

ESIA Information Sheet - Best Practice Guidance

Hot Water System Upgrades: Installation Minimum Requirements

Compliance Process Checks

ESIA Members are encouraged to consider, but are not bound by, the information provided on the following pages authored by Northmore Gordon and generously provided to the ESIA to support the work of the ESIA Hot Water Working Group and the membership.

This information is provided in good faith as a supporting guidance document.

While considered up to date at the time of publishing, and while all care has been taken to ensure the accuracy of content, no responsibility will be taken by ESIA or Northmore Gordon.

As stated in the following pages, energy savings schemes participants including certificate creators and their installers are required to abide by the relevant legal frameworks and it is your responsibility to keep up to date with changes.

Queries and feedback on this document: please email comns@esia.asn.au

Hot Water Systems Retrofit/Upgrade Installation Minimum Requirements

July 2023

To ensure best practice installations we will be required to include checks for the above in our compliance process before jobs can be passed and submitted to the regulator. **Please ensure when you submit your photos of the completed installations all the works are finished so that none of these issues delay the progress of your claims.** To assist all installers we have developed the following guide and examples. The following is based on Australian Standards and represents the minimum requirements for installation of hot water systems in Australia. It is a requirement of all incentive programs in Australia that the minimum requirements are followed. This guide is focused on “simple” retrofits for domestic hot water applications, it is not a substitute for understanding the requirements of the standards, in particular AS/NZS 3500.4:2021- Plumbing and Drainage, Part 4: Heated water services. For more complex installations you should consult the standards for more information.

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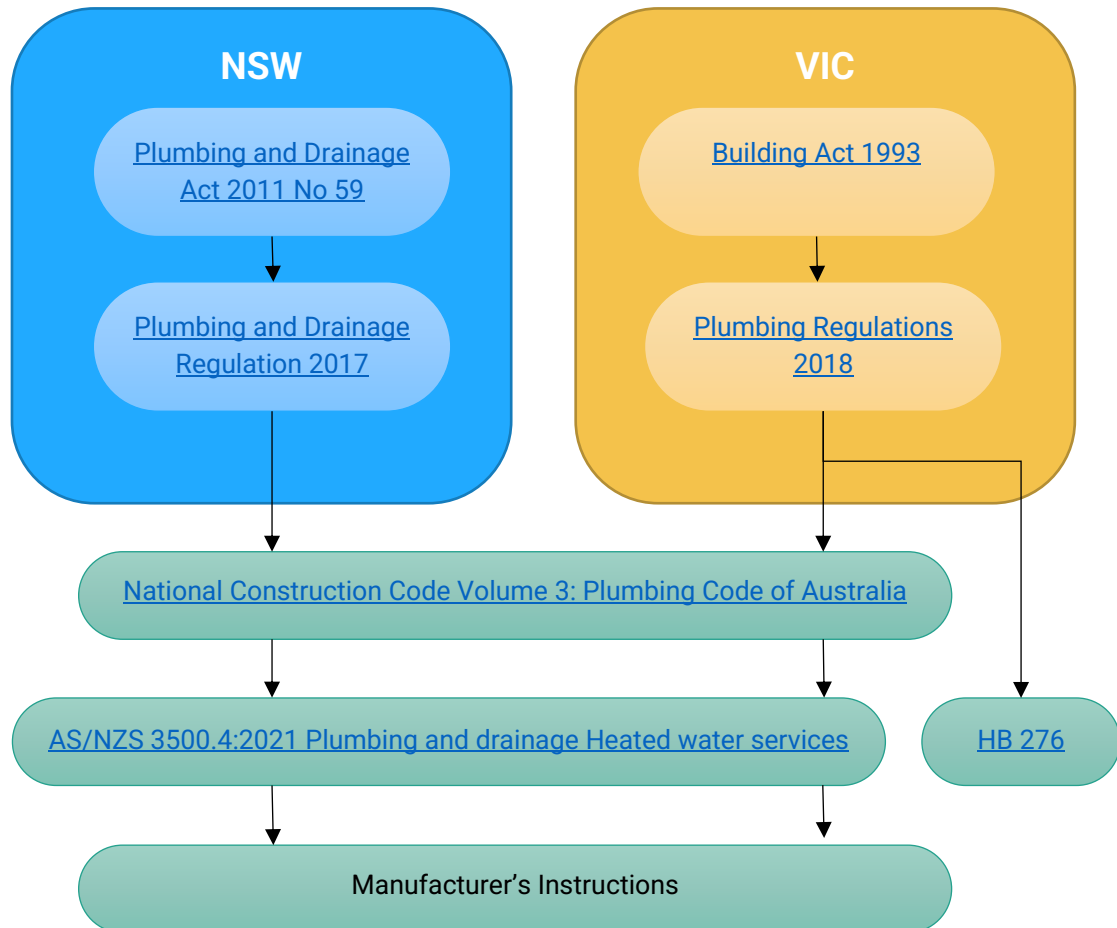
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This guide has been developed by Northmore Gordon on behalf of Energy Savings Industry Association



