Government of Western Australia
Department of Mines, Industry Regulation and Safety
Plumbers Licensing Board

Technical Note

Technical Advice Line 1300 360 897
www.dmirs.wa.gov.au/building-and-energy

# Water heater installations

This technical note has been issued to clarify the general installation requirements of water heaters, including the correct termination of drain lines from temperature/pressure-relief and expansion control valves. These conditions apply to the installation of new water heaters as well as replacements, additions and repairs to water heaters of all types.

## Drain lines from safety valves and tundishes

AS/NZS 3500.4:2021, clause 5.11.3 states that drain lines from temperature/pressure-relief valves, expansion control valves or tundishes shall be installed as follows:

- There shall be no tap, valve or any other restrictions in any drain line.
- Each drain line shall fall continuously to the point of discharge.
- Drain lines from expansion control or temperature/pressure-relief valves shall not discharge into a safe tray.
- The point of discharge from each drain line shall be located so that the release of steam or hot water does not cause a nuisance, is readily discernible and incurs no risk of damage to the building or injury to persons.
- Where a drain line terminates outside a building, the end of the line shall be-
  - (i) not lower than 75 mm or higher than 300 mm above an overflow relief gully or disconnector gully grate, see diagram 3;
  - (ii) not lower than 75 mm or higher than 300 mm above a gravel pit not less than 100 mm in diameter, see diagrams 1 and 2;
  - (iii) over a tundish with a visible a air gap of a size at least twice the diameter of the drain line, see diagram 2; or
  - (iv) not lower than 200 mm or higher than 300 mm above an unpaved surface.

