

Chromagen Residential Solar Hot Water Systems: General Information & Warnings



This document contains important information for water heater installers pertaining to the installation of Chromagen solar water heaters and should be read prior to following the specific system or components installation guide.

Please take your time to read and understand this document in full prior to installing any Chromagen system, to ensure a successful and trouble-free experience.

Assembly and installation instructions for collectors, frames & stands, storage tanks and gas boosters can be found at the following link: www.chromagen.com.au/shw-documentation

If you have any questions, contact CHROMAGEN on 1300 367 565 and follow the prompts to get an "installations" representative.

Standards and Regulatory Requirements

All Chromagen solar hot water systems must be installed only by an authorised plumber in accordance with:

- Australian Standard (AS/NZS 3500.4) and the National Plumbing & Drainage Code
- Site OH&S regulations
- Local authority standards and electrical regulations
- Where required, the relevant electrical and plumbing work will need to be certified to the satisfaction of local regulatory authorities.



IMPORTANT NOTE:

THE INSTALLATION MUST COMPLY WITH THE REQUIREMENTS OF AS/NZS 3500, AS/NZS 3000, and all local codes and regulatory authority requirements. In New Zealand, the installation must conform to the New Zealand Building Code G12

Decommissioning & removal of an existing system

A suitably qualified plumber or electrician should only decommission a solar hot water system. Generally the components used can be disposed of at your local recycling centre - refer to Local council regulations for details. When removing an existing solar hot water system:

1. Drain the tank and remove the tank and collectors in a responsible manner.
2. Take care not to damage grass or garden beds by draining the tank contents on to them.
3. Ensure that proper lifting and safety equipment is used to remove the existing system carefully from the roof and/or site.

Note to Victorian Installers from the Victorian Plumbing Industry Commission.

If a solar hot water system is to be installed in a new Class 1 dwelling in the State of Victoria, it is a requirement to -

1. Record the model number on the Certificate of Compliance.
2. Provide the home owner with permanent documentation recording the system model number exactly as it is shown in the "List of systems capable of complying with the regulations" published by Sustainability Victoria - see www.sustainability.vic.gov.au

This documentation may be in the form of an indelible label adhered to the solar storage tank, or other suitable form placed in an accessible location, such as the meter box, for later inspection.

Tools that you may need to install a solar hot water system:

- A set of spanners / adjustable wrench
- High temperature joint sealant
- Screw driver
- Drill
- Copper cutter & tube bender
- Copper flaring tool
- Plinth base, for levelling tank
- Armaflex (or equivalent) UV stabilised pipe insulation suitable for solar working temperatures
- Sealant / flashing for roof penetrations

Safety equipment that you may require:

1. A ladder in good working order
2. Roof safety railing
3. Device for safely lifting heavy equipment on roof
4. Harness & ladder ties

IMPORTANT. INSTALLERS MUST READ THESE SAFETY PRECAUTIONS

The following warnings and safety precautions must be read and followed to ensure a safe installation and safe operation:

GENERAL WARNINGS:

Care should be taken to avoid coming into contact with any pipe work or fixtures connected to the water heater.



These appliances are not intended for use by persons (including children) with reduced physical sensory or mental capabilities, or lack of experience and knowledge, that prevents them from using the appliance safely without supervision or instruction.

Children should be supervised by a responsible adult for their safety to ensure that they do not play or interfere with the appliance.

EXPLOSION WARNING:



Failure to operate the relief valve easing gear at least once every six months may result in the water heater exploding. Continuous leakage of water from the valve may indicate a problem with the water heater.

HOT WATER WARNINGS:

Under no circumstances should plastic piping be used to plumb a solar hot water system

Solar collectors can generate temperatures that can scald. Exercise extreme care when handling systems, paying special attention to the inlet and outlet fittings. Chromagen advise covering the solar collector during installation.

Water from the solar collectors can be hot enough to create pressurized steam which can cause severe scalding - Under NO circumstances should any 'home handy man' type modifications be attempted.



As solar water heaters can generate water temperatures in excess of 85°C, regulations require that a tempering valve be fitted to the heater to prevent water temperatures going to the home exceeding a pre-set safe maximum. The tempering valve must be connected to the hot water outlet line from the solar system. The valve must be fitted by an authorised plumber at the time of installation or in retrofitting to existing systems.

Any checks of the Pressure Temperature Relief (PTR) valve should be performed when the tank is cold to prevent exposure to scalding hot water.

If solar collectors are not connected to the solar storage tank for extended periods (e.g. on new home installations) it is important to ensure that collector flow and return lines are emptied of water after pressure testing has been completed. Failure to drain flow and return lines can lead to dangerous, scalding water temperatures being released during tank 'fit off', or damage to collectors due to over pressurization and exposure to frost damage.

