

# Cross Connection Questions

September 11, 2019

## What is a cross connection?

A cross connection is an arrangement of piping which could allow undesirable water, sewage or chemical solutions to enter your drinking (potable) water system as a result of backflow. Cross connections with potable piping systems have resulted in numerous cases of illness and even death across the country. Historically, they are one of the most serious public health threats to a potable water supply system, and many times are present in a residential water system.

It's true! You can pollute your own drinking water without even knowing it. But, by eliminating cross connections, you can help protect the water we all share.

## How can backflow occur?

Backflow can occur when either a *backsiphonage* or a *backpressure* condition exists.

## What is backsiphonage?

Backsiphonage is caused by negative pressure from a vacuum (or partial vacuum) in the supply piping, just as drinking through a straw draws liquid from a glass. A garden hose in a car wash suds bucket or a hose submerged in a laundry tub can act as a “drinking straw” allowing undesirable liquids to be drawn through it by backsiphonage. Backsiphonage reverses normal flow in the system, and can pull contaminants into the drinking water. Some typical situations which cause backsiphonage include:

1. Water main breaks or repairs occurring in the system at a point lower than your water service line.
2. High water flow rates exerted on a water main due to fire-fighting, hydrant flushing, large system demands or major piping breaks.
3. Booster pumps taking direct suction for potable water supply piping.
4. Undersized piping in your house.

## What is backpressure?

Backpressure occurs when the downstream water pressure is greater than the water supply pressure. In other words, whenever the drinking water supply is directly connected to another piping system or process which operates at higher system pressure, backpressure backflow can occur. For example, water in a boiler operating under a pressure of 15–20 psi would backflow into the potable water if its supply pressure fell below this level. Sometimes this pressure drop can be created just by flushing a toilet!

Typical causes of backpressure backflow include:

1. Non-potable piping systems equipped with pumping equipment, such as irrigation wells interconnected with a potable system.
2. Steam or hot water boilers.
3. Heat exchangers.

This can occur in any pressurized system such as chemical feed pumps, boilers, elevated tanks, or recirculating systems.

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## What is the law?

Cross connections with potable piping systems are prohibited by the Michigan Plumbing Codes Ordinance. Additionally, Michigan water utilities are required to have a cross connection control inspection program to eliminate and prevent cross connections. City of Alma Water personnel routinely inspect both commercial and industrial facilities as well as residential properties for the presence of cross connections with the city's drinking water supply.

## Commercial and Industrial Hazards?

Common commercial and industrial facilities which may pose a public health threat include:

1. Industries with private wells
2. Industries with chemically treated boilers
3. Plating operations, chemical processing plants
4. Funeral homes
5. Hospitals, nursing homes
6. Car washes
7. Schools
8. Lawn sprinkling systems

## Residential Hazards?

Many common household uses of water may pose a public health threat to the drinking water supply system, including:

1. Hose connections to a chemical solution sprayer to feed lawn/shrub herbicides, pesticides or fertilizers
2. Lawn sprinkling systems
3. Chemically treated heating systems
4. Water softeners
5. Hose connections to a water outlet or laundry tub
6. Swimming pools
7. Solar heating systems
8. Private non-potable water supplies
9. Non-code (siphonage) ballock assemblies in toilets
10. Water operated sump drain devices

This list of potential cross connection hazards is by no means complete. A home that has any of these situations is seriously jeopardizing its own drinking water system and that of the community.

## What can be done?

Homeowners, as well as plant managers, business people, administrators and school officials all share the responsibility of protecting potable water systems from contamination through cross connections. Many residential cross connections can be eliminated by installing a hose bib (faucet) vacuum breaker on each outside hose connection and all hose connections in the basement and laundry room. These devices can be obtained from hardware stores or plumbing shops for under \$10.00 each. In other instances, more complex protective devices may be necessary. For these situations the City of Alma Water department should be contacted for assistance in selecting the appropriate device.