Guide to Backflow Prevention, Cross-Connection Control, Auxiliary Water Systems and Booster Pumps

Why be concerned?

It can be a health hazard for you, your family and others if contaminated water enters your plumbing system. Chemical burns, fires, explosions, poisonings, illness and death have all been caused by backflow through cross-connections and it happens more often than you think.

You are legally responsible for protecting your water supply plumbing from backflow that may contaminate drinking water – either your own or someone else’s. This includes complying with the plumbing code and not creating cross-connections.

What Is Backflow?

Backflow is any reversal of flow within a piping system.

While BCWS maintains the high quality of our water until it enters the customer’s service line, after water enters a customer’s premises, BCWS cannot control its quality or use. Allowing water to flow backward from a customer’s piping system into the public water system could endanger public health. Approved backflow devices prevent water or chemicals found on customer’s premises from re-entering the public water main.

What Causes Backflow?

Backflow can be caused by two different forces: backsiphonage and backpressure.

**Backsiphonage** occurs when there is a sudden reduction in water pressure within the distribution system. This can occur when a water main breaks or when a car hits a fire hydrant. The sudden pressure drop creates suction that can siphon water from your pipes and anything connected to them, back into the public water main.

**Backpressure** is caused when a higher pressure is applied against the public water system’s pressure. Any pumping system such as a well pump or pressurized system such as steam equipment can exert backpressure when cross connected with the public water system.
What is a Cross-Connection?

A Cross-Connection is any temporary or permanent connection between potable water plumbing and a source of contamination. Cross-connections can defeat your plumbing system’s built-in backflow prevention principles, allowing harmful substances to flow into your water supply.

Examples of common residential backflow and cross connection hazards

- A garden hose connected to an insecticide, herbicide or fertilizer dispenser.
- A hose connected to a faucet with its other end submerged in the contents of a sink, bucket, laundry tub, bathtub, swimming pool, or car radiator.
- Livestock or pet areas fed through pipes or hoses from your building’s water supply.
- Chemically treated heating systems, lawn irrigation systems, water-operated sump pump drain devices, swimming pools, hot tubs, and spas connected to your water supply.
- Lawn irrigation systems with submerged nozzles that can allow chemicals and animal feces to be drawn into the water supply when water ponds around the nozzle.
- Private and/or non-potable water supplies located on the property such as wells or ponds.

How Can Backflow and Connections be Prevented?

You can prevent backflow by:

- Eliminating all cross-connections wherever you find them
- Never leave hose ends submerged in sinks, buckets or puddles
- Disconnect hoses when not in use or use a hose bibb vacuum breaker
- Use an approved backflow prevention device

Backflow devices for Single Family Residential Properties

Hose Bibb vacuum breaker devices are available at local hardware stores for use with hoses at residential properties that have low hazards. Use them for connections in your basement, laundry and outside hoses. For residential properties that have fire sprinkler systems, lawn irrigation or auxiliary supplies such as a well or pond, contact BCWS’ Backflow program at 513-887-3686 for the appropriate device information.

Backflow devices for Industrial, Commercial, and Multi-Family Properties

These buildings require approved devices such as an Air Gap Separation, Double Check Valve Backflow Prevention Assembly or a Reduced Pressure Backflow Prevention Assembly. The type of protection is based on the potential for backflow and the degree of hazard to the public water supply. Contact BCWS’ Backflow program at 513-887-3686 for the appropriate device information.
Where is Protection Required?

BCWS requires a reduced pressure backflow prevention assembly to be installed on each water line entering a commercial building, industrial facility, or multi-family residential building of more than three units. Reduced pressure devices must be installed inside a building unless they are protected from cold temperatures and freezing by installation of a hot box. They cannot be installed in pits or below grade level.

BCWS also requires fire lines to have double check valve assemblies which are usually located in outside meter/vault pits.

Some properties with hazards such as chemical tanks or pressurized processed systems will require additional devices within the building to protect internal plumbing components from contamination.

Annual testing

Customers who have backflow devices are responsible for having them tested by a certified plumber annually. Annual testing of backflow devices is required by Ohio EPA to ensure the devices are working correctly. Backflow device testing must be performed by a plumber who is certified by the State of Ohio through the Department of Commerce.

BCWS tracks the annual testing of the backflow devices and mails reminder letters and forms to customers to help them complete the required annual testing. A $25.00 administrative fee is charged for each device tested by the due date. The fee for each late test completed after the due date is $60.00 ($25.00 admin fee + $35.00 penalty). These fees are added to the water bill.

For more information contact BCWS’ Backflow program staff at 513-785-5404.
What are Auxiliary Water Systems?

An Auxiliary Water System is any system on your property other than the public water system that is equipped with pumps or sources of pressure including gravity.

Auxiliary water sources:
Wells  Cisterns  Ponds  Lakes  Streams

What Protection is Required for an Auxiliary Water System?

Auxiliary Water Systems must be completely separate from water supply plumbing served by a public water system.

Auxiliary Water Systems must also have an approved backflow preventer installed at the service connection (where the public water system connects to the customer’s plumbing system).

If those two requirements can not be met, the auxiliary water supply must be eliminated.

What Are Booster Pumps?

A Booster Pump is a pump that is installed only where additional pressure is needed and not where additional quantities of water are required. This is often the case in high rise buildings and fire protection sprinkler systems.

Booster Pump Safety

Booster Pumps connected to plumbing systems or water mains can cause backspiphonage by reducing the pressure in water mains. The following requirements are in place to prevent backspiphonage:

- Domestic Booster Pumps must be equipped with a low suction cut off switch that is tested and certified each year.
- Booster Pumps that are necessary for one, two, and three family dwellings are preferred to have the pump draw from a surge tank filled through an air gap.
- Booster Pumps used in a fire suppression system must be equipped with either a low-suction throttling valve on the discharge side or be equipped with a variable speed suction limiting control system. Low pressure cut-off devices installed prior to August 8, 2008 are acceptable until a significant modification is warranted, at which point the minimum pressure sustaining method must be updated. Each of these methods must be tested and certified every year.
Responsibilities are shared

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<th>Butler County Water and Sewer Department</th>
<th>Butler County Health Department</th>
<th>Customers</th>
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<td>is responsible for protecting the public water supply, which begins at the source, includes the entire water distribution system and service connections, and ends at the point of delivery to the consumer. BCWS requires backflow prevention devices for containment of pollution sources and tracks the testing of these devices.</td>
<td>is responsible for regulating the protection of the consumer’s water system, which begins at the point of delivery from the supplier and includes all piping installations inside the consumer’s premises. Backflow devices required are for isolation of pollution sources within the building. The Butler County Health Department tracks the testing of these devices.</td>
<td>are ultimately responsible for properly maintaining their plumbing system, ensuring that cross connections are not created and that any booster pumps and required backflow preventers are tested yearly and are in operable condition. Inspections, tests, and repairs of backflow devices and booster pumps are at the expense of the water customer.</td>
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BCWS’ Backflow Prevention Rules and Regulations are available at:


For more information about booster pumps, auxiliary systems or containment backflow prevention devices on the incoming water service line or fire lines, contact the Butler County Water and Sewer Department, Mark Smith 513-887-5573.

For information about isolation backflow devices for plumbing within a building, or irrigation systems contact the Butler County Health Department at 513-863-1770.