SIZES

- Hot water connection:      G 1/2 M olive                      tank connection: Rp 3/4
- Cold water connection:    G 1/2 M olive                      tank connection: Rp 3/4
- Relief valve connection:   Rp 1/2

### WATER INLET AND OUTLET

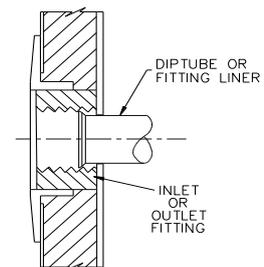
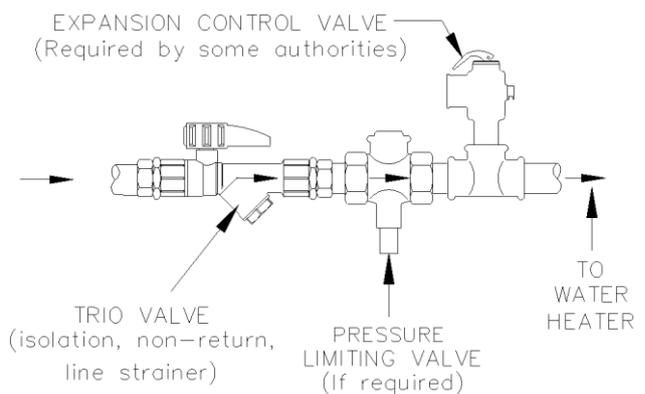
All pipe work must be cleared of foreign matter before connection and purged before attempting to operate the water heater. All olive compression fittings must use brass or copper olives. Use thread sealing tape or approved thread sealant on all sealing threads other than a fitting with an O’ring seal.

An isolation valve and non-return valve must be installed on the cold water line to the water heater. A trio valve and expansion control valve is supplied in the pipe kit supplied with the water heater. An acceptable arrangement is shown in the diagram **and on page 53** for multiple installations. Refer also to **“Hot Water Delivery”** on page 25 and to **“Mains Water Supply”** on page 24.

The cold water isolation valve and expansion control valve must be accessible from ground or floor level. They must not be installed either on the roof or in the ceiling space, unless it is an accessible trafficable area. Extend the cold water line to the cold water inlet fitting on the shoulder of the solar cold pipe.

A disconnection union must always be provided at the cold water connection and hot water Tee at the hot water on the solar storage tank to allow for disconnection of the solar storage tank. The pipe work from the hot water outlet **must not** be installed in front of or prevent access to the electrical cover of the solar storage tank.

This solar storage tank has either a plastic stratifier or dip tube 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.



This water heater is intended to be permanently connected to the water mains and not connected by a hose-set. A braided flexible hose or semi-flexible connector may be used for connection to the water heater, where permitted by AS/NZS 3500.4.

Exposed pipe work between the solar storage tank and the penetrations through the roofing material should be kept to a minimum to maintain the aesthetics of the installation.

Pipes must not be installed in direct contact with metal roofs. Where it is necessary to run piping across a metal roof, it must be fixed above the roof and surrounded with a weatherproof insulation. The insulation must be UV resistant if exposed. The insulation is to assist in freeze protection and to protect the metal roof against corrosion by water runoff over the copper pipe. Consideration should be made for thermal expansion and contraction of the roof material.

### 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.

Pipe work, including that within the roof space, is to be securely fixed to prevent vibration.

### IN-SERIES BOOSTER (IF INSTALLED)

The pipe work between the solar storage tank and an in-series booster has a minimum recommended pipe size of DN20, **MUST BE** of copper and be fully insulated with a closed cell type insulation or equivalent and in accordance with the requirements of AS/NZS 3500.4. The insulation must be weatherproof and UV resistant if exposed. The insulation must be fitted up to the connections on both the solar storage tank and the in-series booster. An isolation valve may be installed on the water line to the in-series booster. The isolation valve must be of a full flow type if the in-series booster is a continuous flow water heater.