Legal Framework

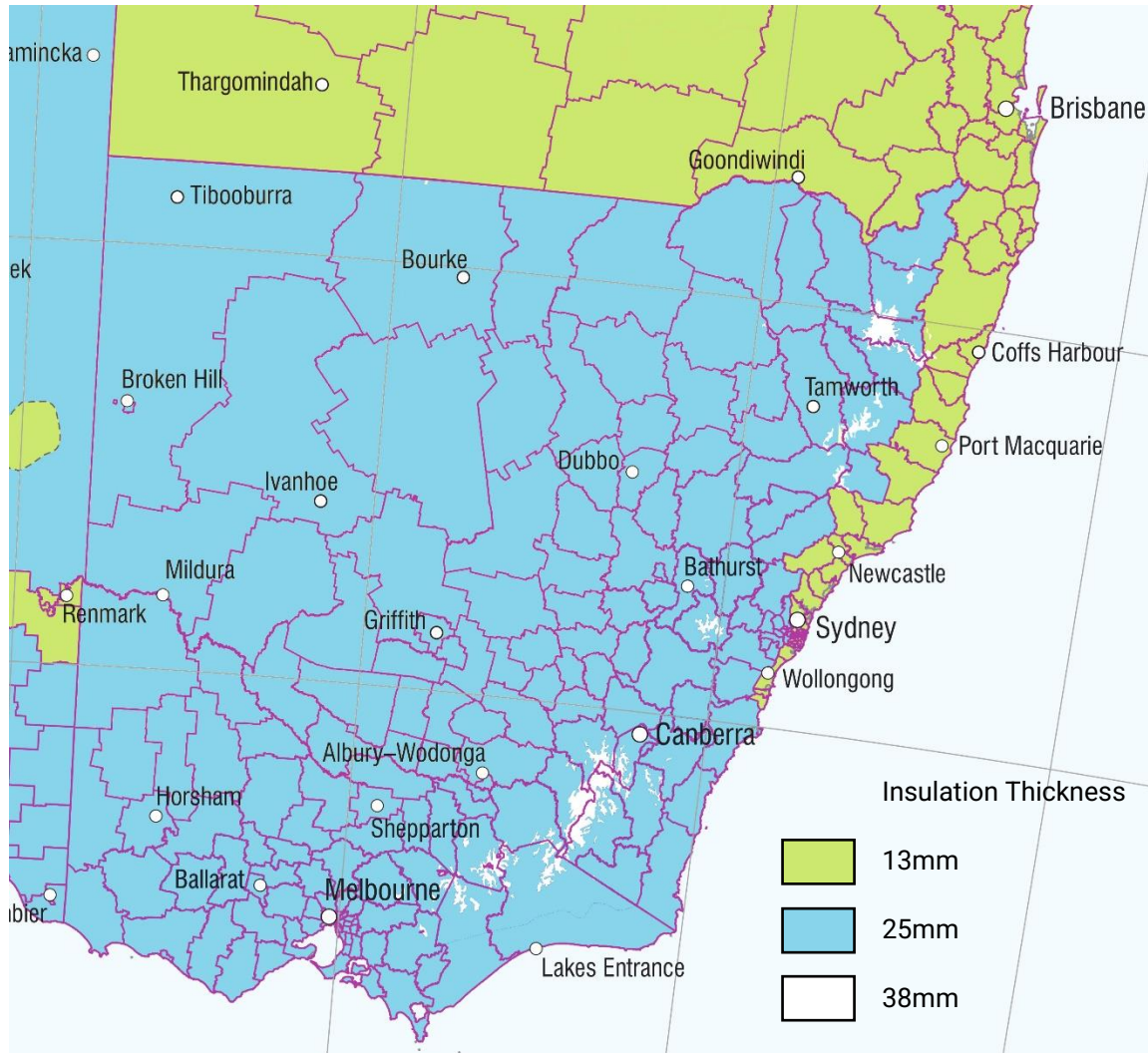
The plumbing requirements are the same throughout Australia, there are no specific exemptions relating to hot water system installations between states.



