Installation Instructions

Collector Kits

Collectors with Copper Waterways, Conetite Connections for use in Open Circuit Systems using uncoated DR Brass Conetite fittings

LCS, TBT200
SOLAR COLLECTORS

WARNING: Plumber – Be Aware
Use copper pipe <u>ONLY</u>. Plastic pipe <u>MUST NOT</u> 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.

This collector kit 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 pipes between the solar storage tank and the solar collectors **MUST BE** of copper. All compression fittings must use brass or copper olives.
- 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 temperatures of up to 150°C, which may be 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, however thicker insulation may be required to comply with the requirements of either AS/NZS 3500.4 or AS/NZS 3500.5:2012 Section 3 (for a Class 1a or Class 10 building) as applicable under the Plumbing Code of Australia.
  - be weatherproof and UV resistant if exposed
  - extend through any penetrations in the eaves, ceiling and roof
  - cover valves and fittings in the solar pipe work
  - be fitted up to and cover the connections on both the solar storage tank and the solar collectors.

  Note: Failure to observe these requirements also increases the risk of freeze damage.

  Uninsulated pipe work, including concealed in cavities and roof spaces or where it may be in contact with a metal roof, may lead to freeze damage. The system has NO WARRANTY for freeze damage if the solar hot and solar cold pipes are not insulated in accordance with the installation instructions.

  The insulation is essential to assist in providing freeze protection, 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.

Plumber: It is important to refer to and read in full the complete "Warning: Plumber – Be Aware" statement commencing on page 14.

CONTENTS

HOUSEHOLDER - This installation instruction booklet is intended for the installer but you may find it of interest.

Notice to Victorian Customers from the Victorian Plumbing Industry Commission.

This water heater must be installed by a licensed person as required by the Victorian Building Act 1993.

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

COMPONENTS AND KIT CONTENTS

SOLAR COLLECTOR KITS – CONETITE FITTINGS
For installation with a pumped open circuit solar water heater.

Your solar water heater is designed for the solar collectors to be roof mounted and the solar storage tank to be installed at ground or floor level. The collector kits are suitable for:

Collector Kit – Conetite Fittings 1 Collector (uncoated brass conetites)
12104793 LCS, TBT200 solar collectors

Collector Kit – Conetite Fittings 2 Collectors (uncoated brass conetites)
12104794 LCS, TBT200 solar collectors

Collector Kit –Conetite Fittings Additional Collector (uncoated brass conetites)
12104795 LCS, TBT200 solar collectors
Note: One Additional Collector Kit is required for a third solar collector.

⚠ WARNINGS

⚠ **Warning:** Only use components with cones of uncoated DR Brass as part of an open circuit system. Coated brass cones must not be used.

⚠ **Warning:** This parts kit shall not be used with a solar collector with a steel absorber plate. Use only with collectors which have copper waterways and conetite style connections.

Part No	Kit Components and Description	12104793 one collector	12104794 two collectors	12104795 collector add on
347229	Installation instructions roof kit	1	1	1
347587	Warning Sheet – DR Brass conetite kits	1	1	1
331847	Collector rail (1020 mm)	2	-	2
331846	Collector rail (1650 mm)	-	2	-
204600	Collector straps	4	4	2
331844	Drive cleat	-	-	2
331928	Collector clamps	4	8	4
209130 209124 209118	Hex screw set M8 x 20, and Washer M8 SS flat, and Nut SS M8 x 1.25 mm	4 4 4	8 8 8	4 4 4
341390	Collector connector (collector union) assembly conetite brass	-	2	2
341391	Collector bung (end plug) assembly conetite brass - consisting of: 1 x 344236 collector bung uncoated 1 x 337116 gland nut	2	2	-
344269	Sensor connector fitting conetite brass – 15BSP temp assbly direct - consisting of: 1 x 344268 fitting conetite -15BSP temp sensor 1 x 337116 gland nut 1 x 088062 sensor nipple solar loline 1 x 087026 O ring 5/16” ID x 1/16 BS011 silicone	1	1	-
344278	Connector fitting conetite brass – 15BSP assbly direct - consisting of: 1 x 344267 fitting conetite -15BSP 1 x 337116 gland nut	1	1	
331656	Olive ½” brass	2	2	-
331655	Nut compression G½	2	2	-
346025 or 056029	Hot sensor assembly immersion including 2 x 087025 O-ring 5/32” ID x 1/16”	1	1	-
346026	Hot sensor adaptor	1	1	-
123204	Label hot pipe / cold pipe	1	1	-
348071	Cable ties 150 mm long	10	10	-

SYSTEM INSTALLATION

THIS WATER HEATER IS NOT SUITABLE FOR POOL HEATING.

The system is suitable for installation with LCS or TBT200 selective surface solar collectors as part of an open circuit system installation.

The system is not suitable for installation above 400 metres altitude.

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 and 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 manufacturer's warranty.

INSTALLATION STANDARDS

The water heater must be installed:

- by a qualified person, and
- in accordance with the installation instructions, and
- in compliance with Standards AS/NZS 3500.4 or AS/NZS 3500.5:2012 Section 3 (for a Class 1a or Class 10 building) as applicable under the Plumbing Code of Australia, AS/NZS 3000 and all local codes and regulatory authority requirements.

In New Zealand, the installation must also conform to Clause G12 of the New Zealand Building Code.

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.

OPEN CIRCUIT SYSTEM INSTALLATION

An open circuit system has a collector circuit which is directly connected to the potable water in the solar storage tank. Potable water from the solar storage tank circulates through and collects heat gained by the solar collectors and then circulates back into the solar storage tank.

⚠ **Warning:** Only use components with cones of uncoated DR Brass as part of an open circuit system. Coated brass cones must not be used.

Freeze Protection

The system has a level of freeze protection designed to guard the system against damage from freeze conditions. The system must be installed with the full length of the solar hot and solar cold pipes insulated to offer protection against freeze damage (refer to “Warning: Plumber Be Aware” on page 14). Freeze conditions occur below 6°C.

The system has NO WARRANTY for freeze damage when installed above 400 metres altitude or if the solar hot and solar cold pipes are not insulated in accordance with the installation instructions (refer to “Warranty Note” on page 39).**Note:** The manufacturer’s warranty against freeze damage applies only to systems installed in Australia.

INSTALLATION – SOLAR STORAGE TANK

SOLAR WATER HEATER STORAGE TANK LOCATION

The solar storage tank should be installed close to the most frequently used outlet and its position chosen with safety and service in mind.

Consideration must also be given to the position of the solar storage tank in relation to the solar collectors. There are limitations on both the maximum length of the solar hot and solar cold pipes and the maximum height between the solar storage tank and the solar collectors. Refer to “Solar Collector Location” on page 9, to “Pipe Lengths” on page 13 and to “Maximum Height to Collectors” on page 16.

Refer to the installation instructions supplied with the solar storage tank for installation details of the solar storage tank.

INSTALLATION – SOLAR COLLECTORS

SOLAR COLLECTOR LOCATION

Consideration must be given to the position of the solar collectors in relation to the solar storage tank. There are limitations on both the maximum length of the solar hot and solar cold pipes and the maximum height between the solar storage tank and the solar collectors. Refer to "Solar Storage Tank Location" on page 8, to "Pipe Lengths" on page 13 and to "Maximum Height to Collectors" on page 16.

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 either AS/NZS 3500.4 or AS/NZS 3500.5:2012 Section 3 (for a Class 1a or Class 10 building) as applicable under the Plumbing Code of Australia, 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 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. Each solar collector and its fittings weighs approximately 41 kg when full of water.

ROOF AREA FOR INSTALLATION

Roof area required for solar collectors:

3 solar collectors – 3.4 m wide x 2.0 m deep. Weight (full) 123 kg approx.

2 solar collectors – 2.3 m wide x 2.0 m deep. Weight (full) 82 kg approx.

1 solar collector – 1.2 m wide x 2.0 m deep. Weight (full) 41 kg approx.

In addition to this area, a minimum of one (1) metre clearance is recommended to be left around the solar collectors on all four sides of the solar collectors for safe service access.

Maximum Number of Collectors

The maximum number of these selective surface collectors for each tank size as part of an open circuit system is:

- 410 tank – 3 x collectors
- 270, 320, 325 tanks – 2 x collectors
- 160 tank – 1 x collector (2 in Victoria only)

ORIENTATION OF SOLAR COLLECTORS

To help maximise system performance, solar collectors should be installed with an optimum orientation facing true north (in the southern hemisphere) or true south (in the northern hemisphere). Always check for true north or true south using a compass or other suitable device.

