

# What is a Cross Connection

WASHINGTON WATER  
SERVICE COMPANY



# Introduction to Cross Connection Control

A **cross connection** is a point in a plumbing system where the drinking (potable) water supply is connected or could potentially be connected to a unapproved (non-potable) source. Pollutants or contaminants can enter the safe drinking water system through this uncontrolled cross connection when a **backflow** occurs.

Under certain conditions, water or other substances can flow back into the consumer's plumbing system and/or public water system (i.e., drinking water). This is known as **backflow**. There are two types of backflow: **backsiphonage** or **backpressure**.

**Backsiphonage** may occur due to a loss of pressure in the water distribution system during a high withdrawal of water for fire protection, a water main or plumbing system break, or a shutdown of a water main or plumbing system for repair. A reduction of pressure below atmospheric pressure creates a vacuum in the piping. If a hose bib was open and the hose was submerged in a wading pool during these conditions, the non-potable water in the pool would be siphoned into the home's plumbing and back into the public water system.

**Backpressure** may be created when a source of pressure, such as a pump, creates a pressure greater than that supplied from the distribution system. If a pump supplied from a non-potable source, such as a landscape pond, were accidentally connected to the plumbing system, the non-potable water could be pumped into the potable water supply.

It is impossible to cover all of the information pertaining to cross connections in a pamphlet. We hope that the preceding information will inspire you to further educate yourself on the hazards of unprotected cross connections. For more information on Cross Connection Control please visit the web sites listed below.

## Washington State Department of Health

243 Israel Road SE  
P.O. Box 47822

Olympia WA 98504-7822

<http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/WaterSystemDesignandPlanning/CrossConnectionControlBackflowPrevention.aspx>

Toll free at  
(800) 521-0323

## Washington State Legislation

<http://apps.leg.wa.gov/WAC/default.aspx?cite=246-290-490>

## Washington Water Service Company

[www.wawater.com](http://www.wawater.com)

Customer Service Department

Toll free at  
(877) 408-4060

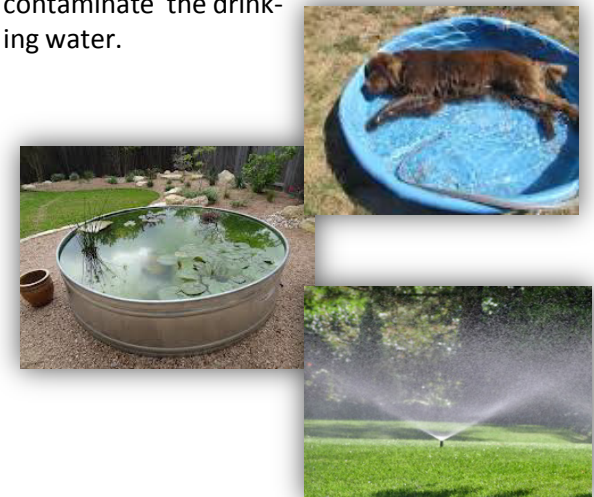
## CROSS CONNECTION Control Program



WASHINGTON WATER SERVICE COMPANY  
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Congress established the Safe Drinking Water Act (SDWA) in 1974 to protect human health from contaminants in drinking water and to prevent contamination of existing groundwater supplies. This act and its amendments (1986 and 1996) have resulted in many programs and actions required by water systems to protect drinking water and its sources. One of these is called the "Cross Connection Control Program" (CCC) which are the administrative and technical procedures the purveyor has in place to protect the public water system from contamination via cross connections (as required by Washington State Administrative Code 246-290-490).

Washington Water Service Company must develop and implement a CCC for each of the water systems it owns and operates. When a potential hazard has been identified on the customer's premise, **the customer must install and maintain an approved backflow prevention assembly on the customer side of the water meter**. Without a proper backflow prevention device installed, backflow can occur and could contaminate the drinking water.





# Where are Cross Connections

**Cross connections** are found in all plumbing systems. It is important that each cross connection be identified and evaluated to determine the type of backflow protection required to protect the drinking water supply. Some plumbing fixtures have built-in backflow protection in the form of a physical air gap. However, most cross connections will need to be controlled through the installation of an approved mechanical backflow prevention device or assembly. Some of the most common customer cross connection hazards include:

- ◆ Irrigation sprinkler systems
- ◆ Fire sprinkler systems
- ◆ Solar heat systems
- ◆ Wash basins and service sinks
- ◆ Hose bibs, faucet or outside spigot
- ◆ Auxiliary water supplies (*Wells, Catchment Systems*)
- ◆ Laboratory and aspirator equipment
- ◆ Photo developing equipment
- ◆ Processing tanks
- ◆ Boilers
- ◆ Water recirculating systems
- ◆ Swimming pools/Hot tubs/Decorative Ponds

Every water system has cross connections. Plumbing codes and State drinking water regulations require cross connections to be controlled by approved methods (physical air gap) or approved mechanical backflow prevention devices or assemblies. The various types of mechanical backflow preventers include: reduced pressure backflow assembly (RPBA), reduced pressure detector assembly (RPDA), double check valve assembly (DCVA), double check detector assembly (DCDA), pressure vacuum breaker assembly (PVBA), spill resistant

vacuum breaker assembly (SVBA) and atmospheric vacuum breaker (AVB).

