Technical Solution Sheet 6.04
Hot Water Plumbing

Installation of Tempering Valves and Heat Retention for Hot Water Piping

AIM
The aim of this technical solution is to clarify the requirements for installation of tempering valves, and heat retention for heated water piping.

PLUMBING REGULATIONS 2008
The *Plumbing Code of Australia* (PCA) is adopted by and forms part of the *Plumbing Regulations 2008*. Part B2 of the PCA specifies the objectives and performance requirements related to the installation of heated water services. ***AS/NZS 3500.4: Plumbing and drainage Part 4: Heated water services***, is a "deemed to satisfy" document listed in Part B2 of the PCA and contains sections on "Water temperature" and "Water and energy efficiency".

INSTALLATION OF TEMPERING VALVES
Some plumbers, in meeting water temperature regulations, are installing tempering valves at the heated water outlet of water heaters in a way that restricts the water temperature to the entire house. Restricting the temperature of heated water to all fixtures and appliances, while compliant, may not be best practice where a higher temperature is required for the satisfactory operation of a fixture or appliance in a kitchen or laundry.

TEMPERATURE STORAGE AND DELIVERY
To protect against the growth of Legionella bacteria it is a legal requirement that any stored heated water be kept at a minimum temperature of 60°C.

To prevent scalding, the delivery temperature of water for personal hygiene purposes (primarily bathroom taps) is legally required not to exceed:

- 45°C for early childhood centres, primary and secondary schools, and nursing homes or similar facilities for young, aged, sick or disabled persons (only a thermostatic mixing valve is acceptable to control this temperature).
- 50°C for all other buildings (either a tempering valve may be used, or a water heater designed not to exceed 50°C which is marked, "this appliance delivers water not exceeding 50°c in accordance with as 3498".

Restricting the delivery temperature in kitchens and laundries is optional.

WHEN TO APPLY THE REQUIREMENTS
The requirement to limit certain water temperatures applies to all new heated water installations. A new heated water installation is defined as either:

- heated water reticulation heater and a heated water reticulation system; or
- a heated water reticulation system.

Therefore, the requirements apply to all new houses and where the heated water supply piping is being reconfigured such as in a bathroom renovation.