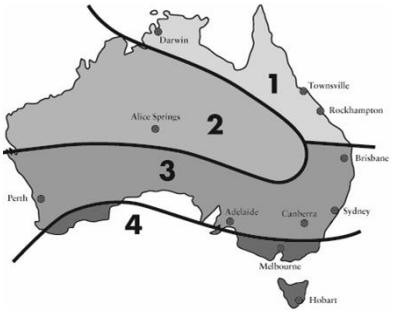
The solar performance of a system reduces as the orientation of the collectors moves away from the optimum orientation, resulting in the need for increased boosting to supply the same hot water load. Solar collectors facing up to 45° from the optimum orientation will receive about 4% to 5% less total solar radiation.

However, the optimum orientation of solar collectors is not always practical or achievable. Solar collectors may be installed up to 90° from the optimum orientation. Where the orientation is greater than 60° from the optimum, it may be possible for an additional solar collector to be installed to help make up for the reduction in solar performance compared to the optimum orientation. This option 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 increased boosting may be required to meet their hot water requirements.

In Australia for climate zones 1, 2, and 3 there is a risk that systems with selective surface LCS or TBT200 solar collectors may over perform.

In these zones, systems with 2 or more LCS or TBT200 solar collectors should be installed at orientations between 60° and 90° from true north only.



In climate zone 4, systems with selective surface LCS or TBT200 solar collectors provide optimum performance compared with non-selective surface collectors, particularly in the months of lower solar radiation.

In Victoria where a system with a 160 litre tank is installed, 2 x LCS solar collectors should only be installed outside of the Regulation Compliance Zone in order to achieve compliance. In areas other than Victoria, a 160 litre tank should not be installed with more than one selective surface collector.

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 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 12.

However, the optimum inclination of solar collectors is not always practical or achievable. Solar collectors may be installed at the roof angle for simplicity of installation and appearance, but must never be flat for a pumped solar open circuit water heater installation. Although the solar collectors can be installed with an inclination of less than 10°, this is not advised. The risks include:

- the collector glass not 'self-cleaning', leading to dirty collector glass reducing solar performance, and
- condensation on the underside of the glass taking longer to clear, and
- condensation droplets falling onto the absorber plate potentially causing discolouration.

The collector kit is suitable for installations with an inclination of up to 45°. Where the solar collectors are installed at inclinations greater than 45°, a With Pitch frame is necessary. Refer to your local Solar Distributor for details.

A Variable Pitch frame can be installed to increase the angle of inclination of the collectors used in a pumped solar water heater installation. This type of frame should be used if the roof pitch either varies by more than 20° from the optimum angle or is less than 10°.

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, it may be possible for an additional solar collector to be installed to help make up for the reduction in solar performance compared to the optimum inclination. This option should be discussed with the system owner.

If these options are neither possible nor acceptable to the system owner, then the system owner needs to be made aware of, understand and accept that increased boosting may be required to meet their hot water requirements.

CYCLONIC OR HIGH WIND AREAS

For an installation of solar collectors on a pitched roof in a cyclonic or high wind area, a suitable With Pitch frame is required. Refer to your local Solar Distributor for details.

The installation of these solar collectors 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 the Building Code of Australia, Australian Standard AS 4055 and the Australian / New Zealand Standard 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 Building Code of Australia 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

PIPE LENGTHS

The solar hot and solar cold pipes between the solar storage tank and the solar collectors shall:

- be of bendable grade or hard drawn copper tube.

  Annealed or soft copper shall not be used.

- have a continuous fall from the solar collectors to the solar storage tank. Horizontal runs of pipe work are acceptable and may be installed as part of an open circuit system.

  Care must be taken to ensure the pipe work maintains a continuous fall or horizontal runs over the life of the installation. Pipe work should be fixed at regular intervals to assist in maintaining this requirement.

- not exceed the maximum recommended combined lengths as specified in the table.

Maximum recommended total combined pipe length (solar hot + solar cold) and number of 90° bends				
Pipe Size	1 or 2 Collectors		3 Collectors	
	Pipe Length	90° Bends	Pipe Length	90° Bends
DN15	40 metres	20	30 metres	20
DN20	NR	NR	40 metres	20

For each additional 90° bend, reduce the maximum total pipe length by 0.5 m.
For each additional metre of pipe length, reduce the number of 90° bends by two.
Note: One 90° elbow is equal to two 90° bends.
NR – not recommended, NA – not available

Notes:

- It is important to connect the solar hot and solar cold pipes to the correct connections at the solar collectors and at the solar storage tank.
- The solar cold pipe connects to the bottom of the solar collector array and may connect to either the left or right hand side. The solar hot pipe must connect to the top of the solar collector array diagonally opposite to the solar cold pipe connection. The solar hot outlet connection is to be the highest point of the system.
- The hot sensor connection is at the solar hot outlet where the solar hot pipe connects to the solar collector for this open circuit system.
- Refer to "Warning: Plumber – Be Aware" on page 14.

It is essential for these requirements to be followed for the system to operate correctly and efficiently. Solar pipe work which is oversized, or is too long, or does not have a continuous fall can result in a reduction in performance or the system not operating effectively.

WARNING: Plumber – Be Aware

- The solar hot and solar cold pipes between the solar storage tank and the solar collectors **MUST BE** of copper. All compression fittings must use brass or copper olives.
- 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 temperatures of up to 150°C, which may be 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, however thicker insulation may be required to comply with the requirements of either AS/NZS 3500.4 or AS/NZS 3500.5:2012 Section 3 (for a Class 1a or Class 10 building) as applicable under the Plumbing Code of Australia
  - be weatherproof and UV resistant if exposed
  - extend through any penetrations in the eaves, ceiling and roof
  - cover valves and fittings in the solar pipe work
  - be fitted up to and cover the connections on both the solar storage tank and the solar collectors.

  Note: Failure to observe these requirements also increases the risk of freeze damage.

  Uninsulated pipe work, including concealed in cavities and roof spaces or where it may be in contact with a metal roof, may lead to freeze damage. The system has NO WARRANTY for freeze damage if the solar hot and solar cold pipes are not insulated in accordance with the installation instructions.

  The insulation is essential to assist in providing freeze protection, 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.

WARNING: Plumber – Be Aware

- The insulated copper pipe work:
  - should be fixed at suitable locations to prevent or reduce the possibility of noise from water hammer and vibration from occurring
  - is not to be placed or installed in contact with plastic pipe work.

    Likewise, plastic pipe work is not to be placed or installed in contact with the insulated copper pipe work after the solar circuit is installed.

- The solar hot outlet and hot sensor connection is to be the highest point of the system. The highest point of the solar hot and solar cold pipes must be where they connect to the solar collectors, to avoid the possibility of air locks occurring in the system. There **MUST BE a continuous fall** in the pipe work from the solar collectors to the solar storage tank. Horizontal runs of pipe work are acceptable and may be installed as part of an open circuit system.

- 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 up to 150°C for non-selective surface collectors and greater than 200°C for selective surface collectors 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.

- The pressure applied to the solar circuit and solar collectors during a pressure test of an open circuit system **MUST NOT** exceed 1000 kPa, otherwise damage may result.

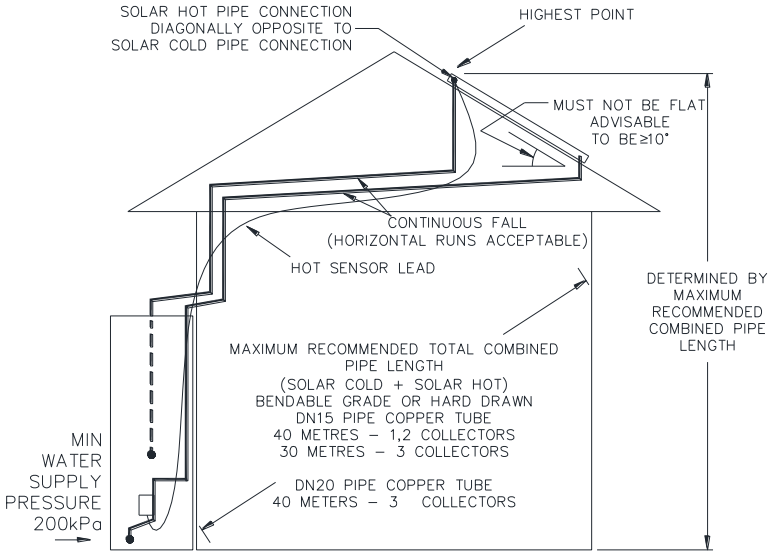
  Refer to "Pressure Testing" on page 17.