Lagging / Thermal Insulation

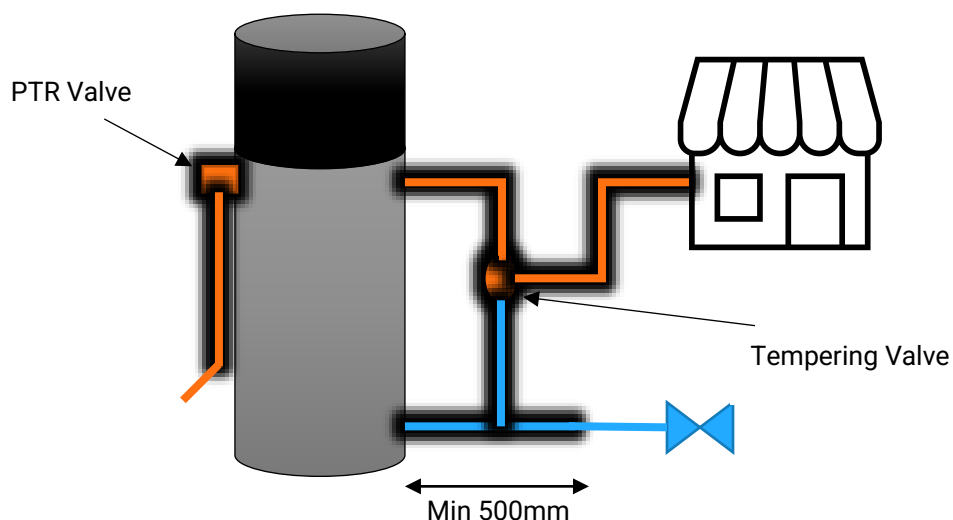
Required R value to be achieved will depend on where in Australia the system is located, as a guide:

- Zone A – 13mm (Climate Zones 1, 2, 3, 5)
- Zone B – 25mm (Climate Zones 4, 6, 7, 8)
- Zone C – 38mm (Alpine Areas)
- Valves – 9mm



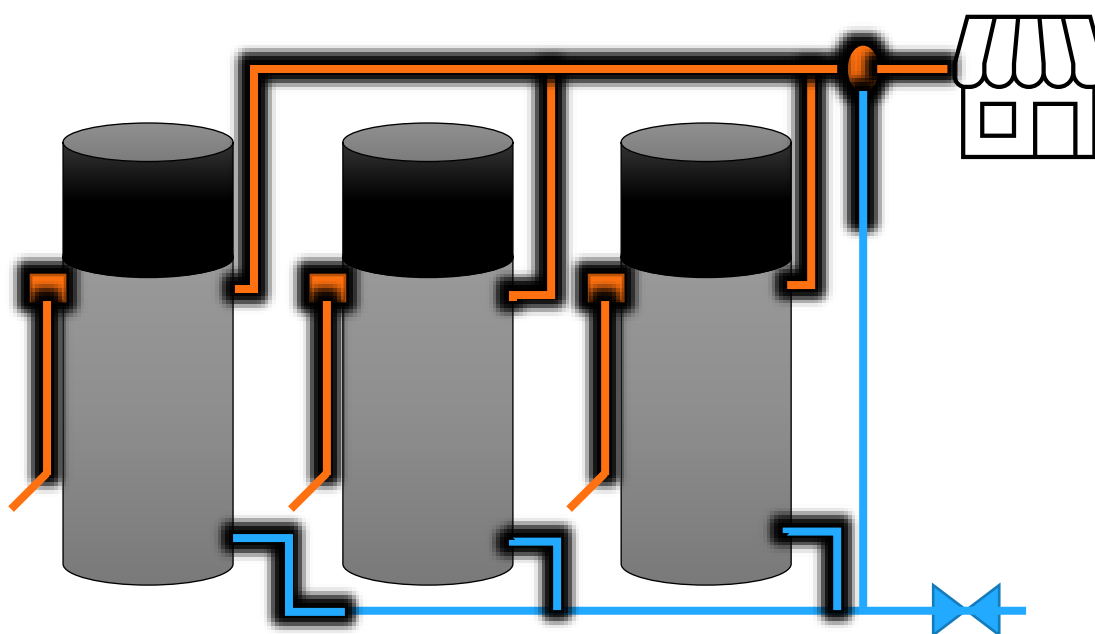
If installed outdoors, must be a weather-resistant type (refer to AS/NZS 3500.4:2021 Section 8.3.1) and for buried piping, all joints must be wrapped in a durable inert waterproof tape (refer to AS/NZS 3500.4:2021 Section 8.3.2).