Thermosiphon arrestor valves are recommended in areas subject to high solar energy conditions and in instances where more than one solar collector is installed. Temperatures exceeding 95°C can result in the temperature relief valve activating, which can result in large volumes of wasted water.



INSTALLATION WARNING:

Chromagen recommends the use of a plinth or appropriate base underneath the solar water heater storage tank to provide more ground stability in wet conditions and to prevent tipping.



POWER WARNING:

With split systems, it is important to ensure that the power supply to the pump control unit is NEVER switched off during normal 'day to day' operation.

The power supply must be protected by an individual circuit breaker at the main electrical supply switchboard and rated to suit the booster size. The supply to the solar water heater can be operated directly from the switchboard or via a remotely mounted switch or time clock as requested by the customer. The heater must be provided with a suitable means for disconnecting the power supply.



CAUTION - IF THE WATER HEATER IS GOING TO BE UNUSED:

A small quantity of hydrogen gas (which is highly flammable) may accumulate in the top of the water cylinder. To dissipate this gas safely it is recommended that a sink or bath hot tap be turned on to dispel a couple of litres of water.

During this procedure there should be no smoking, open flames or any electrical appliances such as washing machines or dishwashers operating nearby. If hydrogen is discharged through the tap, it will make a sound like air escaping.



WEIGHT & LIFTING WARNINGS:

Solar hot water systems are heavy so always use approved lifting devices when installing solar systems at heights. All relevant Occupational Health and Safety issues must be adhered to.



HOT SURFACE WARNING:

Evacuated tubes should be left in protective packaging and not exposed to light / heat until ready for assembly. When installed in the evacuated tube and in good sunlight, the heat pipe tip can reach temperatures in excess of 200°C. At this temperature, touching the heat pipe will result in serious burns. Appropriate personal protective equipment (PPE) must be worn when handling hot tubes and heat pipes.



GLASS (EVACUATED TUBES) WARNING:

Tubes should not be stored where they could fall or where objects could fall on them. Broken glass should be cleared immediately and disposed of appropriately. Care must be taken while handling the evacuated tubes, as they may break if knocked heavily or dropped. Safety glasses MUST be worn at all times when handling evacuated tubes. If the evacuated tubes are struck by a hard object with sufficient force (ie. branch falling on roof), they may break. During installation consideration should be taken as to the possible path any broken glass may take. Protection should be implemented to prevent broken glass from causing injury or creating walking hazards to those below. The home owner should be made aware by the installer of the location of the solar collector and the possible vicinity of broken glass in the event of an extreme storm or object falling on the collector.

Installations in frost-prone zones:



IMPORTANT NOTE:

Chromagen recommend the use of Evacuated Tube collectors in areas that are known to be frost-prone and where average winter temperatures fall below 0°C

Chromagen 'Open Loop' systems with flat plate collectors without frost protection are not suitable for installations in areas where the ambient temperature falls below **4°C** and/or above 800 meters above sea level, due to the potential risk of water freezing within the system. If there is a potential for sub 4°C temperatures, an "anti-freeze" (frost valve) should be specified with an 'Open Loop' system. Where more than 1 collector is installed, multiple freeze protection valves should be installed. In conjunction with a frost valve, chromagen's range of 'Open Loop' split systems are fitted with an inbuilt frost protection mechanism in the solar control unit, which relies on a properly-fitted roof mounted sensor, and is designed to automatically circulate a small amount of water through the solar collector array when freezing conditions occur. It is important to ensure that the sensor is fitted correctly and that the power supply to the pump control unit is NEVER switched OFF during normal day to day operation.

If you are unsure about the level of frost protection required in your area please contact your Chromagen solar specialist on 1300 367 565

Failing to perform this check will render the home owner liable for the full expense of collector replacement should frost damage result.

Water Quality

- Some town water supplies may have elevated mineral content and require more frequent system maintenance.
- Your local water supply authority can supply a water analysis if required
- See the table below for the ideal systems for your water supply

Ideal System Type	Water Quality		
	Total Dissolved Solids	Total Hardness	Alkalinity
Open Loop Systems	Less than 1000 parts per million	Less than 200ppm of CaCO ₃	Less than 150ppm
Evacuated Tube Systems	Greater than 1000 parts per million	Greater than 200ppm of CaCO ₃	Greater than 150ppm

Water Pressure

The storage tank has a pressure/temperature relief valve set at 1,000 kPa. The cold water inlet pressure should not exceed 800 kPa (approximately 20% below the pressure relief valve setting).