### TEMPERATURE PRESSURE RELIEF VALVE

The temperature pressure relief valve is supplied in the pipe kit. The temperature pressure relief valve must be fitted to the end of the hot water Tee before the water heater is operated. Before fitting the relief valve, make sure the probe has not been bent.

To fit the relief valve:

- Seal the thread with an approved thread sealant such as Teflon tape - never hemp. Make sure tape does not hang over the end of the thread.
- Hand tighten the valve into the hot water outlet Tee (refer to the [installation diagrams on pages 30 to 31](#)).
- Using a spanner engaged on the valve's spanner flats and applying medium pressure to tighten, turn the relief valve an additional ½ to 1 ½ turns to secure and make the joint water tight, leaving the valve drain pointing downwards and away from the electrical cover.

**⚠ Warning:** Do not use a pipe wrench or poor fitting tool on the valve body nor over tighten the valve, as this could damage the valve and prevent safe operation.

- Operate the easing lever on the valve to check the smooth operation of the valve plunger. It is very important the lever is raised and lowered gently. The lever should move smoothly and without undue force.
- If the lever cannot be moved or is jerky in its movement, then the valve has been damaged and must be replaced.
- A copper drain line must be fitted to the temperature pressure relief valve (refer to "[Relief Valve Drain](#)" on page 49). The drain line **must not** be installed in front of or prevent access to the electrical cover of the water heater.
- 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.

## EXPANSION CONTROL VALVE

An expansion control valve is supplied in the pipe kit and must be installed. Install the expansion control valve using a brass Tee, brass union and brass nipple on the cold water line to the water heater.

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 the [cold water connection diagrams](#) on page 47. A copper drain line must be fitted to the expansion control valve. Refer to "[Relief Valve Drain](#)" on page 49.

The expansion control valve and its easing gear must be accessible from ground or floor level. It must not be installed either on the roof or in the ceiling space, unless it is an accessible trafficable area. Extend the cold water line from the expansion control valve to the cold water inlet fitting on the solar cold pipe.

The valve, if installed within 500 mm of the water heater, 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 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.

The drain line **must not** be installed in front of or prevent access to the electrical cover of the water heater.

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 nine (9) metres with no more than three bends greater than 45° before discharging at an outlet or air break. The maximum length of nine (9) metres for a drain line is reduced by one (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 not discharge onto roofing materials, roof gutters or onto paved areas. 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.

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.

Where a drain line crosses over a metal roof, the pipe work must be fully insulated with weatherproof lagging to offer corrosion protection to the metal roof against water runoff over the copper pipe. The insulation must be UV resistant if exposed.

For multiple installations the drain lines from several water heaters can discharge into a common tundish. Refer to "[Multiple Installations](#)" on pages 52 and 53.

**⚠ 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.

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## CONNECTIONS – ELECTRICAL

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**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 edition of the Wiring Rules AS/NZS 3000 in force in the state or territory at the time of installation, and all local codes and regulatory authority requirements.

If this water heater is installed with an in-series booster, then the electric booster heating unit will not need to be connected to a power supply and the references to the electric booster heating unit, thermostat and boosting controls in these installation instructions will not be applicable to the installation.

**Note:** AS 3498 requires that a water heater provides the means to inhibit the growth of Legionella bacteria in potable water. This water heater can satisfy this AS 3498 requirement provided, where an in-series booster water heater is not installed, the electric booster is energised for a sufficient period each day and the electric booster thermostat setting is 60°C or higher.

### SOLAR STORAGE TANK

The solar storage tank with an electric booster heating unit must be directly connected to a 220 V - 240 V a.c. 50 Hz mains power supply with an isolating switch installed at the switchboard. The Wiring Rules AS/NZS 3000:2018 requires a second and lockable isolating switch be installed adjacent to but not on or attached to the solar storage tank, and a residual current device (RCD) installed in the electrical circuit to the water heater.