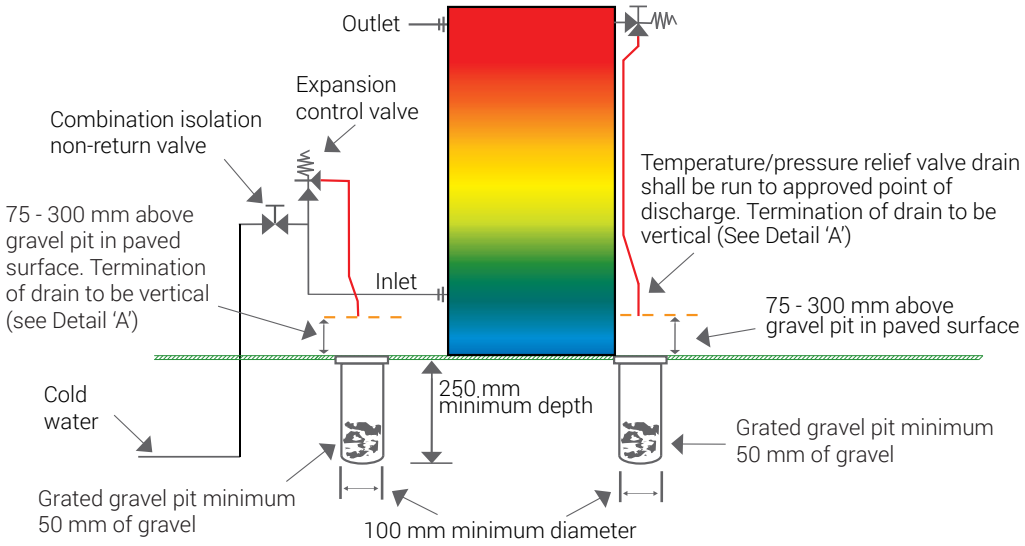


**Diagram 1:** Approved points of discharge for drains terminating outside of buildings to gravel pits.



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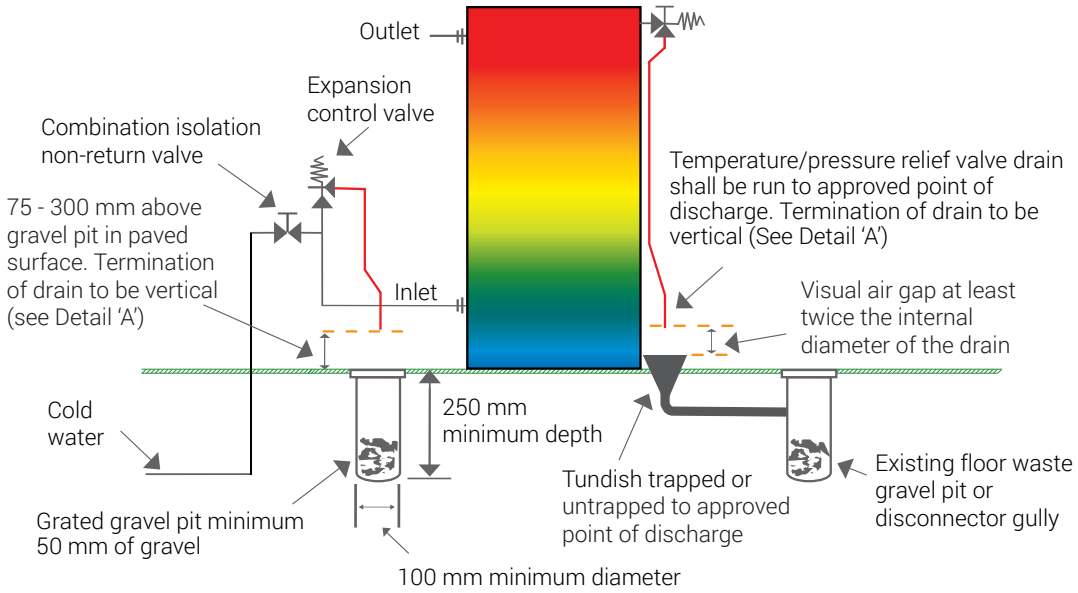