FIGURE 1 - TYPICAL INSTALLATION OF TEMPERING VALVE FITTED AWAY FROM THE WATER HEATER

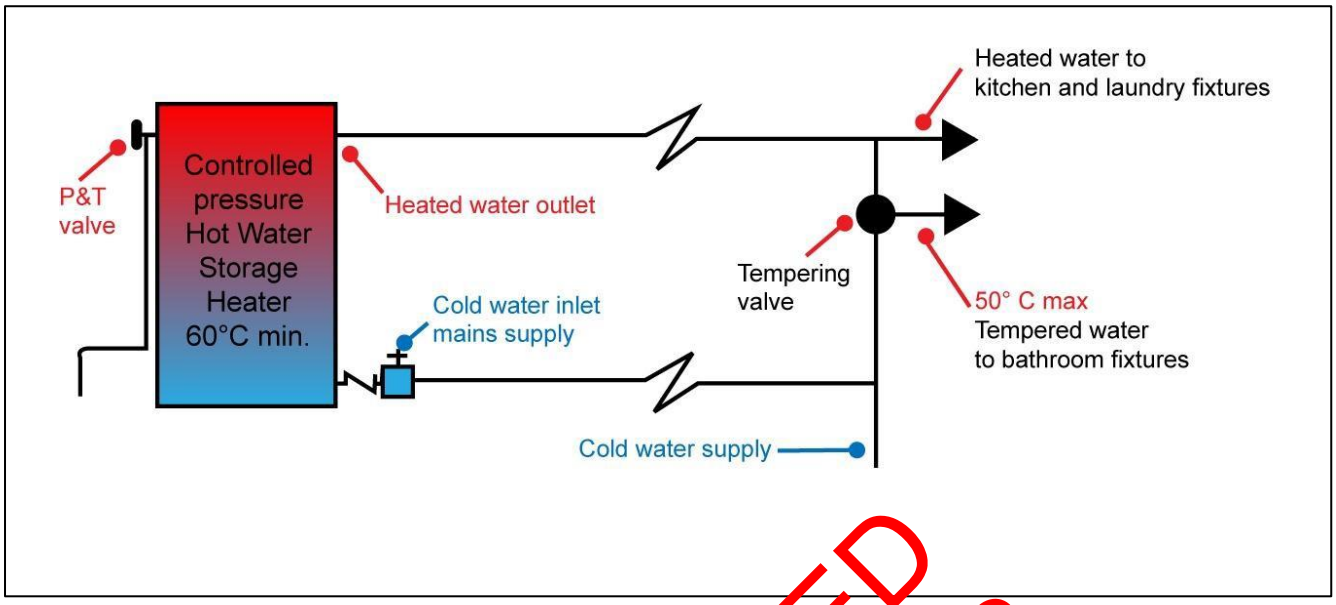
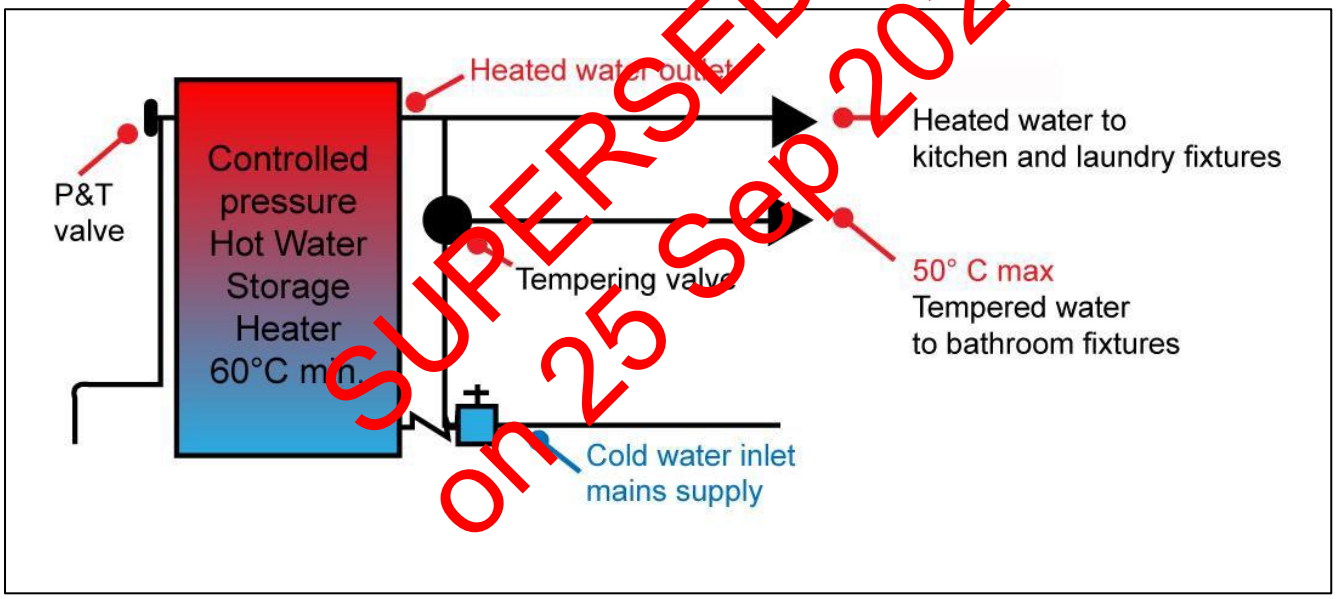


FIGURE 2 - TYPICAL INSTALLATION OF TEMPERING VALVE FITTED AT THE WATER HEATER



The requirements do not apply if you are only changing over a water heater or replacing or repairing part of the heated water reticulation system.

CORRECT INSTALLATION OF TEMPERING VALVES

Figures 1 and 2 suggest two methods of positioning a tempering valve to overcome tempering the entire installation.

Note:

All connections to the water heater must comply with *AS/NZS 3500.4*.

HEAT RETENTION FOR HEATED WATER PIPING

To assist in limiting heat loss from pipes conveying heated water, the pipes must be lagged.