- Upon completion of the installation of the solar collectors with conetite fittings, the packaging material may be removed whether or not the solar circuit is connected to the solar storage tank and / or the solar water heater is commissioned, without damage to the solar collectors.

Maximum Height to Collectors

The maximum height of a pumped open circuit solar installation, from the solar controller (circulator) to the top of the solar collectors, is determined by the maximum recommended total pipe length for the system and the water supply pressure.

The maximum recommended total pipe length of the solar circuit should not be exceeded and a minimum water supply pressure of 200 kPa should be available at the inlet to the system, otherwise the system performance may be reduced or the solar circuit may not be purged of air during the commissioning of the system.



NOTES:

- PIPE WORK MUST HAVE A CONTINUOUS FALL FROM THE SOLAR COLLECTORS TO THE SOLAR STORAGE TANK. HORIZONTAL PIPE RUNS ARE ACCEPTABLE, AND MAY BE INSTALLED.
- PIPE WORK MUST BE OF BENDABLE GRADE OR HARD DRAWN COPPER TUBE. ANNEALED OR SOFT COPPER SHALL NOT BE USED.
- MINIMUM WATER SUPPLY PRESSURE TO INSTALLATION MUST BE 200kPa.
- INSTALL HOT SENSOR LEAD WITH INSULATED SOLAR PIPES DURING CONSTRUCTION FOR NEW HOMES.
- PRESSURE TESTING OF SOLAR COLLECTORS AND SOLAR CIRCUIT MUST NOT EXCEED 1000KPa.

Open Circuit Solar
Pipe Work Installation Requirements

Pressure Testing

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 3500.4:2015 or Clause 3.34.2 (a) of AS/NZS 3500.5:2012 for a Class 1a or Class 10 building as applicable under the Plumbing Code of Australia. The collector circuit includes the solar hot and solar cold pipes and solar collectors.

It may be necessary to pressure test the collector circuit to comply with codes and regulatory authority requirements or on other occasions where the solar collectors and solar hot and solar cold pipes are installed prior to the solar storage tank, such as on a building site.

Collector Circuit

⚠ **Warning:** The pressure applied to the collector circuit during a pressure test of an open circuit system **MUST NOT** exceed 1000 kPa where LCS or TBT200 collectors are installed, otherwise damage may result to the solar collectors.

Open Circuit System

If the solar collectors, solar pipe work and solar storage tank are installed and commissioned together, then the flooding of the collector circuit with water under mains pressure for an open circuit system and checking the pipe work for leaks during the commissioning procedure can be substituted for the pressure testing of the collector circuit.

ROOF ASSEMBLY OF SOLAR COLLECTORS

Notes:

- ⚠ **Warning:** This parts kit shall not be used with J, KF or T200 steel collectors. Use only with collectors which have copper waterways and conetite style connections.
- 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. Refer to your local Solar Distributor for details.
- The manufacturer's 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 your local Solar 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 collectors with conetite fittings, such as on a building site, the packaging material may be removed whether or not the solar circuit is connected to the solar storage tank and / or the solar water heater is commissioned, without damage to the solar collectors.

  The solar collector packaging must be removed completely prior to the permanent operation of the water heater.
- All connectors, unions, end plugs, brass fittings, collector straps and collector rails required for the installation are included with the collector kit. Suitable screws or anchors will be required to fix the collector straps to the rafters for a pitched roof installation.
- Clamps, screws, washers and nuts to secure the solar collector(s) to the collector rails are included with the collector kit.
- All olive compression fittings must use brass or copper olives. Use an approved thread sealant such as Teflon tape on all other threaded joints. Conetite fittings do not require a thread sealant.
- **Roof Condition:** Check the condition of the roof and advise the client of any broken tiles or damaged roof sheeting before commencing the installation.

Numbers in parentheses refer to items in the diagrams on page 36 (one solar collector installation), page 37 (two solar collector installation) and page 38 (three solar collector installation).

DO NOT MODIFY THESE PARTS IN ANY WAY

1. **Solar Frame:** If a solar frame is to be installed, determine the location of the frame(s). Refer to "Solar Collector Location" on page 9 and the installation instructions provided with the frame(s).

   Assemble and fix the frame(s) 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 4.

2. **Solar Collector Location:** If a solar frame is not installed, select a suitable position for the solar collectors. Refer to "Solar Collector Location" on page 9.

3. **Collector Rail (bottom) – Pitched Roof Installation:** Determine the location of the bottom collector rail(s) (1). If more than two solar collectors (17) are installed, locate the collector rail (1) from the Additional Collector kit adjacent to the first collector rail (1) and join together using the drive cleat (8) supplied in the Additional Collector kit.

   Note: The collector straps (2) are to be fitted to the collector rail(s) (1) before fixing the straps to the rafters.

   Determine which slots in the bottom collector rail (1) will be used for the collector straps (2) after locating the rafters and taking note of the rafter spacing. Hook two collector straps (2) to the first bottom collector rail (long) (1) and one collector strap (2) to the additional bottom single collector rail (short) (1) (if used).

   Refer to "Hooking Collector Strap to Collector Rail" on page 26 and Detail A on page 27.

   When positioned, the collector rail is to be either horizontal or have a rise across the solar collectors from the solar cold connection side up to the solar hot connection side for an open circuit system. The solar hot outlet and hot sensor connection is to be the highest point of the system.

   Note: Refer also to "*Tile Roof with a flat tile profile*" on page 20 if the installation is on a tile roof where the tile has a flat profile. Additional requirements for the positioning of the collector rail and installation of the solar collectors apply.

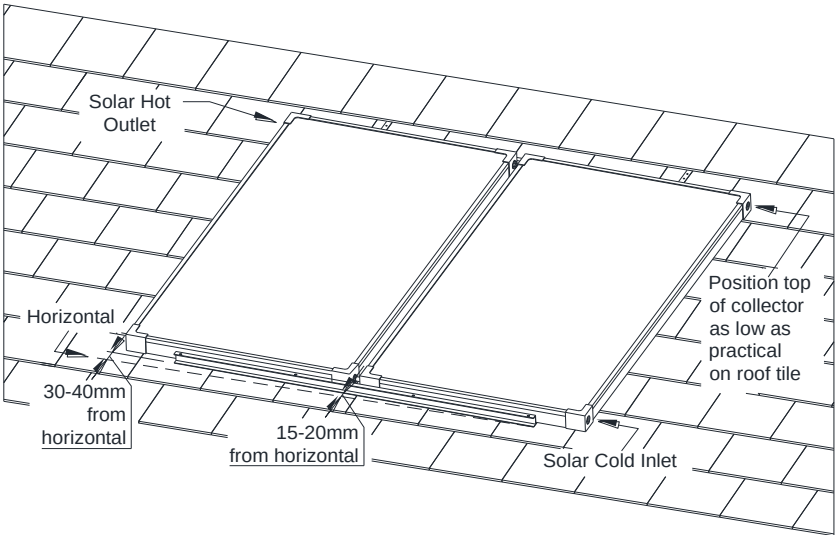
Tile Roof with a flat tile profile: If the installation is on a tile roof with a flat tile profile, the solar collectors (17) must be installed at an angle from the horizontal to assist in rainwater runoff. The solar hot outlet side must be on the left hand side and the solar cold inlet must be on the right hand side of the collector array.

The top end of the solar collector on the solar cold inlet side must sit atop the lower end of a tile lap. Measure down the roof approximately 1940 mm from this point to determine the position of the bottom collector rail.

Ensure the end of the collector rail (1) at the outlet side (left hand side) of the solar collectors is higher up the roof than the end of the collector rail at the inlet side (right hand side) of the solar collectors by:

- 15 – 20 mm for one solar collector, or
- 30 – 40 mm for two solar collectors, or
- 45 – 60 mm for three solar collectors.

This is to provide a downward angle along the top end of the collectors to assist in rainwater runoff in order to prevent pooling.