Additional lagging may be required for frost protection in certain areas.



Refer to AS/NZS 3500.4:2021 Section 8.3.1, the following should be lagged:

- All cold water inlet pipes, including valves, for storage water heaters, for at least the first 500mm in all directions
- All hot water outlet pipes, including valves, for storage water heaters, for at least the first 500mm
- All PTR Relied drain pipes, for at least the first 500mm
- All external hot water pipework to the primary kitchen sink. Note that an external location of a building includes open sub-floors, and areas under open verandas or carports.
- For manifold systems, the whole heated water manifold, including valves, to a point at least 500mm past the last branch to the last water heater in the manifold
- Tempering valves
- All relief valves fitted to the storage water heater, e.g. Pressure-Temperature Relief Valves
- Pipe connections to tanks, e.g. where a 90 degree elbow is used
- Pipes between tanks and external heat pump units
- All piping should be metallic, refer to AS/NZS 3500.4:2021, Section 2.5.2



Equipment Mounting

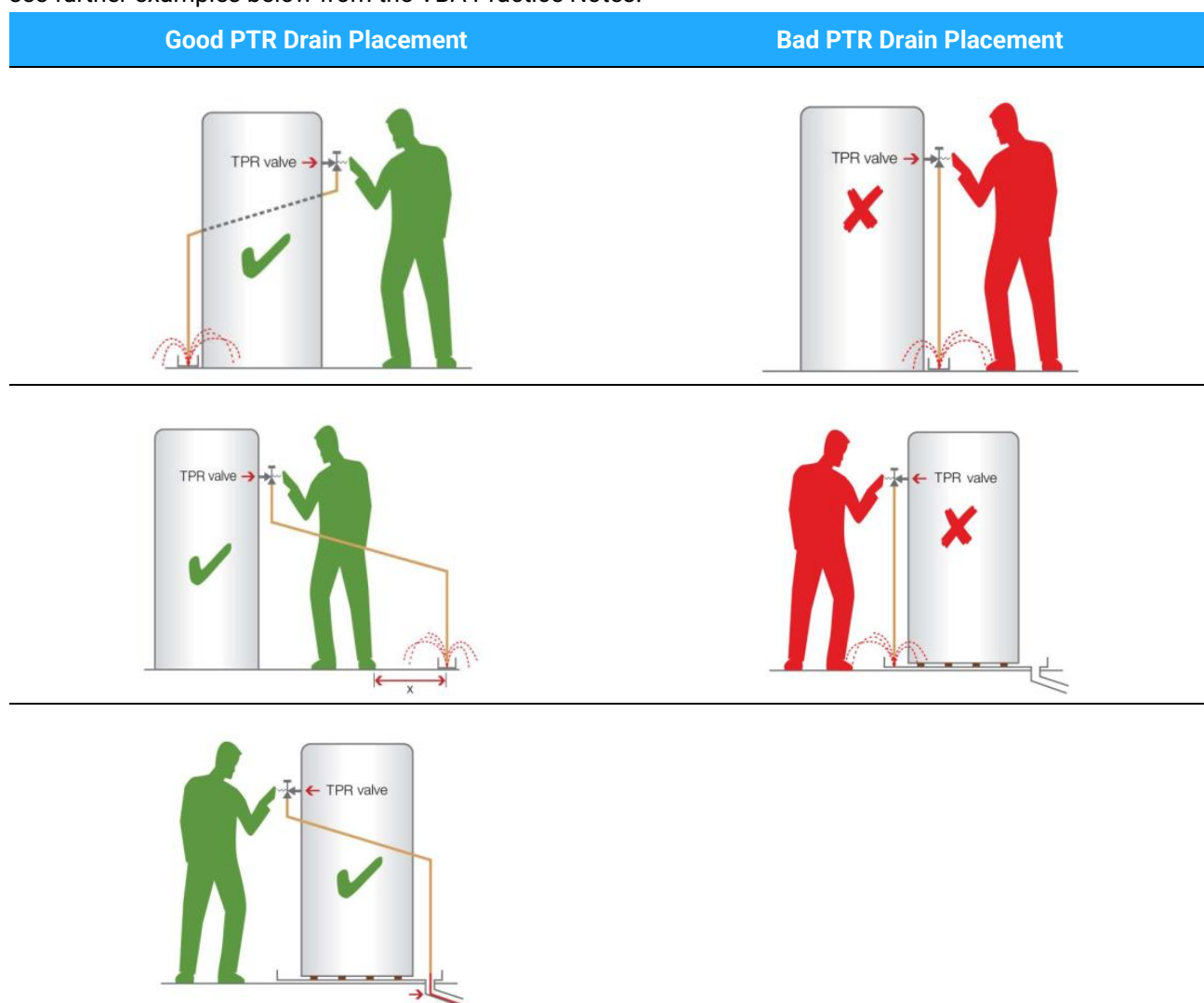
All equipment must be secured to appropriately, including tanks and separate compressors. Refer to AS/NZS 3500.4:2021 Section 5.5.3