**Diagram 2:** Approved points of discharge for drains terminating outside of buildings to a tundish and gravel pits.

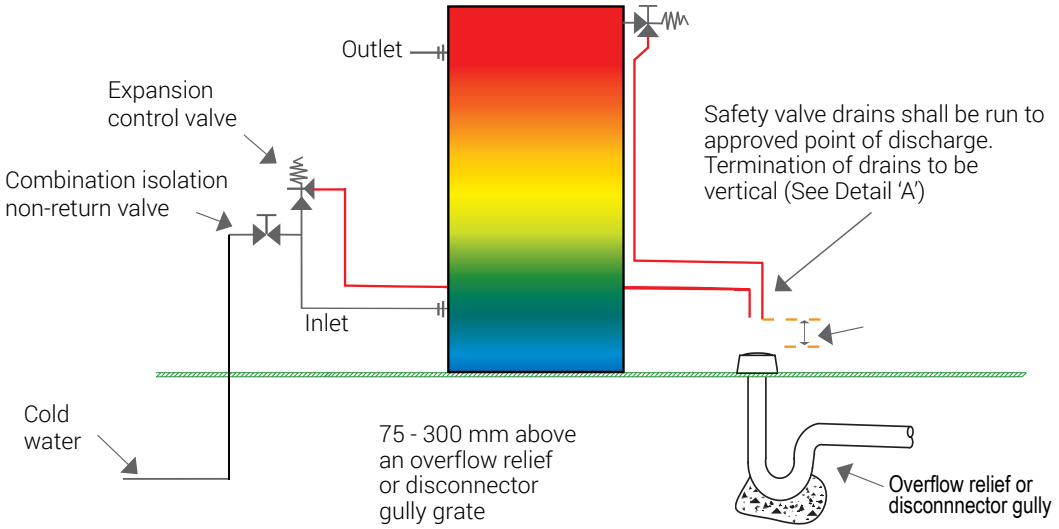



**Diagram 3:** Approved points of discharge for drains terminating outside buildings over gullies.

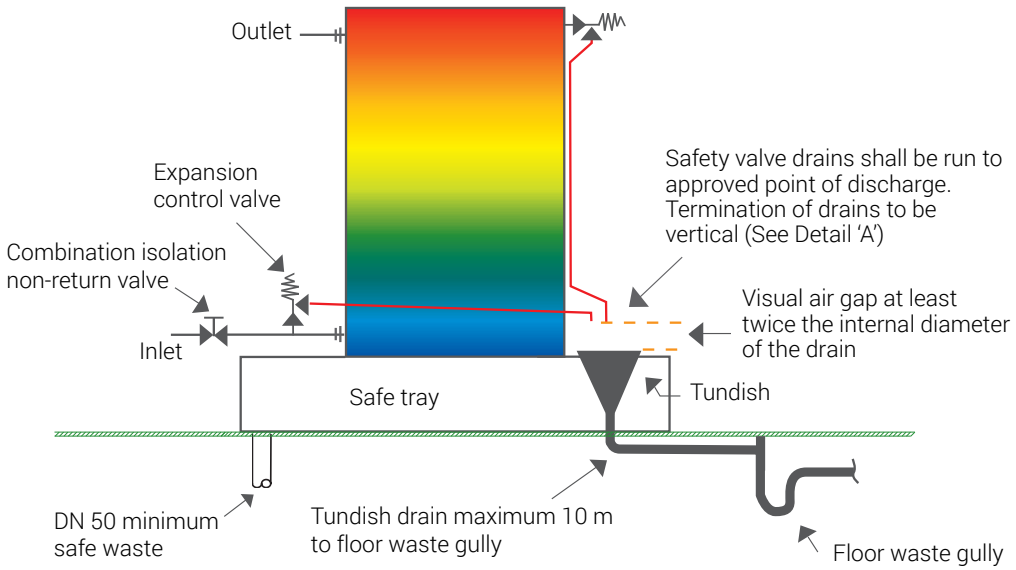
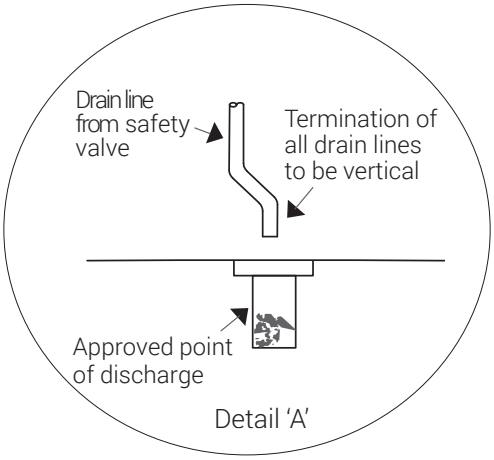



**Diagram 4:** Approved points of discharge for drains terminating inside buildings over a tundish.




**Detail 'A':** Drain lines must terminate over an approved point of discharge as per detail 'A' above.

## Tundish drain line termination

Drain lines from tundishes shall terminate in one of the following ways:

- Drains from untrapped tundishes shall discharge:
  - (i) into the riser of a floor waste gully in accordance with AS/NZS 3500.2:2021, clause 4.6.7.8;
  - (ii) into a gravel pit not less than 100 mm in diameter and a minimum depth of 250 mm; or
  - (iii) above the water seal of a fixture trap provided the top of the tundish is higher than the overflow level of the fixture.
- Drain lines from trapped tundishes shall connect to a wastepipe not smaller than DN 40 in accordance with AS/NZS 3500.2:2021, appendix B.

Tundishes shall be accessible and the tundish drain line shall be at least one size larger than the largest drain line discharging into the tundish.

**Note:** Drain lines from temperature/pressure relief and expansion control valves shall not discharge into a safe tray, see diagram 4.

## Instantaneous water heaters

Instantaneous water heaters must be positioned and mounted in accordance with manufacturers' instructions. Water heaters must be provided with an accessible isolation valve positioned adjacent to the water heater and external to the heater casing, see diagram 5.

AS/NZS 3500.4:2021, table 5.9.1(A) states that isolation valves for instantaneous water heaters must provide full flow, or the cross-sectional area in $mm^2$ through the valve is equivalent to the pipe, not necessarily a ball type valve.

Some manufacturers of gas instantaneous water heaters specify a full way isolation valve, a ball valve type, to allow for expansion back into the cold water supply, others only recommend their use. If a full way valve is not used with some instantaneous electric water heaters, an expansion valve may be required to prevent unwanted tripping of the over pressure cut out switch, see diagram 6.

