IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

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Drinking Water
Cross-Connection Control Programs

What is a Cross-Connection?

A cross-connection is an actual or potential connection or piping arrangement between a drinking water system and another source that could introduce anything other than the potable water intended to normally supply the system.

Cross-connections include bypass arrangements, jumper connections, removable sections, swivel or changeover devices, and other devices that may cause nonpotable water to backflow into the potable water supply. Backflow occurs when the normal flow direction of the water system is reversed due to back pressure or back siphonage.

Responsibilities of Public Water Systems

Water purveyors must take reasonable and prudent measures to protect their water systems against contamination and pollution from cross-connections. Methods include the following:

- Premises isolation or containment
- Internal (or in-plant) isolation
- Fixture protection
- Some combination of above
- Specific cross-connection control requirements vary depending on whether a system is a community water system or noncommunity water system.

Responsibilities of Community Water Systems

Community water system purveyors are required to implement and enforce a cross-connection control program to prevent toxic or hazardous materials from entering the system. Programs must include at least the following:

- An inspection program to locate cross-connections and determine required suitable protection.
- A requirement that suitable protection is installed before providing water service for new connections.
- A requirement that adequate backflow prevention assemblies are installed, operating, and inspected and tested annually by a tester licensed by the Idaho Bureau of Occupational Licenses (IBOL).
- A requirement that assemblies that cannot pass annual testing or are defective shall be repaired, replaced, or isolated within 10 business days. If no action is taken after 10 business days, water service to the failed assembly must be discontinued.
- Discontinuance of service for any facility where suitable backflow protection has not been provided for a cross-connection.

Responsibilities of Noncommunity Water Systems

Noncommunity water system purveyors must make sure that cross-connections either do not exist or are isolated from the water system by an appropriate backflow prevention assembly. Backflow prevention assemblies must be inspected and tested annually by a tester licensed by IBOL.

Backflow Prevention Assemblies and Devices

A backflow prevention assembly and a backflow prevention device are different. A backflow prevention assembly is a set of mechanical components that prevents the undesired backflow of nonpotable water or other liquids into the potable water system and can be tested and repaired in place. A backflow prevention device is a backflow preventer that does not meet the approval requirements of a backflow prevention assembly (i.e., is not testable). Also, not all mechanical assemblies and devices provide equal backflow protection.

Some types of backflow prevention assemblies include the following:

- Double-check valve assemblies
- Reduced-pressure principle backflow assemblies
- Spill-resistant vacuum breaker assemblies
- Pressure vacuum breaker assemblies

Some types of backflow prevention devices include the following:

- Residential meter check/single-check valve
- Dual-check backflow preventer
- Dual-check with atmospheric vent
- Hose bibb vacuum breaker
- Atmospheric vacuum breaker

Backflow assembly types must pass a performance test conducted by the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research. In addition, all double-check valve and reduced-pressure principle backflow assemblies must meet American Water Works Association (AWWA) Standards C-510 and C-511, respectively.

Some types of backflow prevention devices, such as atmospheric vacuum breakers, must be approved by either the International Association of Plumbing and Mechanical Officials (IAPMO) or the American Society of Sanitation Engineers (ASSE).

Before installing backflow preventers (assemblies or devices), water purveyors must make sure they are selected from an appropriate reference material deemed acceptable by the Idaho Department of Environmental Quality (see the “Idaho Rules for Public Drinking Water Systems,” 58.01.08.552.06.b). The installation of any backflow assembly or device must also comply with any local ordinances.

Cross Connection Control
Frequently Asked Questions

1. **What is a Cross Connection?**

   A cross connection is "[A]ny actual or potential connection or piping arrangement between a public or a consumer's potable water system and any other source or system through which it is possible to introduce into any part of the potable water system used water, water from any source other than an approved public water system, industrial fluid, gas or substance other than the intended potable water with which the system is supplied. Cross connections include bypass arrangements, jumper connections, removable sections, swivel or change-over devices and other temporary or permanent devices which, or because of which "backflow" can or may occur."

