

Technical Solution Sheet 8.02

8: Backflow Prevention – Cross Connections in Drinking Water Supplies

Cross Connection Control in Drinking Water Supplies

AIM

The aim of this technical solution is to clarify some of the plumbing issues associated with cross connections in drinking water supplies.

PLUMBING REGULATIONS 2018

The Plumbing Code of Australia (PCA) is adopted by and forms part of the Plumbing Regulations 2018. Part B of the PCA specifies the objectives and performance requirements related to the installation of water services. AS/NZS 3500.1: Plumbing and drainage Part 1: Water Services and AS/NZS 3500.4: Plumbing and drainage Part 4: Heated water services are “deemed to satisfy” documents listed in Part B and they contain sections on cross connection control and backflow prevention.

BACKFLOW AND CROSS CONNECTIONS – WHAT ARE THEY?

Backflow is the unwanted reversal of flow into the drinking water supply which can occur under conditions of backpressure or back siphonage. Backflow can be prevented by installing mechanical backflow prevention devices, (see Figures 1 and 2).

A cross connection is any connection between a drinking water supply system and any non- drinking supply or other substance which could result in contamination of the drinking water supply system.

SOLUTIONS TO BACKFLOW AND CROSS CONNECTIONS

Solutions to backflow and cross connections can be found in Section 4 of AS/NZS 3500.1.

Examples of potential cross connections can be found in Appendix E and suitable types of backflow measures for various cross connections are set out under Appendix F.

PROVIDING PROTECTION

Where protection is provided at source of the cross connection, this is known as Individual Protection. Where protection is provided for a selected area of a property or section of pipework, this is known as Zone Protection.

Where protection is provided at the property boundary at the outlet of the main water meter, this is known as Containment Protection. The requirements for Containment protection are specified by the relevant Water Authority to prevent backflow and contamination of the Authority’s water main.

Water downstream (outlet side) of any device fitted for Individual or Zone Protection is classified as non-drinking whereas water downstream of a device fitted for Containment Protection is classified as drinking unless there are unprotected hazards within the property.

HAZARD RATING & DEVICE TYPE

Cross connections are rated into three degrees of hazard; High, Medium and Low. High hazards are associated with connections of a toxic or bacterial nature that have the potential to cause death. Medium hazards have the potential to endanger health, whereas a low hazard would constitute a nuisance but not endanger health. Backflow prevention devices are classified as either testable or non-testable. A testable backflow device must be installed with cross connections of a medium or high hazard rating and should only be installed with an Annual Maintenance and Test Program. These devices can be tested in-situ.

OWNER'S RESPONSIBILITY

It is the property owner's responsibility to ensure that any testable device is inspected and tested annually.

FIGURE 1 - RANGE OF TYPICAL BACKFLOW PREVENTION DEVICES



FIGURE 2 - TYPICAL FIRE AND GENERAL SERVICE



DEVICE SELECTION FOR RETROFIT CONTAINMENT PROTECTION

When selecting a device suitable for retrofit (existing property) containment protection, all cross connections and hazards within the property must first be identified. Where any cross connection is identified, appropriate backflow protection must be provided, or such cross connection should be reported to the owner and relevant water authority. Before selecting a backflow device appropriate to the hazard rating, all options to remove the cross connection must be considered. If acceptable, it is preferable to remove the cross connection.

Appendices E and F are provided for information and guidance and do not form an integral part

of AS/NZS 3500.1. The appendices should be used as a guide in assessing the hazard/device selection, however, given there are only three hazard levels, the situation is often over prescribed where a testable high and medium hazard device is prescribed rather than a non-testable low hazard device.

The pressure and water flow through devices will vary between various device types, device sizes and manufacturers. It is generally true for mechanical backflow devices that backflow devices for high hazards will result in a higher- pressure loss than backflow devices for low hazards. Therefore, an overprescribed valve can cause an unacceptable pressure and water flow loss, especially in fire service installations.

INSTALLATION/COMMISSIONING

Plumbers with a Water Supply Licence and or Registration can install the backflow prevention device. Installations must comply with Section 4 of AS/NZS 3500.1 and AS/NZS 3500.4.

For containment protection at main meter assemblies, the Victorian Building Authority has published Technical Solution Drawings of Typical Water and Fire Services.

See: www.vba.vic.gov.au

A compliance certificate is required if the value of any installation is \$750 or greater. Where the hazard rating in any cold or hot water installation is Medium or High Risk, the licensed plumber must provide the installation details in the space provided on the certificate.

Commissioning, maintenance, testing and annual retesting of any testable backflow device installed in a medium or high hazard situation, can only be performed by a person who is licensed in the specialised class "Backflow Prevention Work". Persons registered in this specialised class may also carry out this work under the supervision of a person who is licensed in the specialised class. It is this person's responsibility prior to commissioning to ensure that the backflow device fitted is appropriate to the hazard rating.

FIGURE3-REDUCEDPRESSUREZONEDEVICE- RETROFIT FOR CONTAINMENT PROTECTION



COMMISSIONING A NON-DRINKING WATER SERVICE

A non-drinking water service shall be commissioned as follows:

- (a) Turn on the drinking water supply at the meter or isolation valve.
- (b) Turn off the non-drinking water supply at the meter or isolation valve.
- (c) Turn on all tapware (both heated and cold) and all appliances one by one. Water should flow from all drinking water tapware and appliances.
- (d) Flush all toilets. The toilets should not refill (provided they are connected to the non-drinking water service).
- (e) Turn on all external hose tap outlets. Water shall flow continuously from the drinking water hose tap outlets with the non-drinking water taps running dry.
- (f) Turn the non-drinking water meter or supply back on slowly so that all air will be purged from the pipeline while it is being recharged.

COMMISSIONING A DRINKING WATER SERVICE

A drinking water service shall be commissioned as follows:

- (a) Turn off the drinking water supply at the meter or isolation valve.
- (b) Turn on the non-drinking water supply at the meter or isolation valve.
- (c) Turn on all heated and cold water, including appliances one by one.
- (d) Ensure all tap outlets and appliances run dry.
- (e) Flush all toilets. Check that toilet cisterns have refilled after flushing.
- (f) Turn on all external hose taps.
- (g) Check that the drinking water taps have run dry.
- (h) Check that the non-drinking water taps are flowing continuously.
- (i) Turn the drinking water supply back on slowly so that all air will be purged from the pipeline while it is being recharged.

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