- Must be installed to suitably designed bases, e.g. concrete pad or engineered composite base
- Must be designed and located to avoid ponding
- Split-System Heat Pump Units must be fixed to the bases using appropriate fixings, as specified by the manufacturer
- For Wall or roof mounted systems must be mounted and fixed to a suitable bracket/hangers (to withstand the applied load)
- Must be upright and level
- Protected from any hazards that may damage the equipment, e.g. by operating forklifts in a warehouse

Pressure and Temperature Relief Valves and drain lines

- Valves must be accessible (Refer to AS/NZS 3500.4:2021 Section 5.9.4 (a), 5.3.2)
- Valves must be insulated (Refer to AS/NZS 3500.4:2021 Section 5.9.4 (h))
- Refer to AS/NZS 3500.4:2021 Section 5.11, drains should be installed so that they:
 - Don't damage buildings
 - are directed away from building footings
 - Each line fall continuously from the valve to the point of discharge
 - do not pose a risk of injury to people
 - Drain line must be terminated so to discharge water away from the operator during the operation of the valve
 - Must be copper piping (5.11.1 (c)), cannot use plastic pipes for drain lines (AS/NZS 3500.4:2021, 2.5.2 (g))
- Must be insulated for at least the first 500mm, note that these drains are still considered an "outlet" according to the definitions in the standards.

see further examples below from the VBA Practice Notes.



Images from VBA Practice Note 6.09 Hot Water Plumbing - Pressure and Temperature Relief (PTR) Valve Drain Lines

Sufficient Clearance for Airflow and Access

- Heat pumps have different installation requirements compared to electric resistance or gas hot water systems. In particular heat pump system require sufficient airflow to function properly. It is recommend that the compressors are installed outdoors. The compressors can be installed in non climate controlled spaces, e.g. in open warehouse areas, where the manufacturer's airflow requirements can be met.
- As heat pump hot water systems will reject cold air to the environment year-round, the heat pump unit should not be installed in conditioned spaces or where this may cause discomfort to occupants. Refer to the specific manufacturer's recommendations.
- Don't install systems in confined spaces, in the case where the existing hot water system has been installed in a cupboard, the heat pump may need to be relocated.
- Unobstructed access must be provided for all parts that require maintenance, including relief valves
- Allow 150mm clearance from the end of relief valves to allow for valve removal and maintenance.

Other Installation Considerations

Mains Water Pressure

Check that the mains water pressure at the site is suitable for the appliances installed, refer to the manufacture's instructions for the pressure rating of the appliance. A pressure reduction valve may need to be installed on the premises if required.