A flexible 20 mm conduit is required for the electrical cable to the solar storage tank. 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, or the wiring protected by insulating sleeving with an appropriate temperature rating if it can make contact with the internal storage cylinder. The temperature of the internal storage cylinder can reach 95°C during its operation.

The water heater is more suited for the booster heating unit to be connected to either a continuous, or a time of use, or an extended Off-Peak (overnight and day) electricity supply. A timer can also be used to control the boosting periods and help maximise solar savings. Refer to **“Booster Control”** on page 51.

The booster heating unit may be connected to an Off-Peak (overnight) electricity supply, however this will only allow the booster to heat the water overnight. If this type of connection is considered, care must be taken to ensure there is sufficient boost capacity to meet the household’s full day and night’s hot water supply during periods of no or low solar gain, particularly in cold weather. **Temperature Redistribution** (refer to page 20) is more evident with this type of electricity supply connection and its implications should be discussed with the householder.

Discuss the power supply and hot water usage requirements with the householder.

If water and / or power are not available on completion of installation, leave the isolation switch in the meter box in the off position and place a warning label “Do not turn on electricity until the water heater is filled with water and the water heater has been commissioned” on the electrical isolating switch.

### THERMOSTAT SETTING

The thermostat is adjustable from 60°C to 70°C. The factory setting of the thermostat is 60°C. The thermostat is adjusted by turning the adjuster anticlockwise to decrease the temperature setting and clockwise to increase the temperature setting. Only adjust the temperature setting when the isolating switch is switched off at the switchboard.

The thermostat has a safety cut-out (also called an over-temperature energy cut-out) that will de-energise the element should the temperature within the tank reach 83°C whilst the element is activated. This safety cut-out is not resettable. This cut-out is of a type that will not activate due to solar heating of the water in the storage tank above this temperature whilst the element is not energised.

For reasons of safety and economy, we advise the thermostat be set at the lowest temperature that will provide sufficient hot water during periods when boosting is required. Rheem recommends the thermostat is set at 60°C to maximise solar contribution. Discuss the thermostat setting requirements with the householder.

**BOOSTER CONTROL**

The isolating switch(s) installed at the switchboard and adjacent to the solar storage tank (if installed) should be left switched on.

Leaving the isolating switch(s) switched on will also provide a sufficient period of time each day for the booster heating unit to operate, if required, to satisfy the requirements of AS 3498.

**Timer Control Switch**

A suitably rated timer control switch can be installed and will help maximise energy savings with an electrically boosted solar water heater connected to a **continuous, time of use or extended Off-Peak (overnight and day)** electricity supply.

If used with an extended Off-Peak (overnight and day) electricity supply, the timer switch should:

- be operated by a continuous power supply on its own circuit from the switchboard with the booster heating unit operated by the Off-Peak power supply.