When installed under certain conditions, these pipes may also have to be insulated to prevent freezing of the water. The need to lag and / or insulate piping applies regardless of the pipe material used.

PIPING TO BE INSULATED

The following must be insulated to achieve a minimum R value:

- Cold water supply pipe between the storage water heater and the closest valve
- Outlet pipe from a storage water heater excluding valves for a length of at least 500mm or, where an external heat trap is fitted, to a point 150mm down the first vertical leg of the heat trap.

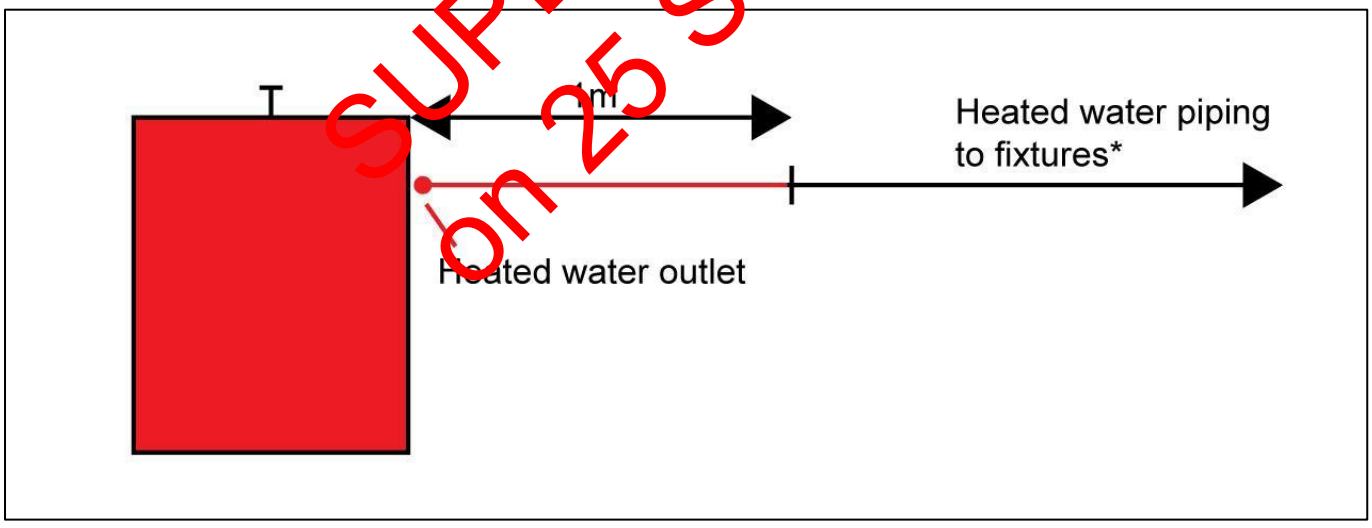
The R value specification will depend upon the climate region, refer to Section 8 in *AS/NZS 3500.4*.

EXAMPLE

Melbourne is Region B

- Pipes in internal locations required an R value 0.3 (13mm closed cell polymer may be used) Pipes in external locations require an R value 0.6 (25mm closed cell polymer may be used).
- Other piping in the heated water system must also be thermally insulated as outlined in Table 8.2 in *AS/NZS 3500.4*. For example, non-circulating external heated water piping must be insulated from the water heater to the primary kitchen sink. Melbourne Climate Region B requires insulation with an R value 0.6 (25mm closed cell polymer may be used).
- All circulating heated water piping on solar hot water heating systems must be insulated with appropriate insulation.
- Protection against freezing is specified in Clause 4.12 of *AS/NZS 3500.*

FIGURE 3 - PLASTIC PIPE AND FITTINGS MUST NOT BE INSTALLED WITHIN 1M OF WATER HEATER OUTLET



Notes:

- Plastics pipes and fittings must not be installed between the cold water isolation valve and the inlet to a water heater.
- Plastics pipes and fittings must not be installed within 1 m of the outlet of a water heater (see Figure 3) unless immediately downstream of the temperature control valve (such as a tempering valve).