Flat Tile Profile – Collector Angle From Horizontal

Failure to adhere to this requirement may result in pooling of rainwater at the top of the collectors. If the top end of the collector array is too close to the lap of the tiles, there is a risk of pooling water seeping up and under the tile lap. The rainwater runoff is to flow from left to right to reduce the risk of water working through the joints between tiles.

Tile Roof: Remove the tiles on the next row above the position of the collector rail (1) to expose the rafters. Position the collector rail (1) and fix the collector straps (2) directly to the rafters, using suitable screws or anchors. Replace the tiles.

Metal Roof: Position the collector rail (1) and fix the collector straps (2) to the rafters, through the metal roofing material, using suitable screws or anchors. 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 are to penetrate through the high point in the roof material profile. 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.

4. **Solar Collectors:** Using a lifting device, lift the first solar collector (17) onto the roof and place it carefully with the lower end seated in the collector rail (1) and prior to positioning the next solar collector, firmly clamp (two clamps per collector) to the collector rail using the clamps, hex screws, washers and nuts provided.

   Repeat this procedure for additional collectors (17), firmly clamping each collector to the collector rail (1) with two clamps (13) prior to positioning a subsequent collector.

   Refer to "Clamping Collector to Collector Rail" on page 29.

   Note: Firmly clamping each solar collector to the collector rail as it is placed in position reduces the possibly of the collector(s) accidently moving or sliding off the collector rail.

   Remove the red transit plugs from the collector sockets.

5. **Collector Unions:** Couple the solar collectors (17) together using the collector unions (3) supplied in the collector kit.

   Refer to "Coupling Collector to Collector – Conetite Fittings" on page 28.

   Note: It will be necessary to loosen the clamps on a collector prior to it being coupled to its adjacent collector. Secure the clamps again on each collector after it is coupled to the adjacent collector.

6. **Fixing Collector (Bottom):** Ensure the solar collectors (17) are correctly positioned, centred and well seated in the collector rail(s) (1).

   Tighten the clamps (13) on each solar collector (17).

   Refer to "Clamping Collector to Collector Rail" on page 29.

7. **Collector Rail (top) – Pitched Roof Installation:** If more than two solar collectors (17) are installed, at the top end of the solar collectors (17) locate the second collector rail (1) from the Additional Collector kit adjacent to the first collector rail (1) and join together using the driver cleat (8) supplied in the Additional Collector kit.

   Note: The collector straps (2) are to be fitted to the collector rail(s) (1) before fixing the straps to the rafters.

   Determine which slots in the top collector rail (1) will be used for the collector straps (2) after locating the rafters and taking note of the rafter spacing. Hook two collector straps (2) to the first top collector rail (long) (1) and one collector strap (2) to the additional top single collector rail (short) (1) (if used).

   Refer to "Hooking Collector Strap to Collector Rail" on page 26 and Detail B on page 27.

   Locate the top collector rail(s) (1) against and underneath the top end of the solar collectors.

8. **Fixing Collector (Top):** Ensure the solar collectors (17) are correctly positioned, centred and well seated in the collector rail (1).

   Clamp the solar collectors (17) (two clamps per collector) to the collector rail (1), using the clamps (13), hex screws, washers and nuts provided.

   Refer to "Clamping Collector to Collector Rail" on page 29.

9. **Fixing Collector Rail (top) – Pitched Roof Installation:** Fix the collector straps (2) to the rafters.

   Tile Roof: Remove the tiles on the next row above the position of the top collector rail (1) to expose the rafters. Once the collector rail (1) is in position, fix the collector straps (2) directly to the rafters, using suitable screws or anchors. Replace the tiles.

   Metal Roof: Once the collector rail (1) is in position, fix the collector straps (2) to the rafters, through the metal roofing material, using suitable screws or anchors. The collector straps (2) may be cut to a length of approximately 100 mm to retain the aesthetics of the installation.

   Note: Fixings are to penetrate through the high point in the roof material profile. 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.

10. **Connector:** Fit a connector (10) to the inlet of the solar collector array.

    Refer to "Coupling Cold and Hot Pipes to Collector – Conetite Fittings" on page 31.

11. **Sensor Connector:** Fit a sensor connector (4) (with hot sensor port) to the outlet of the solar collector array.

    Note: If the installation is on a tiled roof, the orientation of the hot sensor port and hot sensor probe (when installed) must be angled between the perpendicular (90°) to the roof to a maximum 30° off perpendicular down the roof. Refer to Detail J on page 32.

    Refer to "Coupling Cold and Hot Pipes to Collector – Conetite Fittings" on page 31.

12. **End Plug (Collector Bung):** Fit the end plugs (5) (collector bung) assemblies to the two remaining solar collector connections.

    Refer to "End Plug (Collector Bung) Assembly – Conetite Fittings" on page 29.

13. **Solar Hot and Solar Cold Pipes:** Install the solar cold pipe from the solar storage tank to the solar collectors (17) and the solar hot pipe from the solar collectors (17) to the solar storage tank.

    The solar hot and solar cold pipes should be a minimum DN15, but sized to suit the installation for an open circuit system. Refer to "Pipe Lengths" on page 13.

    The solar hot and solar cold pipes must have a continuous fall from the solar collectors to the solar storage tank. Horizontal runs of pipe work are acceptable and may be installed for an open circuit system.

    The full length of the solar hot and solar cold pipes must be insulated. The insulation must be capable of withstanding the temperatures generated by the solar collectors under stagnation conditions.

    ⚠ **Warning: Plumber – Be Aware:** It is important you refer to "Warning: Plumber – Be Aware" on page 14 for further and important information relating to the installation of the solar hot and solar cold pipes.

    Refer also to installation diagrams on pages 36, 37 and 38 and to "Pipe Work Roughing In Dimensions" on page 33.

    Notes:

    - Penetrations through the roofing material must 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 solar hot and solar cold pipes.
    - Exposed insulated pipe work between the solar collectors and the penetration through the roofing material should be kept to a minimum to maintain the aesthetics of the installation.

14. **Connecting the Solar Hot and Solar Cold Pipes to Collectors:** Connect the solar cold pipe to the connector (10) at the inlet of the solar collectors (17) and the solar hot pipe to the sensor connector (4) at the outlet of the solar collectors (17) using the compression nuts (11) and olives (12) provided.

    Refer to "Coupling Cold and Hot Pipes to Collector – Conetite Fittings" on page 31 and the installation diagrams on pages 37 and 38.

15. **Hot Sensor Lead – Collector Connection:** Insert the sensor probe of the hot sensor lead assembly (9) into the sensor connector (4), ensuring the 'O' ring is in position on the probe. Lock it into position with the locking washer and clip provided.

    Hot Sensor Lead – Solar Storage Tank Connection: Run the hot sensor lead down to the solar storage tank. An extension sensor lead is available if the hot sensor lead is not long enough to reach the solar storage tank.

    Refer to the Owner's Guide and Installation Instructions supplied with the solar storage tank for the connection detail.

    Tank with side solar connections and side mounted solar control unit: Connect the hot sensor lead to the hot sensor cable connecting socket located at the underside of the solar control unit screwed to the side of the solar storage tank. If a short sensor lead adaptor is supplied taped to the outside of the plastic bag containing the hot sensor lead assembly, it will be necessary to use this to enable the mating of the connections. If the short sensor lead adaptor is not required it can be discarded.

16. **Cable Ties:** Secure the hot sensor lead at appropriate locations with the cable ties (14) provided.

    Notes:

    - The hot sensor lead may be cable tied to the outside of the insulation on the solar pipe work.
    - Ensure the hot sensor lead is not in direct contact with the solar pipe work at any point of the collector circuit, otherwise damage to the sensor lead can occur due to the high temperatures which can be experienced within the pipe work.
    - Damage to the hot sensor lead can result in solar gain not being achieved and the freeze protection system being rendered inoperative.

17. **Labels:** At ground or floor level, above the location of the solar storage tank, attach the 'Solar Cold Pipe' label (16) to the insulation on the solar cold pipe to the solar collectors and the 'Solar Hot Pipe' label (15) to the insulation on the solar hot pipe from the solar collectors.

    Ensure the arrows on the labels are pointing in the correct direction of closed circuit fluid flow.

18. **Pressure Testing the Collector Circuit:** Upon completion of the solar collector and solar hot and solar cold pipe installation, it may be required to pressure test the collector circuit. Refer to "Pressure Testing" on page 17.