For a backflow preventer to provide proper protection, it must be approved and designed for the degree of hazard it is controlling, installed correctly, **tested annually** by a State certified tester, and repaired as necessary. Some States require mandatory backflow protection on certain facilities where high health-hazard-type cross connections are normally found. The following is a partial list of those facilities:

1. Hospitals, mortuaries, clinics
2. Laboratories
3. Food and beverage processing
4. Metal plating and chemical plants
5. Car washes
6. Petroleum processing and storage plants
7. Radioactive processing plants and nuclear reactors
8. Piers and docks
9. Sewage treatment plants

*Outside Hose Bibs with Air Vacuum Breaker*



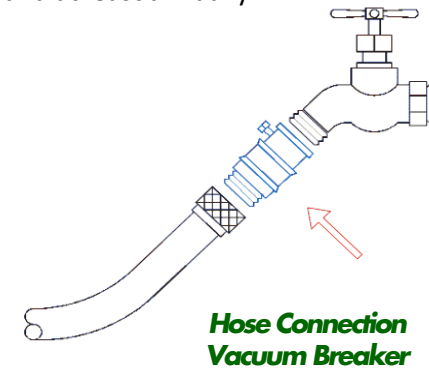
*Double Check Valve Assembly (DCVA)*



# Approved Backflow Prevention Devices

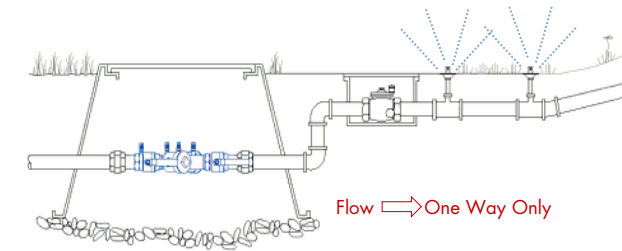
## Double Check Valve Assembly

- ◆ The double check valve assembly (DCVA) may be installed to isolate all irrigation systems that do not use injectors or pumps to apply fertilizer and other agricultural chemicals.
- ◆ The DCVA may be installed in a below ground enclosure provided the assembly test cocks are plugged; the test cocks are pointed up; adequate space is provided for maintenance and testing, and any compressed air connections are installed only downstream of the DCVA.
- ◆ The DCVA shall be tested by a certified backflow assembly tester upon installation, after repair or relocation, and at least annually.



## Reduced Pressure Backflow Assembly

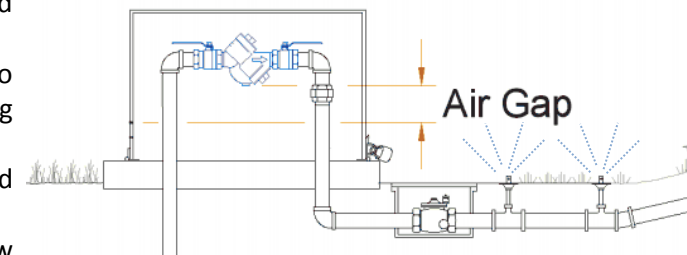
- ◆ The reduced pressure backflow assembly (RPBA) should be installed to isolate irrigation systems using injectors or pumps to apply fertilizer and other agricultural chemicals.
- ◆ The RPBA must be installed 12" above ground to prevent the relief valve opening from becoming submerged.
- ◆ The RPBA must be installed in an insulated enclosure to provide freeze protection.
- ◆ The RPBA must be tested by a certified backflow assembly tester upon installation, after repair or relocation, and at least annually.



**Double Check Valve Assembly in Below-Ground Box**

## Hose Connection Vacuum Breaker

- ◆ Hose connection vacuum breakers are specifically made for portable hoses attached to hose thread faucets. Their purpose is to prevent the flow of contaminated water back into the drinking water. These devices screw directly to the faucet outlet. They can be used on a wide variety of installations, such as service sinks, hose faucets near a wading pool, laundry tub faucets, etc.
- ◆ Some units are designed for manual draining for freezing conditions. Some are furnished with breakaway set screws as a tamper proof feature.
- ◆ These devices are not intended for operation under continuous pressure.



**Reduced Pressure Backflow Assembly In Above-Ground Enclosure**