

## **Cross-Connections and Backflow: What Are They?**

QUESTION: What is a cross-connection?

ANSWER: A cross-connection is any temporary or permanent connection between a public water system or consumer's potable (i.e. drinking) water system or any source or system containing non-potable water or other substances. An example is the piping between a public water system or consumer's potable water system and an auxiliary water system, cooling system, or irrigation system.

QUESTION: What is backflow?

ANSWER: Backflow is the undesirable reversal of flow of non-potable water or other substances through a cross-connection and into the piping of a public water system or consumer's potable water system. There are two types of backflow: backpressure backflow and backsiphonage.

QUESTION: What is backpressure backflow?

ANSWER: Backpressure backflow is backflow caused by a downstream pressure that is greater than the upstream or supply pressure in a public water system or consumer's potable water system. Backpressure (i.e. downstream pressure that is greater than the potable water supply pressure) can result from an increase in downstream pressure, a reduction in the potable water supply pressure, or a combination of both. Increases in downstream pressure can be created by pumps, temperature increases in boilers, etc. Reductions in potable water supply pressure occur whenever the amount of water being used exceeds the amount of water being supplied, such as during water line flushing, fire fighting, or breaks in water mains.

QUESTION: What is backsiphonage?

ANSWER: Backsiphonage is backflow caused by a negative pressure (i.e. a vacuum or partial vacuum) in a public water system or consumer's potable water system. The effect is similar to drinking water through a straw. Backsiphonage can occur when there is a stoppage of water supply due to nearby fire fighting, a break in a water main, etc.

QUESTION: Why do water suppliers need to control cross-connections and protect their public water systems against backflow?

ANSWER: Backflow into a public water system can pollute or contaminate the water in that system (i.e. backflow into a public water system can make the water in that system unusable or unsafe to drink), and each water supplier has a responsibility to provide water that is usable and safe to drink under all foreseeable circumstances. Furthermore, consumers generally have absolute faith that water delivered to them through the public water system is always safe to drink. For these reasons, each water supplier must take reasonable precautions to protect its public water system against backflow.

QUESTION: What should water suppliers do to control cross-connections and protect their public water system against backflow?

ANSWER: Water suppliers usually do not have the authority or capability to repeatedly inspect every customer's premises for cross-connections and backflow protection. Alternatively, each water supplier should ensure that a proper backflow prevention device is installed and maintained at the water service connection to each system or premises that poses a significant hazard to the public water system. Generally, this would include the water system connection to each dedicated fire protection system or irrigation piping system and the water service connection to each of the following types of premises; (1) premises with an auxiliary or reclaimed water system; (2) industrial, medical, laboratory, marine or other facilities where objectionable substances are handled in a way that could cause pollution or contamination of the public water system; (3) premises exempt from the State Plumbing

Code and premises where an internal backflow prevention device required under the State Plumbing Code is not properly installed or maintained; (4) classified or restricted facilities; and (5) tall buildings. Each water supplier should also ensure that a proper backflow prevention device is installed and maintained at each water loading station owned or operated by the water supplier.

QUESTION: What is a backflow prevention device (i.e. backflow preventer)?

ANSWER: A backflow preventer is a means or mechanism to prevent backflow. The basic means of preventing backflow is an air gap, which either eliminates a cross-connection or provides a barrier to backflow. The basic mechanism for preventing backflow is a mechanical backflow preventer, which provides a physical barrier to backflow. The principal types of mechanical backflow preventer are the reduced-pressure principle assembly, the pressure vacuum breaker assembly, and the double check valve assembly. A secondary type of mechanical backflow preventer is the residential dual check valve.

QUESTION: What is an air gap?

ANSWER: An air gap is a vertical, physical separation between the end of a water supply outlet and the flood-level rim of a receiving vessel. This separation must be at least twice the diameter of the water supply outlet and the flood-level rim of the receiving vessel. This separation must be at least twice the diameter of the water supply outlet and never less than one inch. An air gap is considered the maximum protection available against backpressure backflow or backsiphonage but is not always practical and can easily be bypassed.

QUESTION: What can I do to prevent backflow and backsiphonage?

ANSWER: Ensure that there are no cross-connections between the public water supply line (i.e. drinking water pipes) and such things as swimming pools, wells, irrigation ponds, boilers, cooling towers, and fire protection systems. Whenever possible, use an air gap to eliminate a cross-connection because it will provide the most protection from backflow and backsiphonage. In the event an air gap is not possible, it will be necessary to install a backflow prevention device. If you have any questions, please do not hesitate to contact a licensed plumber or Harpeth Valley Utilities District at (615) 352-7076.