

# **Backflow Prevention – Keeping our drinking water safe.**

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## **ABSTRACT**

Backflow prevention is a critical aspect of maintaining the safety and quality of our drinking water supply. Backflow occurs when non-potable water, such as wastewater or chemicals, flows back into the potable water supply due to a change in pressure or back siphonage. This can lead to contamination of the drinking water, posing a serious health risk to the public.

To prevent the unwanted reversal of the water supply, backflow prevention devices are installed at points where the potable water supply connects with non-potable water sources, such as irrigation systems, chemical plants, fire sprinkler systems etc. These devices are designed to ensure that the water flows in only one direction, preventing any potential contaminated water flowing back into the drinking water supply.

Regular maintenance and testing of backflow prevention devices is crucial to ensure they are functioning properly and effectively protecting the drinking water supply. The installation and maintenance requirements are set out in The Plumbing Code of Australia and the Australian Standards 3500.1 and 2845.3.

Backflow prevention is a critical component of maintaining the safety and quality of our drinking water supply. Proper installation, maintenance, and testing of backflow prevention devices are essential to ensure that our communities have access to clean and safe drinking water.

## **INTRODUCTION**

The Backflow Prevention Association of Australia Inc (BPAA) is a professional body dedicated to the protection of our drinking water supply.

We are a not for profit, volunteer organisation made up of members across all aspects of the plumbing and water supply industry.

Our members include the local government and water supply authorities, manufacturers, plumbing contractors, education and training providers.

We have chapters in Queensland, New South Wales, Victoria, Tasmania and Western Australia.

We also have The Legionella Management Advisory Group (LMAG) as a division of our Association.



## **WHAT IS BACKFLOW?**

Backflow refers to the undesired reversal of the normal flow of liquids, gases, or other substances within a piping system. It occurs when the flow of a substance in a pipe or pipeline is reversed, resulting in it flowing back in the opposite direction. This can pose significant health and safety risks in various industries and residential plumbing systems.

Backflow can happen due to two types of pressure situations, and or a cross connection.

1. Back-siphonage: This occurs when there is a sudden drop in the supply pressure of a system, causing a partial vacuum to form. The reduced pressure in the system can lead to the backward flow of liquids or substances from a lower pressure area (such as a container or fixture) into the plumbing system.
2. Back pressure: This happens when the pressure in a downstream system becomes higher than the pressure in the upstream system. When the pressure in the downstream system exceeds the supply pressure, it can force the liquid or substance to flow back into the supply system.
3. Cross-connection:

## **WHAT IS A CROSS-CONNECTION?**

A cross-connection is a physical connection between a potable (drinking) water supply and a non-potable water source or other contaminated substances. If there is a backflow event, such as a sudden drop in supply pressure or back pressure, contaminants from the non-potable source can be drawn into the drinking water supply, resulting in contamination.

## **WHAT DO YOU DO AS WATER INDUSTRY OPERATORS?**

Water industry operators have various responsibilities related to the management and operation of water treatment plants, distribution systems, and wastewater treatment facilities. Their primary role is to ensure the safe and reliable supply of clean water to consumers and the proper treatment of wastewater.

*There have been reported cases where water authorities have cross-connected drinking water with non-drinking water (potable & non potable). In one case the authority even proudly advised that they used a series of gate valves to separate the two systems.*

*Back in the 1800's in America they did the same thing - supplementing river water with town water to help fight fires. However, this cross-connection resulted in waterborne diseases including Typhoid.*

*They even tried up to eight valves, but to no avail, the outbreaks of diseases continued.*

*This led to the beginning of the Backflow devices that we have today.*

## **WHAT DO WE DO AS LICENCED BACKFLOW PREVENTION SPECIALISTS?**

- Plumbing System Evaluation:

Examines the property's plumbing system, including the water supply lines, fixtures, and any existing backflow prevention devices.

Assess the type and condition of the plumbing system to identify potential points of backflow vulnerability.

- Install backflow prevention devices:

Based on the assessment, they install appropriate backflow prevention devices, such as check valves, double-check valves, reduced pressure zone (RPZ) devices, or vacuum breakers. The specific device used depends on the level of hazard associated with potential contaminants.

- Inspect and test backflow prevention devices:

Backflow prevention devices need regular inspection and testing to ensure they are functioning correctly. Licenced plumbers perform these tests, following local regulations and guidelines, to verify that the devices are preventing backflow effectively.

- Repair and maintain backflow prevention devices:

If a backflow prevention device is found to be faulty or malfunctioning during an inspection, a backflow prevention plumber can repair or replace the device to restore its proper functioning.

- Stay updated with regulations:

Backflow prevention plumbers need to keep abreast of local plumbing codes and regulations concerning backflow prevention. This knowledge ensures they comply with legal requirements and install appropriate devices for different applications.

## **HAZARD RATINGS AND BACKFLOW VALVES.**

**There are three hazard ratings as follows:**

(a) *High hazard* Any condition, device or practice that, in connection with the water supply system has the potential to cause death.