Mezzanine / Ceiling Installations

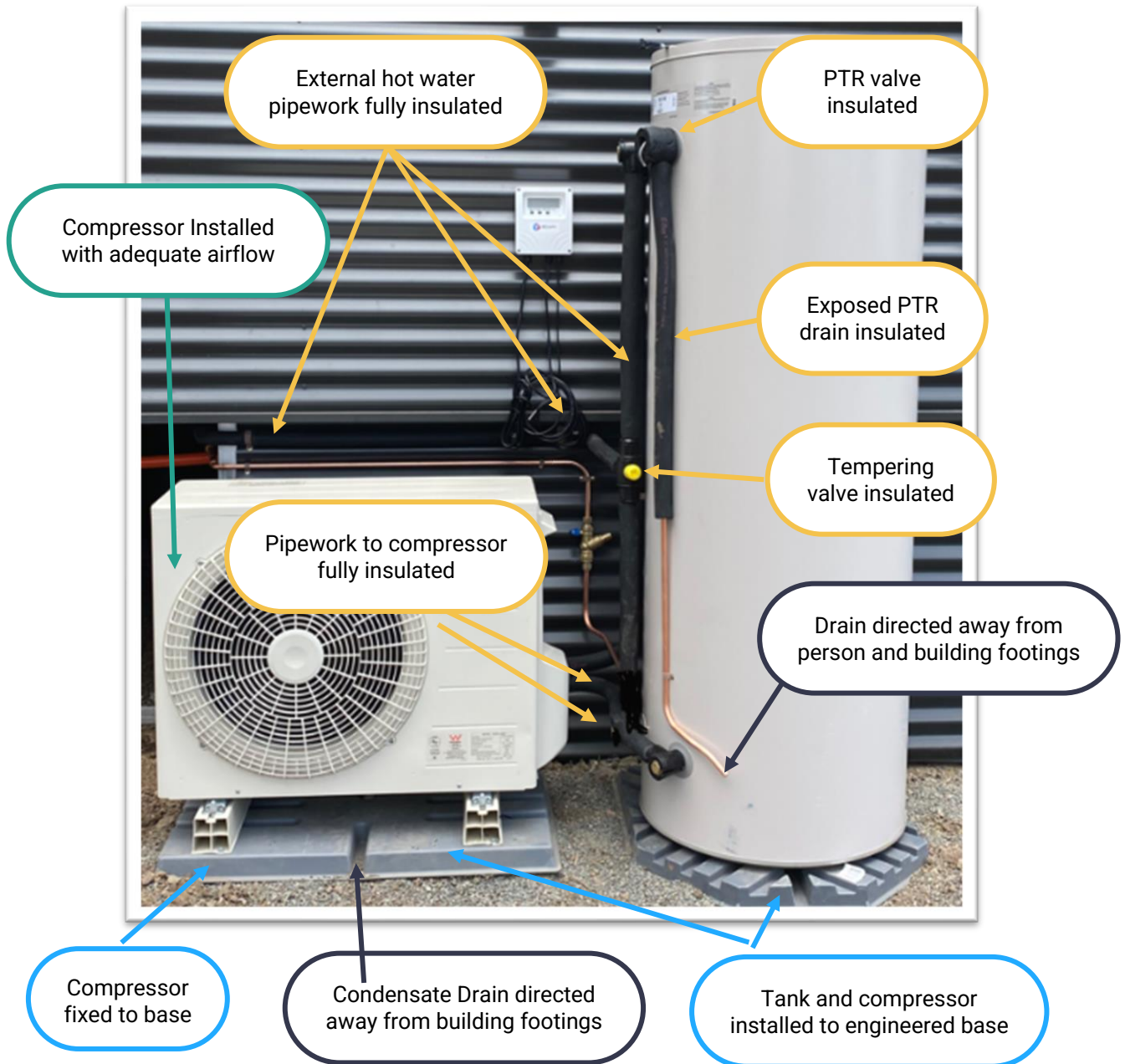
If replacing a hot water system on a mezzanine / ceiling space with a larger unit, it is recommend that the system be relocated to ground level. If the system is installed to the same location, ensure that is it suitably supported above a load-bearing wall and as safe tray in installed. Refer to AS/NZS 3500.4 section 5.5 for more information.