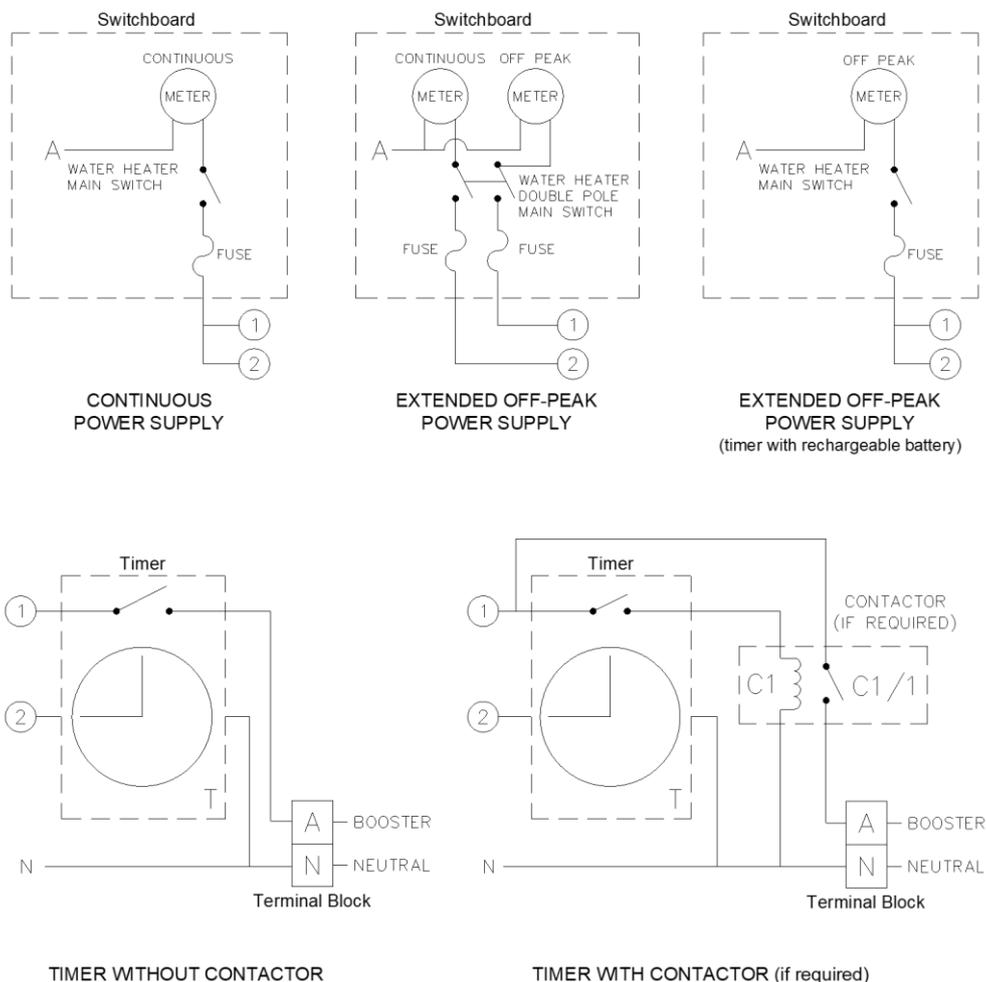
A double pole isolating switch is required to be installed at the switchboard to simultaneously isolate both circuits.

or

- be of a type which has an internal rechargeable battery to keep time when the power supply is not available to the timer.

Refer to “**Booster Control**” on page 12 for information on programming the timer.

**TIMER CONTROL SWITCH WIRING DIAGRAM**



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## MULTIPLE INSTALLATIONS

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A multiple installation of Rheem solar Hiline water heaters on a single manifold or multiple manifolds is possible, using the Rheem Equa-Flow® manifold principal, where large volumes of hot water are required.

The system may be installed with the solar water heaters as preheaters and their electrical heating units not be connected to a power supply. Rheem commercial or heavy duty water heaters should be installed in series with the solar water heaters to boost the water temperature during periods of poor or no solar gain.

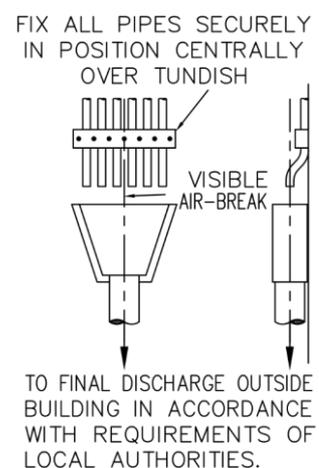
Alternatively, the solar water heaters can be installed with their heating units connected to a power supply and without in series booster water heaters.