19. **Connecting the Solar Hot and Solar Cold Pipes to the Solar Storage Tank:** Refer to "Connections – Plumbing" in the Owner's Guide and Installation Instructions supplied with the solar storage tank for details on the solar hot and solar cold pipe connections to the solar storage tank.

20. **Commissioning:** Upon completion of the installation, refer to the Owners Guide and Installation instructions supplied with the solar storage tank for the commissioning procedure of the solar water heater.

INSTALLATION CHECK LIST

Once the installation is complete, it is important to check the following:

- Maximum recommended total combined solar hot and solar cold pipe length is not exceeded.
- Solar hot and solar cold pipes are insulated in accordance with the installation instructions.
- The solar hot and solar cold pipes have a continuous fall from the solar collectors to the solar storage tank. Horizontal runs of pipe work are acceptable.
- 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.

  Or if the installation is on a tile roof with a flat profile tile, then the end of the collector rail at the outlet side (left hand side) of the solar collectors is higher up the roof than the end of the collector rail at the inlet side (right hand side) of the solar collectors by:

  - 15 – 20 mm for one solar collector, or
  - 30 – 40 mm for two solar collectors, or
  - 45 – 60 mm for three solar collectors.

HOOKING COLLECTOR STRAP TO COLLECTOR RAIL

Refer to installation diagrams on pages 36 to 38 for position and Detail A on page 27 and Detail B on page 27.

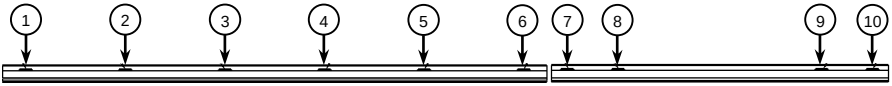
1. Determine which slots in the collector rail(s) (1) will be used for the collector straps (2) after locating the rafters and taking note of the rafter spacing.

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

	Recommended slots	
Rafter spacing	**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 & 3 or 2 & 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



collector rails – three collectors

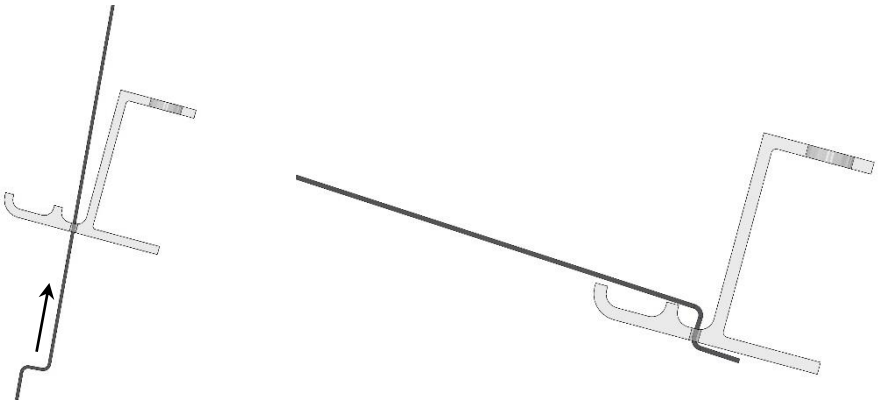
	Recommended slots – Three collectors
Rafter spacing	**(1 x two and 1 x one collector rails)**
300 mm (12”)	1 & 5 (long) & 9 (short)
400 mm (16”)	1 & 5 (long) & 9 (short)
450 mm (18”)	2 & 5 (long) & 10 (short)
500 mm (20”)	1 & 6 (long) & 10 (short)
600 mm (24”)	1 & 5 (long) & 9 (short)
900 mm (36”)	1 & 4 (long) & 10 (short)

3. Noting the orientation of the collector strap's folded end:

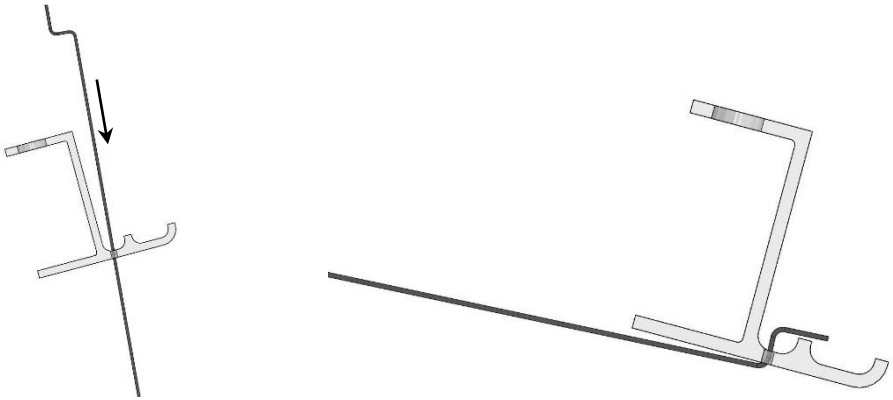
   Bottom collector rail – slide the long straight end of the collector strap through the appropriate slot from the **underside** of the collector rail (refer to Detail A).

   Top collector rail – slide the long straight end of the collector strap through the appropriate slot from the **top** side of the collector rail (refer to Detail B).

   Pull the collector strap through until the first bend in the strap slips into the slot in the collector rail. The strap will engage with the collector rail.



DETAIL A
BOTTOM COLLECTOR RAIL – COLLECTOR STRAP ORIENTATION



DETAIL B
TOP COLLECTOR RAIL – COLLECTOR STRAP ORIENTATION

COUPLING COLLECTOR TO COLLECTOR – CONETITE FITTING

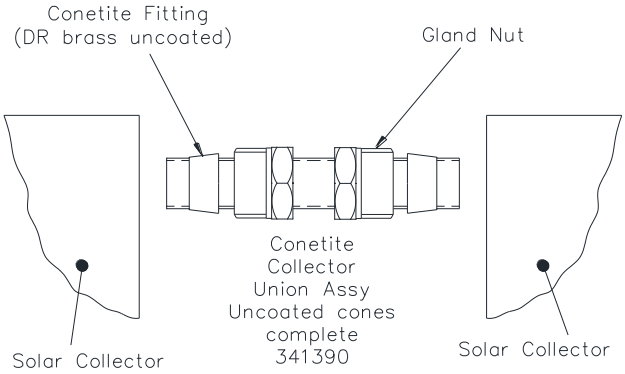
Refer to installation diagrams on pages 37 and 38 for position and Detail C on page 28.

1. Fit a collector union (3) to each collector connection of the first solar collector (17) to receive the second solar collector and screw in the unions until they seat firmly against the collector connection. Hand tighten only so the solar collectors can be shifted and centred.

2. Place the collector unions (3) into the collector connections on the second solar collector and screw in the unions until they seat firmly against the collector connection. Hand tighten only so the solar collectors can be shifted and centred.

3. Repeat steps 1 and 2 for a third solar collector (if installed).

4. After the solar collectors are centred on the collector rail(s), tighten each collector union (3) with a spanner applying medium pressure.

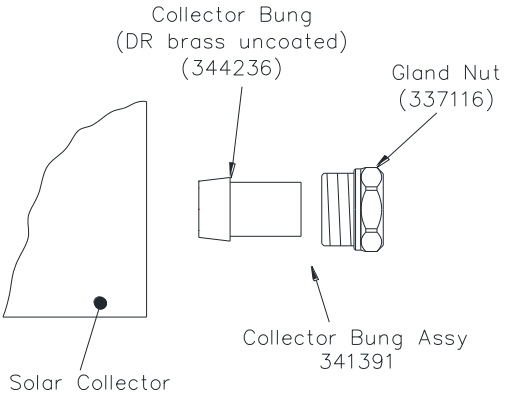


DETAIL C – COLLECTOR UNION ASSEMBLY – CONETITE FITTING

END PLUG (COLLECTOR BUNG) ASSEMBLY – CONETITE FITTING

Refer to installation diagrams on pages 36 to 38 for position and Detail D on page 29.

1. Place the collector bung of the end plug (5) assembly into the collector connection and screw in the gland nut until it seats firmly against the collector connection, applying medium pressure with a spanner to tighten.