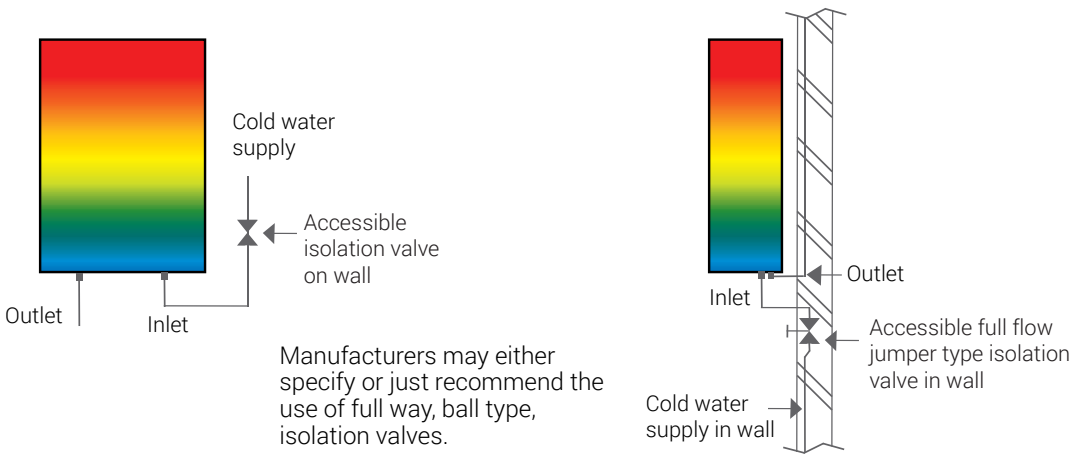



**Diagram 5:** Isolation valves for gas and electric instantaneous water heaters.

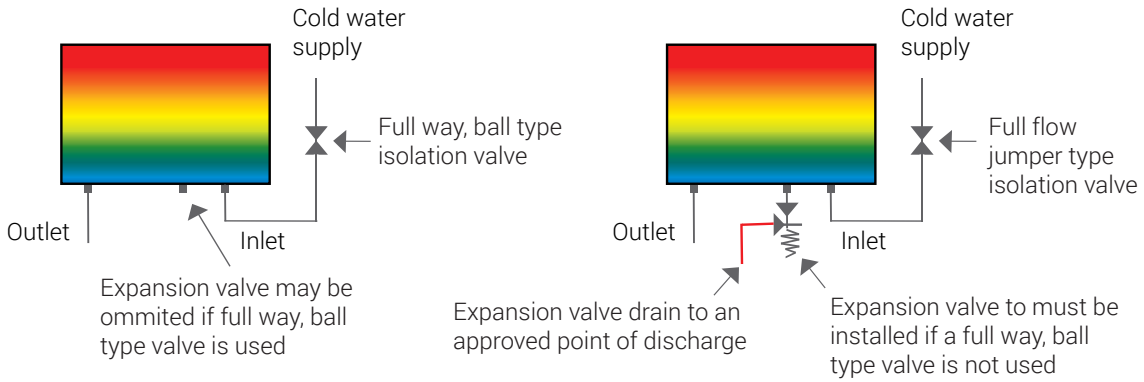



**Diagram 6:** Isolation valves for some electric instantaneous water heaters.

## Wrapping of heated water piping

In addition to the thermal insulation requirements for heat loss described in AS/NZS 3500.4:2021, table 8.2.2 metallic and plastic heated water pipes and/or relief valve drain lines, encased in plaster, mortar or similar material, shall be wrapped or sleeved to permit movement due to expansion and contraction. Refer to AS/NZS 3500.4:2021, clause 4.6.1.2 and clause 4.6.4.

## Wrapping of cold water piping

Pipes located in chases, ducts, conduits or embedded in masonry or concrete shall be installed in accordance with AS/NZS 3500.1:2021, clause 5.5.3(a) which requires metallic and plastic pipes and fittings in chases to be continuously wrapped with an impermeable flexible material.

**Notes:**

1. Service pipes shall not be embedded or cast into concrete structures.

2. All materials regardless of manufacturers' statements shall comply with the above lagging requirements as stated in AS/NZS 3500:2021, parts 1 and 4.