The cold water and hot water manifolds must be designed to balance the flow from each solar storage tank. To achieve this, there are basic installation requirements and principles which must be followed:

1. The maximum number of solar storage tanks in a bank should be five (5), however several banks of solar storage tanks can be installed.
2. The hot water line from the manifold must leave from the opposite end to which the cold water line enters the manifold.
3. The solar storage tanks must be of the same model.
4. The cold water line, cold and hot water headers and hot water line must be sized to meet the requirements of both AS/NZS 3500.4 and the application.
5. A non-return valve, isolation valve and if required a pressure limiting valve, must be installed on the cold water line to the system.
6. A full flow gate valve or ball valve (not stop taps, as used on a single solar storage tank installation) must be installed on both the cold water branch and hot water branch of each solar storage tank.
7. The expansion control valve for each solar storage tank can be installed into a brass Tee on the cold branch to the tank.
8. Non-return valves or pressure limiting valves **must not** be installed on the branch lines to the solar storage tanks.
9. All fittings, valves and branch lines must be matched sets all the way along the manifold.
10. Sufficient space must be left to enable access, servicing or removal of each solar storage tank.
11. The temperature pressure relief valve drain line from each solar storage tank can terminate at a common tundish with a visible air break at each drain discharge point. Refer to the [diagram on page 53](#) and to "Relief Drain Line" on page 49.

**Note:** A temperature-operated bypass valve(s) or primary temperature control valve(s) should be installed prior to the in-series water heater(s) if the water heater has either an over temperature energy cut-out which can be permanently disabled by high temperature hot water or a maximum recommended inlet supply temperature less than the temperature of water which can be supplied by this solar water heater.

Refer to the [diagram on page 53](#) for installation and plant layout details.



**TPR Valve Drain Line  
Common Discharge Point**



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# COMMISSIONING

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## TO FILL AND TURN ON THE WATER HEATER

**The power supply to the solar storage tank 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 isolation valves fully on the cold and hot water branches to the water heater(s) in a bank.
- Open the cold water isolation valve fully on the cold water line to the water heater(s).

Air will be forced out of the taps.

- Close each tap as water flows freely from it.
- Check the pipe work for leaks.
- Inspect for leaks at the temperature pressure relief valve connection to the water heater.

If a leak is detected, close the cold water isolation valve fully and relieve pressure from the water heater by either operating the easing lever on the temperature pressure relief valve or opening a hot tap. Remove the valve and all of its thread sealant from the threads of the valve. Reapply new thread sealant and refit the valve. Refer to the procedure in ["Temperature Pressure Relief Valve"](#) on page 48.

- Operate the easing lever on the temperature pressure relief valve to check the smooth operation of the valve plunger and that water discharges freely from the drain line. It is very important the lever is raised and lowered gently. The lever should move smoothly and without undue force.

If the lever cannot be moved or is jerky in its movement, then the valve has been damaged and must be replaced.

- Switch on the electrical supply at the water heater isolating switch(s) on the switchboard and at the isolating switch(s) at the solar storage tank(s) (if installed).
- Set the timer if one is installed. Refer to ["Booster Control"](#) on page 12.
- Remove the packaging / covers from the solar collectors. The packaging / covers must be removed completely prior to the permanent operation of the water heater.
- Complete the installation check list. Refer to ["Installation Check List"](#) on page 55.

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

- Ensure the collectors are covered with an opaque material,
- Switch off the electrical supply at the water heater isolating switch(s) on the switchboard and at the isolating switch(s) at the solar storage tank(s) (if installed).
- Close the cold water isolation valve at the inlet to the water heater(s) to shut down the entire system, or;
- Close the isolation valves on the cold and hot water branches to shut down an individual water heater in a bank.

**INSTALLATION CHECK LIST**

Prior to handover, complete the installation check list:

1. System is installed as per the installation instructions .....[ ]
2. Water is connected, turned on and solar storage tank is filled.....[ ]
3. All mechanical fixings are secured .....[ ]
4. Collector rail has a rise of 12-15 mm per collector on the hot outlet side of the solar collectors if installed directly onto the roof .....[ ]
5. Collector rail is either horizontal or higher on the hot outlet side of the solar collectors if part of a frame.....[ ]
6. Protective plastic film removed from tank (if fitted) .....[ ]
7. Covers removed from collectors .....[ ]
8. Pipe, conduit penetrations through the roof have been sealed correctly .....[ ]
9. Roof tiles put back into position .....[ ]
10. Roof flashing watertight.....[ ]
11. System checked for water leaks and pipe connections are correctly tightened.....[ ]
12. Cold and hot water piping checked for water leaks .....[ ]
13. Drain pipes free of any obstruction .....[ ]
14. All pipe work clipped where necessary .....[ ]
15. Electrical power to the booster is switched on (if required).....[ ]
16. Operation of booster checked .....[ ]
17. Air bled from taps.....[ ]