Electrical Work

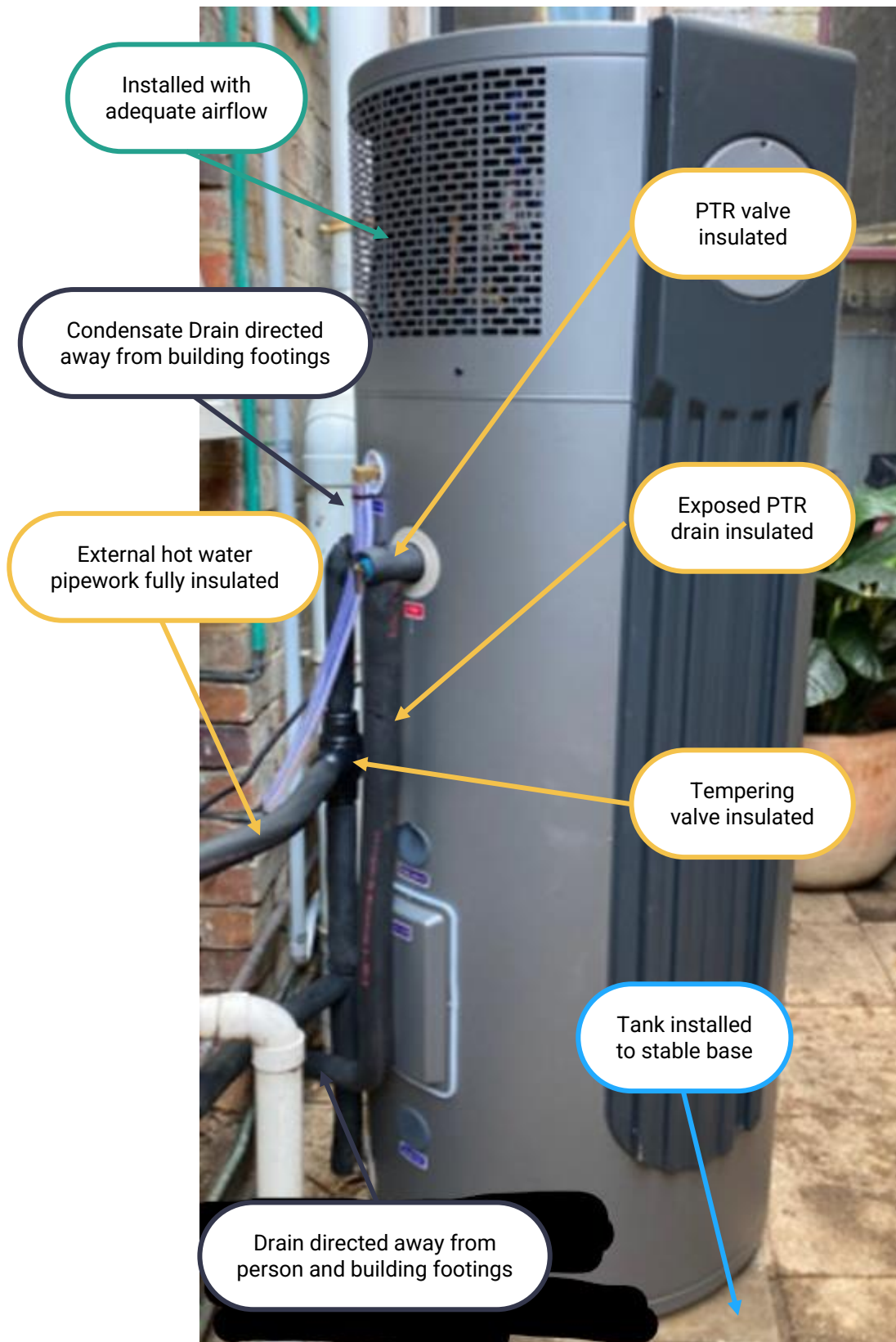
Any changes to fixed wiring work will require an electrician, e.g. installation of GPOs. Ensure all fixed cables are safely routed and secured so not to cause a hazard.

Example Installations

Split System



All in One System



Licencing

| | All In One | Split System – “Water Loop” | Split System – “Refrigerant Loop” |
|--|------------|--------------------------------|--------------------------------------|
| Plumbing Licence – Water Supply | Yes | Yes | Yes |
| Plumbing Licence – Refrigerated Airconditioning (VIC) | No | No | Yes |
| Plumbing Licence – Mechanical Services (NSW) | No | No | Yes |
| Refrigerant Handling Licence | No | No | Yes – RAC01 |

[Refrigerated Air-conditioning | Victorian Building Authority \(vba.vic.gov.au\)](https://vba.vic.gov.au/Refrigerated-Air-conditioning)

[Licence Types | ARC Industry Site \(arctick.org\)](https://arctick.org/Licence-Types)

[Air conditioning and refrigeration | NSW Fair Trading](https://www.fairtrading.nsw.gov.au/air-conditioning-and-refrigeration)

[Plumbing, draining and gasfitting | NSW Fair Trading](https://www.fairtrading.nsw.gov.au/plumbing-draining-and-gasfitting)

References / Further Information

AS/NZS 3500.4:2021- Plumbing and Drainage, Part 4: Heated water services

- Section 5 – Installation of Water Heaters – General Requirements
 - 5.5 Support
 - 5.11 TPR Valve and expansion control valve drain lines
- Section 8 – Energy Efficiency

AS/NZS 3500.2:2021 – Plumbing and Draining, Part 2: Sanitary plumbing and drainage

HB 276: A Guide to Good Practice for Energy Efficient Installation of Residential Heating, Cooling & Air Conditioning Plant & Equipment

