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What is a cross-connection?

A **cross-connection** is any temporary or permanent connection between a public water system or consumer's potable (i.e., drinking) water system and a 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.

What is backflow?

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

What is backpressure backflow?

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 can result from an increase in downstream pressure, a reduction in the potable water supply pressure, or a combination of both.

Causes of increases in downstream pressure: Pumps (such as wells and booster pumps), temperature increases in boilers, etc.

Causes of decreases in downstream pressure: Water line flushing, firefighting, or breaks in water mains.

What is back-siphonage?

Back-siphonage 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. Back-siphonage can occur when there is a stoppage of water supply due to a nearby firefighting, a break in a water main, etc.

Why does NBU need to control cross-connections and protect the public water system against backflow?

Backflow into a public water system can pollute or contaminate the water in that system making it unsafe to drink. Each water supplier has a responsibility to provide water that is usable and safe to drink under all foreseeable circumstances. Furthermore, consumers have faith that water delivered to them through a public water system is safe to drink. Therefore, NBU must take precautions to protect its public water system against backflow.

What does NBU do to control cross-connections and protect the public water system against backflow?

NBU follows Texas Commission on Environmental Quality (TCEQ) mandates with regard to regulations established to protect the public water system. This includes:

1. Requiring backflow prevention at each service connection that may create a threat to the public water supply.
2. Requiring backflow devices and assemblies within a premise as outlined by the state required plumbing codes.

Generally, this would include the water service 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 inspection and premises where an internal backflow preventer required under the State Plumbing Code is not properly installed or maintained; 4) classified or restricted facilities; and 5) tall buildings.

What is a backflow preventer?

A **backflow preventer** is a means or device which prevents pollutants and contaminants from flowing into the public water system.

What is an air gap?

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 never less than one inch. An air gap is considered the maximum protection available against backpressure backflow or back-siphonage, but it is not always practical and can easily be bypassed.



What is a reduced pressure zone assembly?

A **reduced pressure zone assembly** protects water from substances that may contaminate water causing illness or death. A sprinkler/irrigation system that has a chemical feed requires this device. It is also commonly used in commercial establishments to protect against numerous contaminants. These devices must be installed above ground.



Reduced pressure zone assembly

What is a double-check valve assembly?

A **double-check valve assembly** protects water from substances that may pollute but not contaminate the water. For instance, non-health hazard applications require these devices. They are normally installed near the meter in an underground box.



Double-check valve assembly

What is a hose bib vacuum breaker?

A **hose bib vacuum breaker (HBVB)** is one of the least expensive and most commonly used backflow preventers. When attached to an outside water tap, these backflow preventers keep water that may be contaminated with fertilizer or insecticide from entering your drinking water. You should attach an HBVB if you have a sprayer on your hose.



Hose bib vacuum breaker

Why do backflow preventers have to be tested periodically?

In order to ensure the proper operation of a backflow assembly, a backflow preventer must be tested and certified upon installation and periodically thereafter as required by state code. If the hazard (substance you are protecting against) is considered a high hazard (i.e., a hazard that can cause health problems), the City requires that the device be tested annually. The TCEQ oversees the state requirements.

Where can I get more information about cross-connection control?

Recommended Practice for Backflow Prevention and Cross-Connection Control, Manual M14, second edition (1990) is available from the American Water Works Association (AWWA) Bookstore; 6666 West Quincy Avenue; Denver, Colorado 80235; 800/926-7337; <http://www.awwa.org>.

University of Southern California's Manual of Cross-Connection Control, ninth edition (1993) is available at the Foundation for Cross-Connection Control and Hydraulic Research; University of Southern California; KQP-200 University Park MC-2531; Los Angeles, California 90089-2531; 213/740-2032; <http://www.usc.edu/dept/fccchr>

Additional information can be found at:

- American Backflow Prevention Association (www.abpa.org)
- Texas Commission on Environmental Quality (www.tceq.state.tx.us)