DETAIL D – END PLUG (COLLECTOR BUNG) ASSEMBLY CONETITE FITTING

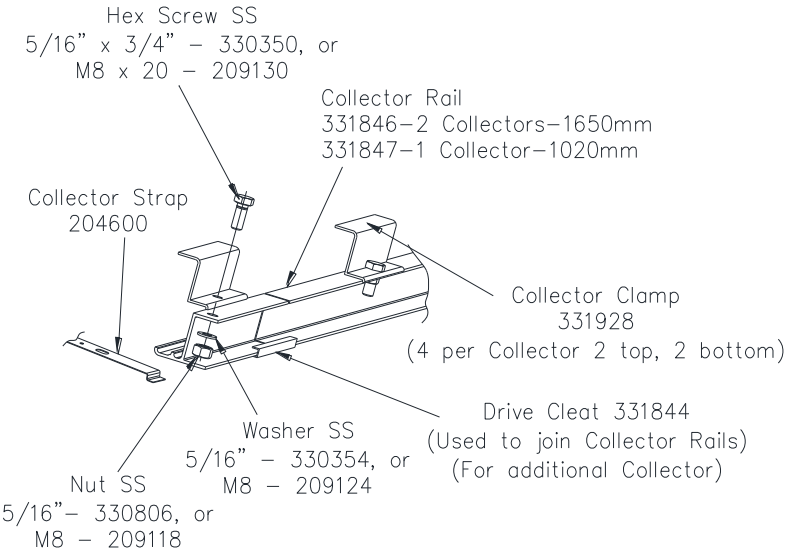
CLAMPING COLLECTOR TO COLLECTOR RAIL

Refer to installation diagrams on pages 36 to 38 for position and Detail E on page 30 and Detail F on page 30.

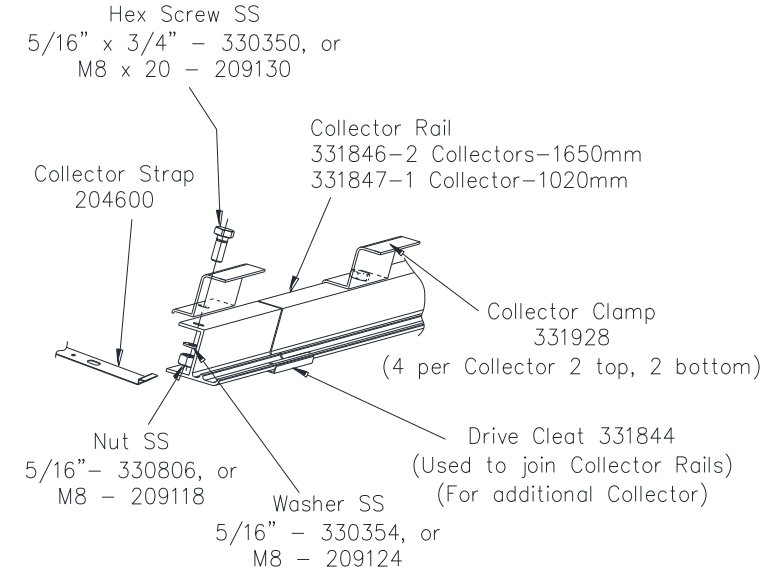
1. Centre the solar collectors on the collector rails (1).

2. Position the collector clamp (13) over the hole in the collector rail (1) with the top lip of the clamp over the collector trim.

3. Insert the hex screw through the hole in the collector clamp and collector rail (1), place the washer and nut on the screw and screw the nut until it seats firmly against the lip of the collector rail, applying medium pressure with a spanner to tighten.



DETAIL E – CLAMPING COLLECTOR TO COLLECTOR RAIL – BOTTOM



DETAIL F – CLAMPING COLLECTOR TO COLLECTOR RAIL – TOP

COUPLING COLD AND HOT PIPES TO COLLECTOR – CONETITE FITTING

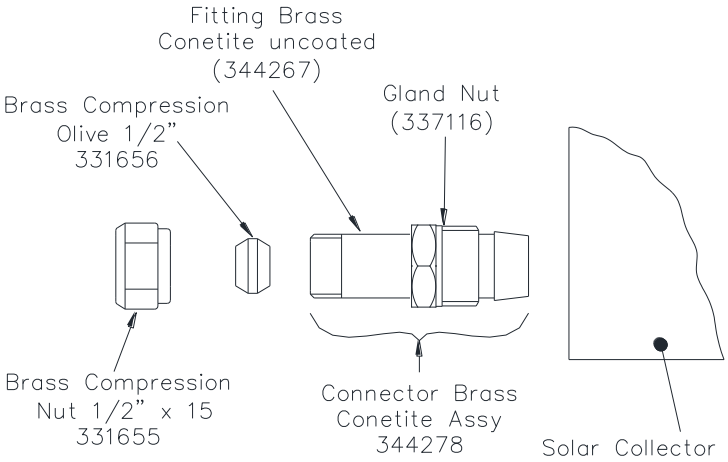
Refer to installation diagrams on pages 36 to 38 for position and Detail G on page 31, Detail H on page 32 and Detail J on page 32.

1. Place the conetite connector of the connector (10) assembly into the solar cold collector connection and screw in the gland nut until it seats firmly against the collector connection, applying medium pressure with a spanner to tighten.

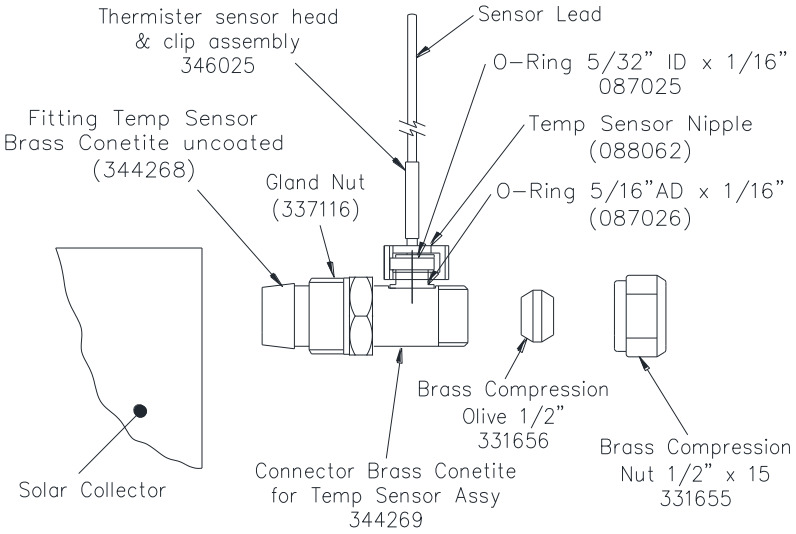
2. Place the compression nut (11) and olive (12) over the end of the solar cold pipe. Position the cold pipe into the connector (10) assembly, seat the olive (12) and tighten the compression nut (11).

3. Repeat this procedure with the sensor connector (4) assembly to couple the solar hot pipe to the solar collector (17).

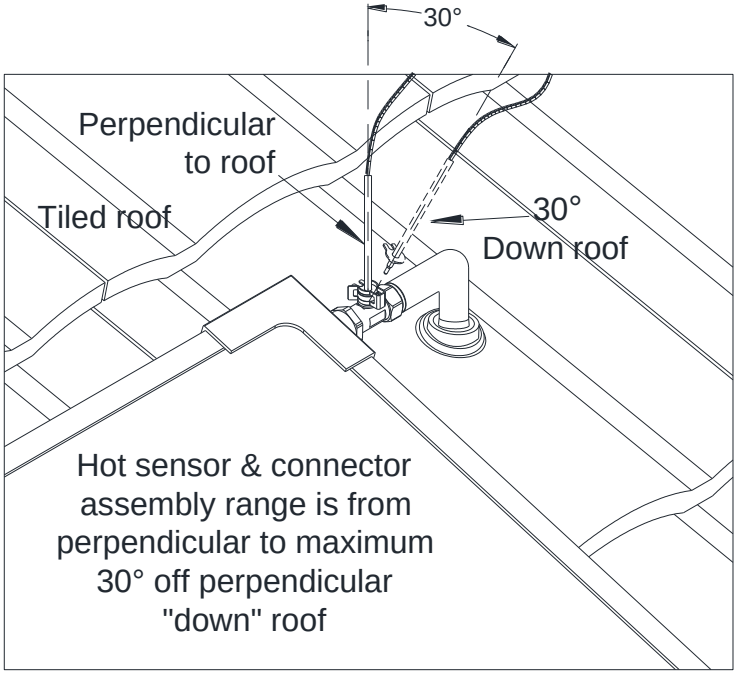
   Note: If the installation is on a tiled roof, the orientation of the hot sensor port and hot sensor probe (when installed) must be angled between the perpendicular (90°) to the roof to a maximum 30° off perpendicular down the roof. Refer to Detail J on page 32.