- Reconfirmed in 2016
- Is listed in the Victorian Regulations, as such is a requirement to follow in Victoria

The VBA has produced a series of Plumbing Practice Notes that give additional explanatory information and are applicable nationwide. They are available from the VBA Website or contacting the VBA directly, [Plumbing Practice Notes - Victorian Building Authority \(vba.vic.gov.au\)](https://vba.vic.gov.au/Plumbing-Practice-Notes)

- 6.04 Hot Water Plumbing - Installation of Tempering Valves and Heat Retention for Hot Water Piping June 2014
- 6.07 Hot Water Plumbing - Special Option for a Temperature Pressure Relief (TPR) Valve June 2014
- 6.09 Hot Water Plumbing - Temperature Pressure Relief (TPR) Valve Drain Lines June 2014
- 6.10 Hot Water Plumbing - Thermal Insulation of Heated Water Pipework June 2014
- 7.08 Mechanical Services - Split Systems Air Conditioning June 2014

CHECKLIST OF INSTALLATION MINIMUM REQUIREMENTS

Tank Installation [8]

| | |
|--|--------------------------|
| Tank installed to level, stable, and impervious base that is designed and located to avoid ponding. E.g. 50mm concrete base, 75mm in-situ concrete, 100mm polyslab | <input type="checkbox"/> |
| For tanks installed on surfaces that may become wet, must be installed to allow free air circulation between the surface and the base of the water heater | <input type="checkbox"/> |

Pipes/Valves that are required to be insulated

| | |
|--|--------------------------|
| The cold-water inlet pipes [1], for storage water heater at least the first 500mm, including any in-line valves and fittings | <input type="checkbox"/> |
| The hot-water outlet pipes [2] for storage water heater at least the first 500mm, including any in-line valves and fittings | <input type="checkbox"/> |
| All relief valves fitted directly to a storage water heater [3] | <input type="checkbox"/> |
| All external hot-water piping from the water heater to the primary kitchen sink. [4] | <input type="checkbox"/> |
| If multiple installations – the whole heated water manifold including valves until at least 500mm past the heated water outlet branch from the last water heater installed | <input type="checkbox"/> |
| Tempering valve to be fully insulated [5] | <input type="checkbox"/> |
| For split systems, pipework to compressor fully insulated [6] | <input type="checkbox"/> |
| TPR drain pipe for at least the first 500mm [7] | <input type="checkbox"/> |
| Insulation is of appropriate thickness for the location it is installed | <input type="checkbox"/> |
| All outdoor insulation is weather resistant, and all joins wrapped with a durable, inert waterproof tape | <input type="checkbox"/> |

Temperature-Pressure Relief Valve Drains [9]

| | |
|---|--------------------------|
| Copper pipe used of a diameter not smaller than the nominal size of the outlet | <input type="checkbox"/> |
| No taps, valves or restrictions in the line | <input type="checkbox"/> |
| Each line falls continuously from the valve to the discharge point, i.e. avoid 90 degree bends | <input type="checkbox"/> |
| Drain discharges such that it is readily discernible, does not cause a nuisance, poses no risk to damage the building or cause injury to people, and prevents ponding | <input type="checkbox"/> |
| Drain line must be terminated so to discharge water away from the operator during the operation of the valve | <input type="checkbox"/> |
| Drain cannot discharge into a safe tray, must be directed to drain or other safe location | <input type="checkbox"/> |
| For multiple installations, each system has a separate drain line that is not interconnected | <input type="checkbox"/> |
| Provide 150mm clearance around relief valves to allow for maintenance, operation, and removal | <input type="checkbox"/> |

Condensate Drains [10]

If plastic pipe is used, must be suitable for installation in direct sunlight

Must be directed away from the building to prevent ponding, or discharge to a stormwater or sanitary drainage system

Compressor (for split systems) [11]

Compressor installed with adequate airflow in accordance with the manufacturers instructions, both around unit and for flow rate if installed in an indoor location

☐

Mounted level to an appropriate support base (e.g. concrete pad or engineered composite base) and secured/restrained with appropriate fixings and anti-vibration pads, as specified by the manufacturer

☐

Used an engineered, commercially available mounting system, e.g. could be a combination of wall bracket, concrete base, polyslab or similar, PVC smartduct floor support or similar. (Alternate solutions may be acceptable but will require written justification for compliance with the standards)

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Insulation Example:



Other installation example:

