

## What is a Cross Connection?

A cross connection is a point in a plumbing system where the potable water supply is connected to a non-potable source. Briefly, a cross connection exists whenever the drinking water system is or could be connected to any non-potable source (plumbing fixture, equipment used in any plumbing system). Pollutants or contaminants can enter the safe drinking water system through uncontrolled cross connections when backflow occurs.

Backflow is the unwanted flow of non-potable substances back into the consumer's plumbing system and/or public water system (i.e., drinking water).

There are two types of backflow: **backsiphonage** and **backpressure**. **Backsiphonage** is caused by a negative pressure in the supply line to a facility or plumbing fixture. Backsiphonage may occur during waterline breaks, when repairs are made to the waterlines, when shutting off the water supply, etc.

**Backpressure** can occur when the potable water supply is connected to another system operated at a higher pressure or has the ability to create pressure. Principal causes are booster pumps, pressure vessels and elevated plumbing.

Backflow preventers are mechanical devices designed to prevent backflow through cross connections. However, for backflow preventers to protect as designed, they must meet stringent installation requirements.

For further  
information  
contact your  
local water  
purveyor or the  
PNWS/AWWA  
Cross-Connection  
Control Committee  
through the  
PNWS office at  
(877) 767-2992  
or on the web at

[www.pnws-awwa.org](http://www.pnws-awwa.org)

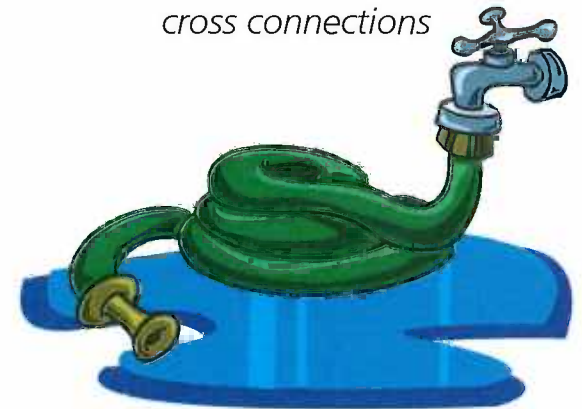
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Cross Connections  
can create

**Health  
Hazards**

Drinking water systems  
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**Polluted  
or  
Contaminated**  
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cross connections



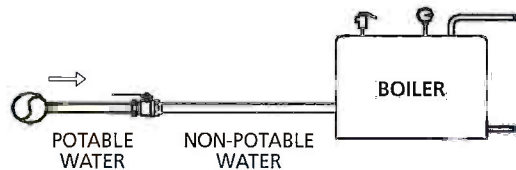
American Water Works Association  
Pacific Northwest Section

## Why Be Concerned?

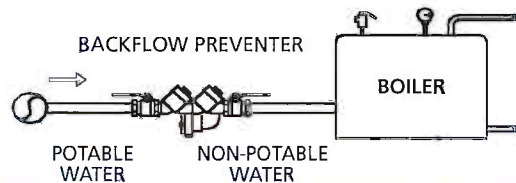
Most water systems in the United States and Canada have good sources of water and/or sophisticated treatment plants to convert impure water to meet drinking water standards. Millions of dollars are spent to make the water potable before it enters the distribution system so most water purveyors think that their supplies are not in jeopardy from this point on. Studies have proven this to be wrong. Drinking water systems may become polluted or contaminated in the distribution system through uncontrolled cross connections.

Cross connections are installed each day in the United States because people are unaware of the problems they can create. Death, illness, contaminated food products, industrial and chemical products rendered useless are some of the consequences of such connections. As a result, many hours and dollars are lost due to **cross connections**.

### Wrong: Uncontrolled Cross Connection



### Right: Controlled Cross Connection



## Where are Cross Connections Found?

Cross connections are found in all plumbing systems. It is important that each cross connection be identified and evaluated as to 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 common cross connections found in plumbing and water systems include:

1. Wash basins and service sinks.
2. Hose bibs.
3. Irrigation sprinkler systems.
4. Auxiliary water supplies.
5. Laboratory and aspirator equipment.
6. Photo developing equipment.
7. Processing tanks.
8. Boilers.
9. Water recirculating systems.
10. Swimming pools.
11. Solar heat systems.
12. Fire sprinkler systems.

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 for backflow protection, designed for the degree of hazard and backflow 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 centers.
4. Metal plating and chemical plants.
5. Car washes.
6. Petroleum processing and storage plants.
7. Piers and docks.
8. Sewage treatment plants.

## What to Do?

It is impossible to cover all of the information pertaining to cross connections in a pamphlet. We hope the preceding information will inspire you to further educate yourself on the hazards of unprotected cross connections. Cross connection control manuals and training schools are offered throughout the Northwest. Information on manuals, schools and cross connection control can be obtained from:

### Washington

**Department of Health**  
Airdustrial Way, Bldg. 3  
P.O. Box 47822  
Olympia WA 98504-7822  
**(360) 236-3133**

### Oregon

**Oregon Health Division**  
3420 Cherry Av NE, #110  
Keizer OR 97303  
**(503) 373-7201**

### British Columbia, Canada

**BC Water & Waste Association**  
Ste. 342 - 17 Fawcett Road  
Coquitlam B.C. V3K 6V2  
**(604) 540-0111**

### Idaho

**Idaho Division of Environment**  
1410 N Hilton  
Boise ID 83706  
**(208) 373-0275**

Additional sources of information may be found on the PNWS-AWWA web site:  
[www.pnws-awwa.org](http://www.pnws-awwa.org)