DETAIL G – CONNECTOR ASSEMBLY – CONETITE FITTING (SOLAR COLD CONNECTION TO SOLAR COLLECTOR)



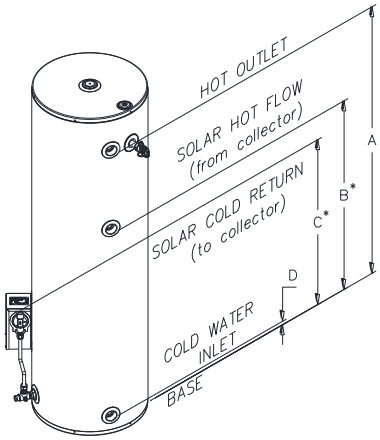
DETAIL H – SENSOR CONNECTOR ASSEMBLY – CONETITE FITTING (SOLAR HOT CONNECTION TO SOLAR COLLECTOR)



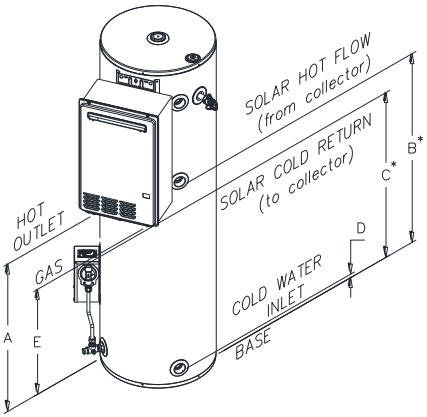
DETAIL J – SENSOR CONNECTOR ORIENTATION – TILED ROOF

PIPE WORK ROUGHING IN DIMENSIONS

Refer to the diagrams for roughing in dimensions for pipe work to the solar collectors and to the solar storage tank.



remote boost

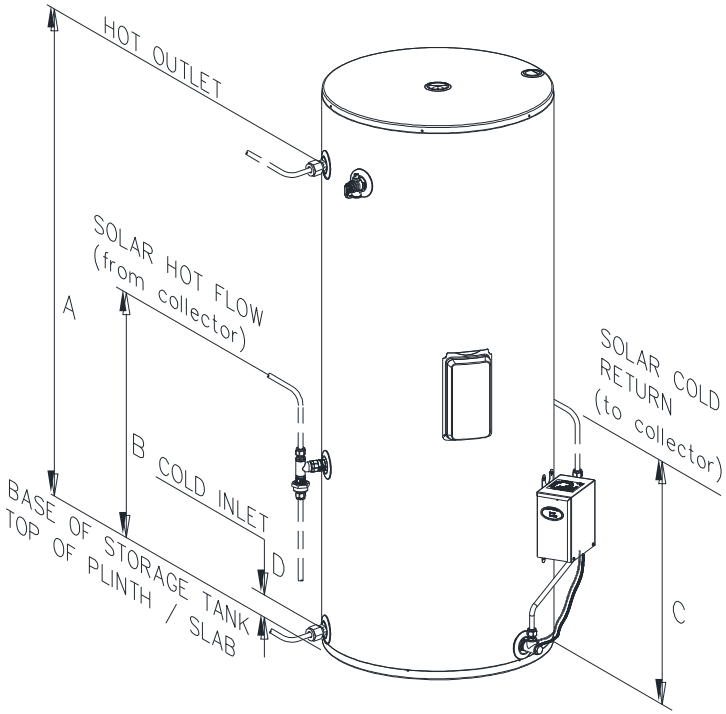


integrated boost

Integrated Gas Boost and Remote Boost
Solar Storage Tanks 160 Litre (Open Circuit)

Pipe Work to 160 Solar Storage Tank	A – Hot Outlet			B	C	D	E – Gas	
	Hot Outlet 20L	Hot Outlet 24L 26L	Hot Outlet 27L	Solar Hot Flow *	Solar Cold Return *	Cold Inlet	Gas 20L	Gas 24L 26L
integrated gas boost	1000	987	-	1239	714	104	1000	987
remote gas boost	1434	1434	1434	1239	714	104	-	-

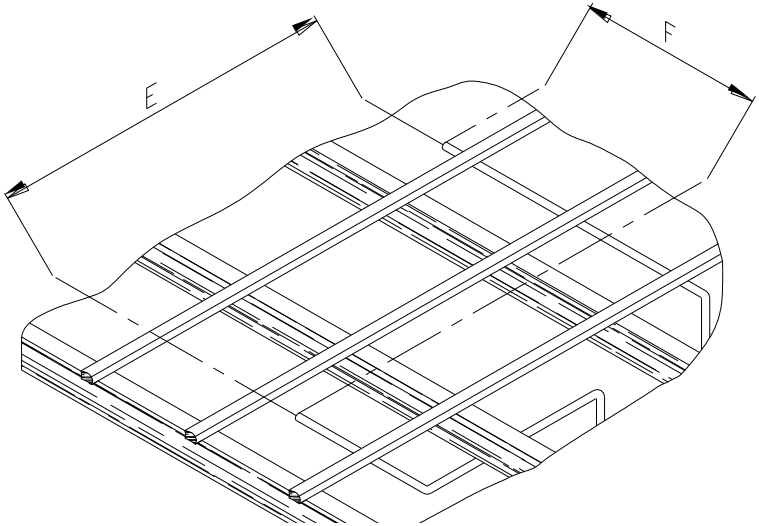
Note: * the roughing in dimensions for B and C are 200 mm above fitting to allow room for bends and valve installation.



Electric Boost
Solar Storage Tanks (Open Circuit)

Pipe Work to Solar Storage Tank		A	B	C	D
	Capacity (litres)	Hot Outlet	Solar Hot Flow *	Solar Cold Return *	Cold Inlet
270 tank	270	1190	685	635	73
320, 325 tanks	325	1430	754	635	73
410 tank	410	1600	820	643	81

Note: * the roughing in dimensions for B and C are 200 mm above fitting to allow room for bends and valve installation.



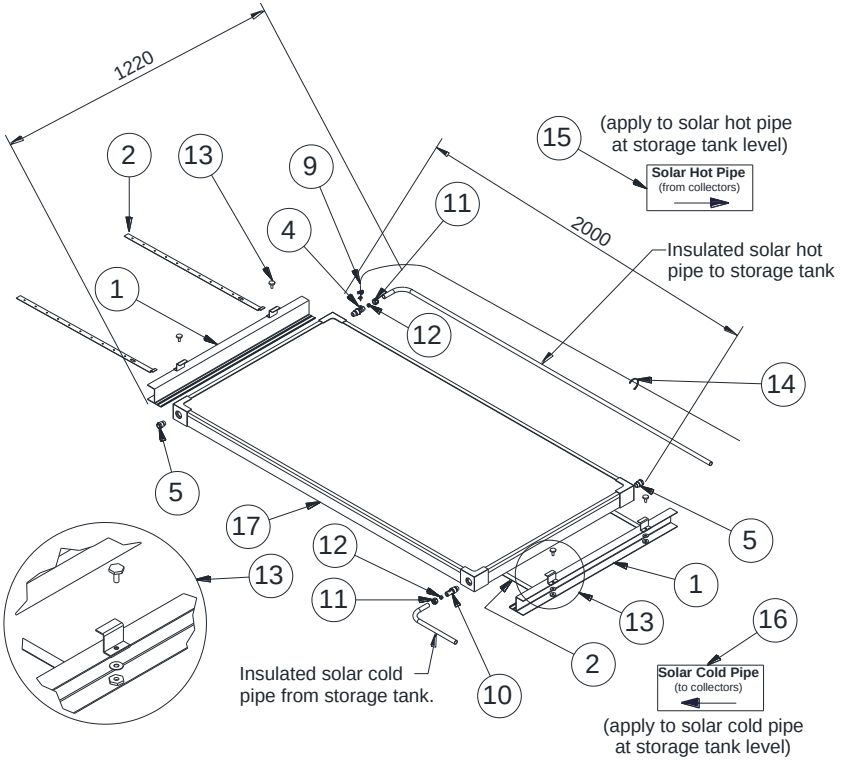
Solar Pipe Work Roughing In Dimensions

Pipe Work to Solar Collectors	E	F
1 Collector	1200	1875
2 Collectors	2260	1875
3 Collectors	3320	1875

EXPLODED VIEWS – SOLAR COLLECTORS

Note: Although the drawings illustrate the solar cold pipe connecting the bottom left hand corner of the solar collector array, the solar cold pipe may be connected to either the bottom right or the bottom left hand corner. The solar hot pipe must connect to the top of the solar collector array diagonally opposite to the solar cold pipe connection.