(b) *Medium hazard* Any condition, device or practice that, in connection with the water supply system has the potential to endanger health.

(c) *Low hazard* Any condition, device or practice that, in connection with the water supply system constitutes a nuisance but does not endanger health or cause injury.

**There are three types of backflow valve Ratings with two classifications.**

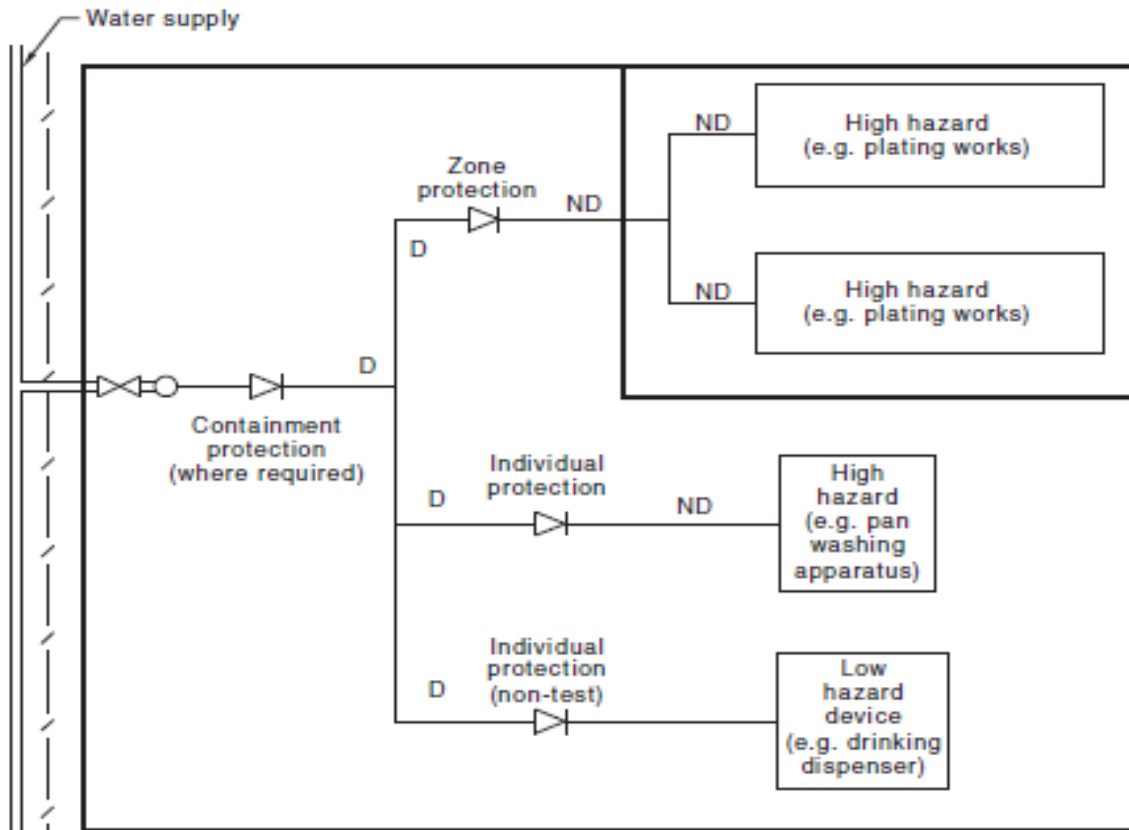
1- *High* = testable

2- *Medium* = testable

3- *Low* = non-testable

## **TYPES OF PROTECTION.**

**There are three types of protection as per the diagram.**



## HOW DOES A BACKFLOW VALVE WORK?

**Backflow valves consist of several components that work together to ensure the one-way flow of water.**

Backflow preventers consist of several components that work together to ensure the one-way flow of water including one or more check valves.

Check valves are mechanical devices that allow water to flow in one direction while preventing it from flowing backward. They use a spring-loaded disc or a similar mechanism to close off the valve when the flow of water tries to reverse

Backflow preventers also rely on a pressure differential to operate effectively. The public water supply typically operates at a higher pressure compared to the water in the customer's plumbing system. This pressure difference helps to keep the check valves closed and prevent the backflow of water.

## CONCLUSION.

Backflow prevention is necessary and important in many situations.

Backflow can pose significant health risks because it can introduce pollutants, chemicals, bacteria, or other harmful substances into the drinking water system. These contaminants may include pesticides, fertilizers, sewage, industrial chemicals, or even bacteria from stagnant water sources.

Backflow prevention devices are specifically designed to prevent the reversal of water flow and ensure the protection of the water supply.

Australian and local plumbing codes and regulations require the installation of backflow prevention devices in specific situations to safeguard the public water supply. regular testing and maintenance of these devices to ensure their effectiveness.

By implementing backflow prevention measures, the risk of water contamination is reduced, helping to maintain the quality and safety of the drinking water supply. It is essential for protecting public health and meeting the standards of water quality and safety regulations.