



Plumbing newsflash number 456

Guidance on tempering devices and recycled water pipe marking standards

Purpose

To advise on the use and location of tempering devices and the appropriate identification of piping used in recycled water installations.

Background

Industry groups have requested guidance on the:

- requirements for sanitary fixtures under AS/NZS 3500.4 relating to water temperature and tempering devices (AS/NZS 3500.4 is an applied provision under the SPDR)
- location of tempering valves for solar hot water systems
- appropriate pipe marking standards for recycled water.

Hot water temperatures

The Australian Standard for hot water systems, AS/NZS 3500 requires water to be delivered to sanitary fixtures at temperatures that will minimise the risk of scalding, as follows—

“All new heated water installations shall, at the outlet of all sanitary fixtures used primarily for personal hygiene purposes, deliver heated water not exceeding—

- 45 degrees Celsius for early childhood centres, primary and secondary schools and nursing homes or similar facilities for young, aged, sick or people with disabilities; and
- 50 degrees Celsius in all other buildings.”

Standard industry practice has been to locate the tempering device as close as practicable to the hot water storage tank. In a close coupled roof mounted system the device has usually been installed on the roof in close proximity to the tank. However, recently this has been challenged due to the concerns regarding health and safety issues which may arise if the device needs to be accessed for maintenance.



Tempering valves

AS/NZS 3500.4—Plumbing and drainage, Part 4—Heated water services, requires that tempering valves shall be ‘readily accessible.’ The standard does not define readily accessible and as a consequence there is inconsistency in the interpretation and application of the most appropriate location for tempering valves.

Recycled water—piping standards

The relevant Australian Standard for water services, AS/NZS 3500.1 (Water services), requires piping used in recycled water installations be coloured or lined purple for identification. This identification standard serves to minimise the risk of cross-connection between potable and recycled water services. The chances of a cross-connection incident are significantly reduced by using purple coloured or lined pipe for the supply of recycled water. There is a provision in the standard allowing the use of plastic sleeve or tape to achieve identification if purple coloured or lined pipe is unavailable. The Department has been advised that some licensees use coloured sleeve or tape on blue coloured pipe.

Issues

Hot water temperatures

The scope of AS/NZS3500.4 must be considered which states:

“This Standard sets out the requirements for the installation of heated water services using drinking water. It includes aspects of the installation from, and including, the valve(s) on the cold water inlet to any cold water storage tank or water heater and the downstream fixtures and fittings. It applies to new installations **as well as alterations, additions and repairs to existing installations.**”

All heated water installations involving sanitary fixtures, including new installations, alterations, additions and repairs to existing installations, must deliver water at a temperature mandated under the standard. A tempering device is an acceptable solution for achieving this. Subsequently, where a hot water unit (solar, heat pump, gas or electric resistance system) is being replaced, the plumber must ensure all fixtures or fittings used primarily for personal hygiene purposes meet the requirements for temperature control under AS3500.4. This may mean that a tempering device needs to be installed on the hot water supply pipe to the required fixture.



Please note that this only applies to hot water systems without temperature control devices installed as part of their original installation. Sanitary fixtures not used primarily for personal hygiene purposes and appliances, such as dishwashing and clothes washing machines, do not require the hot water supply to be tempered.

Tempering valves

If tempering valves are located on the roof of a two storey building next to a close coupled hot water system, accessibility to the roof and working at heights can become a workplace health and safety issue. Also, access to the roof may become an issue in a small lot development.

If tempering valves are located at or near ground level, in a retrofit situation, this could increase cold water draw off prior to the flow of hot water and this is inefficient in terms of water savings targets. Placing tempering valves at ground level could increase the overall amount of pipework and significantly increase the cost of the installation.

Following discussion with a range of plumbing industry consultative groups, BCQ recommends that installers of close coupled roof mounted solar hot water systems should locate tempering valves either:

- at ground level at a height no greater than 1.6 metres; or
- within one metres of the inspection hatch in the roof space; or
- in close proximity to the hot water storage tank, as is current standard practice, on the roof of single-storey buildings only.

Recycled water—piping standards

The use of purple coloured pipe for recycled water has been accepted practice internationally for over 30 years. Public health and safety must be paramount in recycled water installations and the intent of AS/NZS 3500.1. AS/NZS 3500.1, section 9.5.2.1 provides:

“All pipes shall be identified by a purple colour in accordance with AS 2700 (NZS 7702 being no darker than P24 Jacaranda or P12 Purple and no lighter than P23 Lilac. Where pipes are not integrally coloured purple, identification may be achieved by means of close fitting durable purple coloured sleeving, netting or spirally wrapped tape.”

Blue coloured or lined pipes are universally recognised for supplying potable water. Using sleeve or tape on blue coloured or lined pipes creates an unacceptable risk of cross-connection because sleeve or tape can disintegrate over time. Also, sleeve and tape can be damaged during installation. It is also likely that any sleeve or tape used on the pipe will be damaged or removed if it is uncovered or work is performed on it at a later date. This poses a significant risk to future identification of the pipe and the risk of cross-connection is greatly increased.



The following practices are recommended for recycled water installations:

- coloured sleeve or tape should only be used to identify pipe for recycled water as a last resort
- where purple coloured or lined pipe is not available, use plain black pipe with purple coloured sleeve or tape
- blue coloured or lined pipe should not be used in recycled water installations in any circumstances
- if sleeve or tape is used to identify pipe carrying recycled water, the sleeve or tape must be durable and applied continuously over the entire length of the pipe.

The provision allowing use of sleeve or tape to identify pipe used for recycled water is included in AS/NZS3500.1 to cover unusual circumstances such as emergencies and it is not recommended as a standard practice. For some rarely used pipe sizes, it may be necessary to use sleeve or tape for identification. Using sleeve or tape must be regarded as a practice of last resort and should not be used as a convenience or cost saving measure.

Legislation and standards

Plumbing and Drainage Act 2002 (PDA)

Standard Plumbing and Drainage Regulation 2003 (SPDR)

Queensland Plumbing and Wastewater Code (QPW Code)

Plumbing Code of Australia (PCA)

AS/NZS 3500.0—Glossary

AS/NZS 3500.4—Heated water services

AS/NZS 3500.1—Plumbing and drainage—Part 1: Water services

Contact for further information

Department of Infrastructure and Planning

Building Codes Queensland Division

tel +61 7 3239 6369

buildingcodes@dip.qld.gov.au

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