A pressure reduction valve must be installed if this is not the case. The relief valve will discharge a small amount of water when the system is heating and should be checked every six months

Selecting a System Location

- For best system efficiency the storage tank should be positioned as close as possible to the most utilised hot water outlets
- The storage tank may be installed internally (dependant on plumbing regulations) if it is placed on an approved spill tray with an appropriate drain (refer to special note below)
- The collectors should be installed facing the equator. North in the Southern Hemisphere (South in the Northern Hemisphere).
- A deviation of 45° to east or west has little effect on annual solar gain.
- The solar collector should be no more than 15 metres away from the storage tank (in ground mounted systems).
- The collector/s must be at a minimum pitch of 10°, with flat roof frames available if less than 10° roof pitch. 30° pitch and over requires extra fixings and frames.
- The collector array should be free from shade all year round and clear from obstructions.
- The collector should not obstruct roof drainage (e.g. gutters, valleys)

Important Notes

Water heaters shall be located and oriented in accordance with the following:

1. The rating plate and instruction notice shall be in a visible position.
2. Unobstructed access shall be available to the heating units, valves, controls, tanks and other parts requiring maintenance.
3. There shall be 150 mm minimum clearance from the end of the easing gear of temperature/pressure-relief valves to allow for valve removal.
4. The heater shall be subsequently removable without major structural alteration to the building or major alteration to the piping.
5. The installation site should be readily accessible for inspection and servicing.

Special Notes for Internal installations:

For internal installations the tank should be placed on a suitable safe tray with automatic cut off valves as required.

The installation shall comply with the following:

- a. It shall have no portion of any the tank closer than 75 mm to a vertical line from the edge of the safe tray and no portion of the tank or any attached auxiliary part closer than 25 mm to the vertical line.
- b. It shall have placed, between the tank and the safe tray, supports not less than 12 mm thick and of an area not less than 0.5A, nor more than 0.6A, where A is the area of the base of the tank. The support shall project beyond the sides and walls of the tank but not closer than 20 mm to the sides of the safe tray.

Solar Flow and Return Lines

Solar flow and return lines need to be run from the collector/s to tank using insulated copper or stainless steel with a gradual fall to the storage tank. Approved flashing must be used when penetrating the roof.

Roof Support Requirements:

System Type	Full Weight	Roof support requirements
Thermosiphon Systems	Greater than 500kg	Check roof strength to determine ability to hold weight. Reinforce if necessary
Split Systems (Tank on ground)	30-100kg	No extra reinforcing required

When installed in cyclonic areas, the use of an approved Chromagen cyclone frame will be required. If you have any queries regarding the requirements of your location please contact your local Chromagen representative. Non cyclonic areas (i.e. near coastal areas, etc) may also require additional mounting brackets. Expected wind loads should be checked for these areas.

General information on Electrical Connections

Local codes must be adhered to for all electrical work and be undertaken by a qualified electrician

Element connections (Electric Models Only):

Both roof mounted (thermosiphon) systems and ground mounted (pumped) systems will need the element connected for auxiliary boosting (see data plate for power rating on hot water tank). A waterproof seal must be used for all electrical entry and exit points

GPO's for pump, controller & boosters:

All ground mounted (pumped) solar hot water systems require a weatherproof general power outlet (GPO) to operate the pump. When using a gas booster, a double general power outlet is required; dependant on gas boosters proximity to tank location.

Solar Differential Controller Installation

The solar differential controller should be fitted to the solar pump station, which should be fixed to the storage tank (refer to separate to instructions on fitting pump station to tank) or the wall close to the tank using the fixing lugs. The controller must be protected from weather by being covered by the shower-proof pump station cover or installed in an otherwise suitable location.

Servicing And Repair

All servicing and repair should be performed by an authorised person in accordance with the appropriate product manual & instruction. Below are some overall instructions regarding the service and maintenance of the Solar hot water system.

Inspection & Flush

The tank and collectors should be inspected and flushed if there is any noticeable drop in hot water pressure and other filters have been cleaned or 5 years whichever the earlier. In areas of hard water this may be required more frequently due to calcification within the system. The system should be drained as per the below instructions, flushed with clean water and the re-instated as per the original installation instructions. This work must be performed by an authorised person.

Draining the system

The power supply to the pump controller and gas booster or electric element must be switched off and/or breakers locked out of service.

3. Close the cold water mains supply stop cock or duo valve.
4. Open a hot tap to relieve pressure.
5. Disconnect the hot outlet near the top of the storage cylinder.
6. Disconnect the cold inlet near the bottom of the storage cylinder.
7. Disconnect the connection between the solar 'flow pipe' and solar pump.
8. Disconnect the connection between the solar 'return pipe' and the cylinder.
9. The cylinder and solar collectors will now drain completely.



**Looking for More
Installation Instructions?**

Visit www.chromagen.com.au/shw-documentation
or scan QR code

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NOTE: All roof penetrations are the responsibility of the installer. All details in this document are accurate at time of publishing. Illustrations shown are representative only. Product specifications may change without notice. For the latest product details and specifications, please visit our website - www.chromagen.com.au.