



Backflow Prevention - Frequently Asked Questions

What is backflow?

Backflow is the undesirable reversal of flow in a potable water distribution system through a cross-connection. A cross-connection is an actual or potential link connecting a source of pollution or contamination with a potable water supply. Backflow may allow liquids, gases, nonpotable water and other substances, from any source, to enter a public water system.

How does backflow occur?

Backflow may occur due to high pressure on the customer side, or low pressure in the water system. Backflow through a cross-connection can contaminate the potable water in a building, on a block, or throughout an entire water system.

What is backflow prevention?

Backflow prevention protects public water systems from contamination or damage through cross-connections located in customer facilities. Backflow prevention is typically achieved by placing a backflow prevention assembly between the customer and the public water system. This is called containment backflow prevention.

Does my water system require backflow prevention?

Missouri's backflow prevention regulation (10 CSR 60-11.010) applies to all community water systems. These are water systems that serve at least 15 connections or at least 25 people on a year-round basis. Missouri has more than 1,400 community water systems. They serve more than 4.9 million people, almost 90 percent of the state population.

Must my home or business have backflow prevention?

Many businesses must have backflow prevention. Common examples are manufacturing and processing plants, medical facilities, laboratories (including school chemistry and biology labs), and buildings that have boilers, fire sprinkler systems and irrigation systems.

Solely residential facilities are exempt from the rule unless a specific cross-connection is identified. For example, single-family residences with a lawn irrigation system require backflow prevention. Multi-family residences with a boiler or fire sprinkler system require backflow prevention.

Call your local water supplier to confirm whether or not backflow prevention is required at your home or business.

What kind of backflow prevention is required at my home or business?

Under the Missouri rule, three types of backflow prevention assemblies are permissible for containment: air gaps, reduced pressure principle assemblies and double check valve assemblies. The type of assembly you need depends on the type of hazard present.

Generally, where you have a backflow hazard that may threaten public health you must have an air gap or a reduced pressure principle assembly. Where there is a lesser hazard that may damage the water system or degrade the aesthetic quality of the water, a double check valve assembly is required.

Only approved backflow prevention assemblies may be used. If you can find the manufacturer and model number on your assembly you can check with your water supplier to find out if it is an approved assembly. Modifications to an assembly invalidate the approval. If your assembly looks like it has been changed, get in touch with your water supplier or a certified backflow prevention assembly tester to see if it is an approved assembly.

Water suppliers may have more strict or specific requirements than the state rule. Contact your local water supplier to make sure you have the appropriate backflow prevention assembly to meet local requirements.

Must I have my backflow prevention assembly inspected?

Yes. To ensure the device is functioning properly, a certified tester must test it at least annually. For new facilities, the assembly must be tested when installed. If the tester finds the assembly is not working, you must arrange to have it repaired and tested again. It is your responsibility to pay for the test and repairs. The tester is required to provide a copy of the test report to you and the water supplier. To obtain a list of certified testers in your area, call your water supplier or the Missouri Department of Natural Resources.

Does the backflow prevention assembly protect my entire facility?

No. The required backflow prevention assembly provides containment and it protects the public water system from hazards in your facility. Cross-connections in your own plumbing may allow contaminants to backflow from hazardous processes to drinking water taps in your building.

Backflow prevention applied within a facility to protect drinking water plumbing from process plumbing is called isolation. Isolation backflow prevention is not covered by departmental rules, but may be required by local plumbing codes. Check with your local code enforcement agencies to see what standards apply to your facility.

Additional Resource:

Cross-Connection Control Manual,
U.S. Environmental Protection Agency (EPA 816-R-03-002, February 2003),
www.epa.gov/safewater/crossconnection.html

For more information

Missouri Department of Natural Resources
Water Protection Program, Public Drinking Water Branch
P.O. Box 176
Jefferson City, MO 65102-0176
1-800-361-4827 or (573) 751-5331 office,
(573) 751-3110 fax
www.dnr.mo.gov/env/wpp/index.html



Basics of Backflow Prevention: Missouri Regulation 10 CSR 60-11.010-.030

Backflow Prevention

In 1997, the Missouri Department of Natural Resources revised a drinking water regulation entitled "Backflow Prevention." This revised regulation places certain responsibilities on water suppliers to ensure that customer facilities identified as actual or potential backflow hazards provide the necessary protection to prevent contaminants from entering the public water system.