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## DRAINING AND FLUSHING THE WATER HEATER

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### DRAINING AND FLUSHING THE SOLAR STORAGE TANK AND COLLECTORS

It may be necessary to drain or flush the solar storage tank and / or solar collectors during maintenance or if there is sediment in the water supply. This should be conducted in the morning, within three (3) hours of sunrise when the sun is low in the sky. The water temperature inside the solar collectors should be lower as the solar collectors would not have had as much chance to gain as much heat as later in the day.

**⚠ Warning:** Exercise care to avoid splashing of water, as water discharged from the solar storage tank and solar collectors may be of a very high temperature.

**Note:** The water discharged from the solar storage tank and solar collectors may contain sediments and should be diverted away from any section of roof which is part of a rainwater collection system.

Prior to draining and / or flushing the solar storage tank and / or solar collectors:

- Cover the solar collectors with an opaque material to prevent absorption of solar energy and the transfer of heat to the solar storage tank.

Failure to do so may cause a safety issue.

- Open a hot water tap and allow the water to run for five minutes immediately prior to draining or flushing the solar storage tank and / or solar collectors.

This will assist in the transfer of any high temperature water in the solar collectors to the solar storage tank.

- Close the hot water tap.
- Turn off the water heater. Refer to [“To Turn Off The Water Heater”](#) on page 54.
- Ensure all hot water taps are closed.
- Operate the temperature pressure relief valve lever – do not let the lever snap back or you will damage the valve seat. **It is very important the lever is raised and lowered gently.**

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

### Draining and Flushing the Solar Storage Tank

- Undo the union at the cold water inlet to the solar cold pipe.
- Undo the fitting and remove the solar cold pipe from the solar storage tank.  
Connect a hose to the tank connection. Let the other end of the hose go to a drain.
- Open the temperature pressure relief valve by holding the lever in the raised position.  
This will let air into the solar storage tank and allow the water to drain through the hose.
- If flushing the solar storage tank:
  - Disconnect and remove the booster heating unit.
  - Place a hose inside the tank.
  - Open the isolation valve to the hose.
  - Allow the hose to run until water runs clear from the hose connected to the cold water connection.
  - When satisfied the solar storage tank is flushed, close the cold water isolation valve to the hose and remove the hose from the tank.
  - Replace and reconnect the booster heating unit.
- When satisfied the solar storage tank is drained and / or flushed, remove the hose from the cold water inlet connection and reconnect the solar cold pipe to the solar storage tank and cold water pipe work to the solar cold pipe.

### **Draining and Flushing the Solar Collectors**

- From the bottom end of the solar collectors, unscrew and remove the end plug.  
Connect a hose to the collector connection. Let the other end of the hose go to a drain.
- From the top end of the solar collectors, unscrew and remove the end plug.  
This will let air into the collector and allow the water to drain through the hose.
- If flushing the solar collector:
  - Connect a hose to the top collector connection. Let the other end of the hose go to a drain.
  - Open the cold water isolation valve to the water heater.
  - Allow water to flow from the solar collectors until it is clear of any sediment.
  - When satisfied the solar collectors are flushed, close the cold water isolation valve to the water heater.
- When satisfied the solar collectors are drained or flushed, remove the hose(s) and reconnect the end plug(s).

### **FILL AND TURN ON THE WATER HEATER**

After the solar storage tank and solar collectors have been drained or flushed:

- Fill and turn on the water heater. Refer to [“To Fill And Turn On The Water Heater”](#) on page 54.
- Remove the covering from the solar collectors.

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