## Securing and support of water heaters

To avoid bracket and fixing problems when installing storage water heaters, any soil beneath a platform or base should be compacted and/or supported on brickwork so as to prevent soil erosion. The water heater should be filled with water prior to securing to the wall to assist with soil settling. Brackets and fixings appropriate to the weight of the water heater when filled shall be used.

Licensed plumbing contractors are required by the Plumbers Licensing and Plumbing Standards Regulations 2000 to install water heaters to manufacturers' specifications.

AS/NZS 3500.4:2021, clause 5.5.3 requires that storage water heaters shall be floor mounted or supported as follows:

- By brackets or hangers, designed to withstand the applied load.
- On a level, stable and impervious base designed and located to avoid ponding and made of-
  - (i) bonded brick or concrete cast in situ, having a thickness of not less than 75 mm; or
  - (ii) pre-cast concrete having a thickness of not less than 50 mm.
- On a platform of timber or other suitable and not less durable material. Where such a platform is located at or near ground level, it shall be supported so that a clearance of not less than 100 mm is maintained from the surrounding ground.
- In a recess in a wall structure able to withstand the applied load.

## Safe trays

Safe trays, including those of plastic and safe tray wastes shall be fabricated from materials that comply with the requirements of AS/NZS 3500.4:2021, clause 2.6. Safe trays do not require WaterMark certification although they must be fit for their intended purpose in line with the provisions of the Plumbing Code of Australia, part A5G4.

**Notes:**

1. Where discharges from safety valves may adversely affect slabs and footings of buildings, the drain lines should discharge away from the building. Further guidance is provided in the National Construction Code (NCC).
2. For multiple or banked water heater requirements see AS/NZS 3500.4:2021, clause 5.10. Requirements for expansion valves are in clause 5.10.3(b) and always ensure that manufacturers' specifications for manifolding individual water heaters are met.
3. As per AS/NZS 3500.4:2021, clause 5.11.2.1, drain lines from the temperature/pressure-relief and expansion control valve serving the same water heater may be combined into one drain providing the installation and termination complies with AS/NZS 3500.4:2021, clause 5.11.3.
4. Licensed plumbing contractors are reminded that boiling water units fall under the definition of water heaters and therefore the replacement or installation of these units is considered major plumbing work and requires the submission of a notice of intention and certificate of compliance under the Regulations.
5. All storage water heaters, especially those with high energy efficiency ratings can produce excessive amounts of condensate. This is quite normal and in warm climatic conditions it should dry off as the water is heated. Under cool climatic conditions, water may drip from a drain near the bottom of the water heater during the heating cycle and it is possible for several litres a day of condensation to discharge from the drain. The discharge of this water from water heaters whether internal or external to the building may have to be controlled. This can be achieved by the installation of a tundish, gravel pit or by following manufacturers' specifications to avoid damage to the water heater, buildings or creating a slip hazard on paved surfaces.
6. It is particularly important that heat pump water heaters are installed in an upright position to operate correctly, consider using a spirit level. Some types prohibit the use of screws directly into the external case and some require a specific condensate drain terminating to an approved location.
7. The majority of braided flexible hoses are not suitable for connect directly to storage water heaters, particularly those with flexible rubber cones. However there are hoses approved for this purpose, in particular for connection of instantaneous type water heaters.
8. When using materials as a base other than those listed above, other authorities should be consulted for suitability and regulatory compliance.

## Notes

The technical note series is issued by the Plumbers Licensing Board to assist the plumbing industry to comply with the Plumbers Licensing and Plumbing Standards Regulations 2000 (the Regulations) applicable to plumbing work in Western Australia.

Each technical note is to be read in conjunction with Part 6 of the Regulations that currently adopt the Plumbing Code of Australia (PCA) and the deemed to satisfy provisions of AS/NZS 3500:2021, parts 0, 1, 2 and 4 but modified in certain matters to suit the State's building approach and other local conditions.

## Feedback

The Plumbers Licensing Board welcomes your feedback. If you have any questions on this technical note or any suggestions on any areas of plumbing work that the technical notes should cover, please contact the Board's Senior Technical Officer on (08) 6251 1377.

## Copies

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