What is Backflow?

Backflow is defined as the unwanted reversal of flow in a water distribution system. Due to changes in the hydraulic pressure in a water distribution system or a piping system inside a customer's premises, backflow occurs on a regular basis.

The polluting substance, usually a liquid, tends to enter the potable water supply if the net force acting upon the liquid acts in the direction of the water supply. Therefore, two factors are essential for backflow to occur. First, the normal direction of flow in the distribution system must be interrupted. Second, there must be a link or connection between the potable system and the source of contamination.

Backflow only becomes a serious problem when there are cross connections within the water distributions system.

Public Health Significance of Cross Connections

A cross connection is a physical link between a source of pollution or contamination with a potable water supply.

Public health specialists have long been aware of the threat to public health posed by cross connections. Education is the most important factor in cross connection control. No one would intentionally connect plumbing fixtures, equipment, etc. to their water supply if they knew it would contaminate their drinking water. But it happens thousands of times a day.

Various court decisions have held water suppliers responsible for the delivery of safe water to consumers. But the safety of our drinking water supply can be jeopardized at any location, at any time because of the frequency of plumbing defects and cross connections. Due to frequent changes in piping systems, an effective cross connection control program, including continued surveillance of the public water system, is necessary to prevent backflow incidents.

Components of an Effective Cross Connection Control Program

The first step in preventing backflow incidents is enacting local rules that grant the water supplier the authority to enforce the cross connection control program. For the water supplier to comply with the state backflow prevention regulation, the local rules should include the following provisions:

- A requirement for annual testing of assemblies and inspection of air-gaps.
- Authority to enter customer premises for purposes of inspection.
- Authority to terminate water service for failure to comply.

Another responsibility of the water supplier is to notify customers, where backflow hazards exist, that they must comply with the local rule. Once these customers have been notified, the supplier must maintain records of inspections, exemptions, or installation of assemblies.

A local program may not be less stringent than state regulations. Local plumbing codes may require additional backflow prevention devices.

Methods of Backflow Prevention

The department's Public Drinking Water Branch maintains a list of backflow prevention assemblies approved by the Foundation for Cross Connection Control and Hydraulic Research at the University of Southern California www.usc.edu/dept/fccchr/. The following methods of backflow prevention meet the requirements of the state backflow prevention rule.

Air-gap: An air-gap is the most positive method of backflow protection. It is a physical separation between the water supply and the customer's internal piping system. The distance for an air-gap must be at least two times the diameter of the pipe. For example, a two-inch separation is required for a one-inch water supply pipe.

Reduced Pressure Principle Assembly: A reduced pressure principle assembly is the highest level of mechanical backflow protection. The reduced pressure principle assembly has a hydraulically operated relief port located between two spring loaded check valves. A drop in pressure from the supply or an increase in back pressure from the customer's facility will cause the check valves to close and the relief port to open, creating an air-gap within the assembly. If either check valve becomes fouled by debris, the relief port will also open. The drawback to using an reduced pressure principle assembly is that it will lower the pressure available to the customer's premises.

Double Check Valve Assembly: The double check valve assembly is designed for low hazard protection only. The double check valve assembly has two spring valves that act independently to provide protection from back pressure and back siphonage. The drawback to double check valve assemblies is that both check valves are susceptible to fouling by debris in the water system, which hinders their function and allows backflow to occur.

Testing/Inspection Requirements

The function of all backflow prevention devices must be reviewed annually. Air-gaps may be inspected by the water supplier. A state-certified backflow prevention assembly tester must perform the specific testing procedures required to verify the proper function of reduced pressure principle assemblies and double check valve assemblies.

The Public Drinking Water Branch maintains a list of certified backflow prevention assembly testers.

For Additional Assistance

Please contact your local Regional Office for more information.

Public Drinking Water Branch	(573) 751-5331
Northeast Region Office	(660) 385-8000
Southwest Region Office	(417) 891-4300
Southeast Region Office	(573) 840-9750
Kansas City Region Office	(816) 622-7000
St. Louis Region Office	(314) 416-2960

For more information

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