INSTALLATION ONE COLLECTOR WITH CONETITE FITTINGS



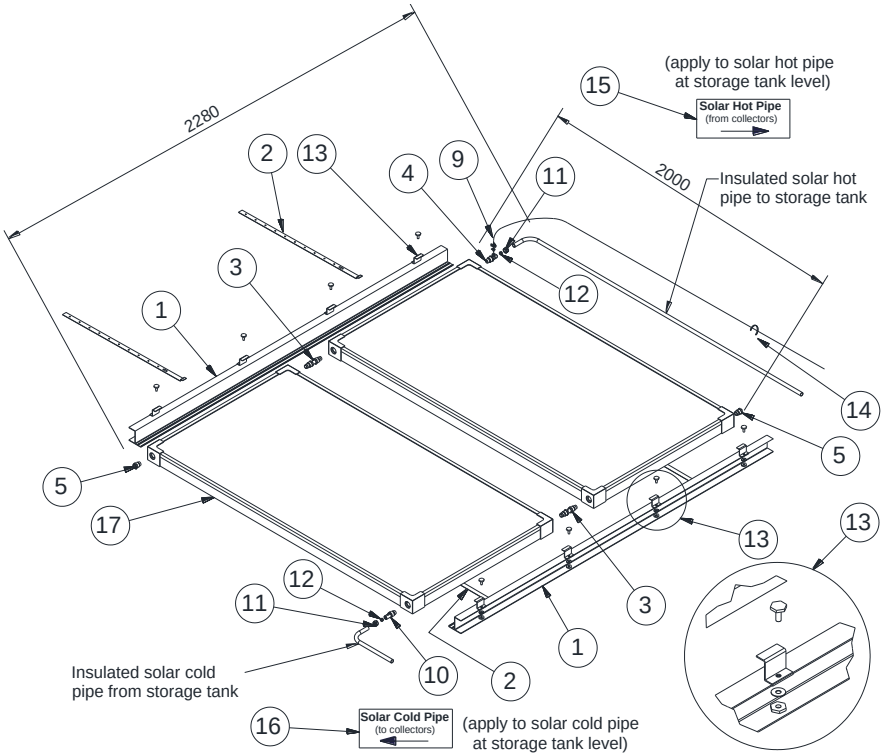
SUPPLIED IN ONE COLLECTOR KIT (CONETITE FITTINGS) (12104793)

1. Collector rail
2. Collector strap
4. Sensor connector
5. End plug (collector bung) assembly
9. Hot sensor lead assembly
10. Connector
11. Compression nut
12. Compression olive
13. Clamp, hex screw, washer, nut
14. Cable tie
15. Label – solar hot pipe
16. Label – solar cold pipe

(Supplied separately)

17. Solar collector

INSTALLATION TWO COLLECTORS WITH CONETITE FITTINGS



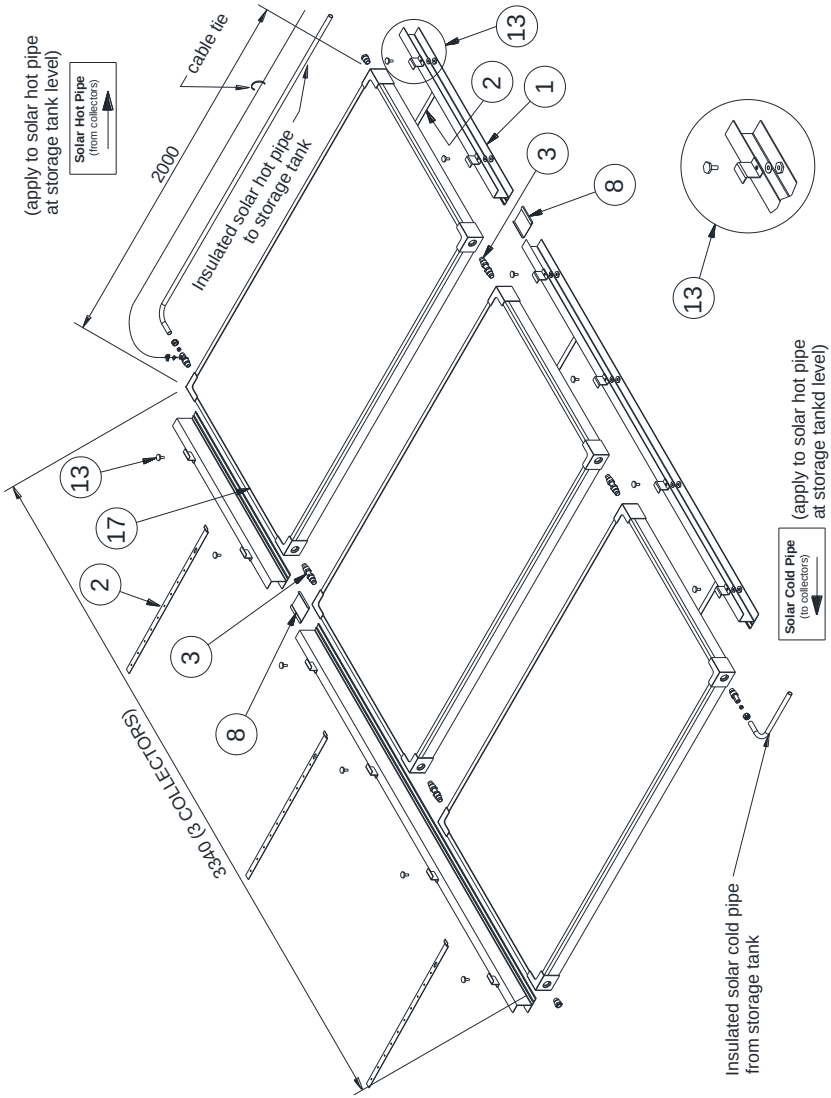
SUPPLIED IN TWO COLLECTOR KIT (CONETITE FITTINGS) (12104794)

1. Collector rail
2. Collector strap
3. Collector union (connector assembly)
4. Sensor connector
5. End plug (collector bung) assembly
9. Hot sensor lead assembly
10. Connector
11. Compression nut
12. Compression olive
13. Clamp, hex screw, washer, nut
14. Cable tie
15. Label – solar hot pipe
16. Label – solar cold pipe

(Supplied separately)

17. Solar collector

INSTALLATION – ADDITIONAL SOLAR COLLECTOR – CONETITE FITTINGS



SUPPLIED IN COLLECTOR ADD ON KIT (CONETITE FITTINGS) (12104795)

1. Collector rail
2. Collector strap
3. Collector union (connector assembly)
8. Drive cleat
13. Clamp, hex screw, washer, nut

(Supplied separately)

17. Solar collector

WARRANTY NOTE

The solar water heater and its components are covered by a manufacturer's warranty. For full details, refer to the Owners Guide and Installation Instructions supplied with the solar storage tank.

The part extracts from the "Terms Of The Warranty And The Exclusions To It" of the water heater Warranty should be noted before commencing the installation of the solar collectors.

TERMS OF THE WARRANTY AND EXCLUSIONS TO IT

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.

2.7 The warranty does not cover faults that are a result of:

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.

k) Breakage of collector glass for any reason including hail damage (we suggest that the collector glass be covered by the home insurance policy).

l) Ice formation in the waterways of a water heater system incorporating a freeze protection system where the electricity supply has been switched off or has failed or where it is installed at an altitude more than 400 metres above sea level.

2.8 Subject to any statutory provisions to the contrary, this warranty excludes any and all claims for damage to furniture, carpet, walls, foundations or any other consequential loss either directly or indirectly due to leakage from the water heater, or due to leakage from fittings and/ or pipe work of metal, plastic or other materials caused by water temperature, workmanship or other modes of failure.

Revision Date: 2016 August 347229E

RHEEM AUSTRALIA PTY LTD - ABN 21 098 823 511
SOLAHART INDUSTRIES PTY LTD - ABN 45 064 945 848
1 Alan Street Rydalmere NSW 2116 Australia
(PO Box 7508 Silverwater NSW 2128 Australia)

PATENTS

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

TRADEMARKS