2. **What is a Fixture Protection?**

   Fixture Protection is "[T]he practice of installing backflow prevention assemblies or devices to isolate one (1) or more cross connections within a customer's facility."

3. **What are Backflow, Backpressure and Backsiphonage?**

   Backflow is "[T]he reverse from normal flow direction in a plumbing system or water system caused by back pressure or back siphonage."

   There are two types of backflow: backpressure and backsiphonage.
   Backpressure is backflow caused by a downstream pressure that is greater than the upstream or supply pressure in a public 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, firefighting, or breaks in water mains.
   Backsiphonage is backflow caused by a negative pressure (i.e., a vacuum or partial vacuum) in a public 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 firefighting, a break in a water main, routine maintenance flushing, or any other situation that causes a significant loss in water system pressure.

4. **Who is responsible to protect the public water systems from contamination of the potable water through cross connections?**

   "[T]he water purveyor is responsible through its cross connection control program to take reasonable and prudent measures to protect the water system against contamination and pollution from cross connections through premises isolation or containment, internal or in-plant isolation, fixture protection, or some combination of premises isolation, internal isolation, and fixture protection."

5. **What is a Community Water system?**

   Community Water System is "[A] public water system which serves at least fifteen (15) service connections used by year-round residents or regularly serves at least twenty-five (25) year-round residents. See also the definition of a Public Drinking Water System in these rules."

6. **What is a Cross Connection Control Program for a community water system?**

   Community water system purveyors are required to implement and enforce a cross-connection control program to prevent toxic or hazardous materials from entering the system. Programs must include at least the following:

   - An inspection program to locate cross- connections and determine required suitable protection.
   - A requirement that suitable protection is installed before providing water service for new connections.
   - A requirement that adequate backflow prevention assemblies are installed and operating as well as inspected and tested annually by a tester licensed by the Idaho Bureau of Occupational Licenses (IBOL).
   - A requirement that assemblies that cannot pass annual test or are defective shall be repaired, replaced or isolated within ten (10) business days. If no action is taken after ten (10) business days, water service to the failed assembly must be discontinued.
   - Discontinuance of service for any facility where suitable backflow protection has not been provided for a cross-connection.

7. **What is a Transient or Nontransient Noncommunity Water System?**

   A Noncommunity water system is "[A] public water system that is not a community water system. A noncommunity water system is either a transient noncommunity water system or a non-transient noncommunity water system. See also the definition of a Public Drinking Water System in these rules."
   A Nontransient Noncommunity Water System is "[A] public water system that is not a community water system and that regularly serves at least twenty-five (25) of the same persons over six (6) months per year."
   A Transient Noncommunity Water System is "[A] noncommunity water system which does not regularly serve at least twenty-five (25) of the same persons over six (6) months per year."

8. **What is a Cross Connection Control Program for a Noncommunity water system?**

   Noncommunity water system purveyors must make sure that cross connections either do not exist or are isolated from the water system by an appropriate backflow prevention assembly. Backflow prevention assemblies must be inspected and tested annually by a tester licensed by IBOL.

9. What are backflow prevention assemblies and backflow prevention devices?

There is a difference between a backflow prevention assembly and a backflow prevention device. A backflow prevention assembly is a set of mechanical components that prevents the undesired backflow of non-potable water or other liquids into the potable water system and can be tested and repaired in place. A backflow prevention device is a backflow preventer that does not meet the approval requirements of a backflow prevention assembly (i.e. are not testable). Also, not all mechanical devices and assemblies provide equivalent backflow protection.

Some types of backflow prevention devices include the following:

- residential meter check/single-check valve (CV)
- dual-check backflow preventer (DCV)
- dual-check with atmospheric vent (DCAV)
- hose bibb vacuum breaker (HBVB)
- atmospheric vacuum breaker (AVB)

Some types of backflow prevention assemblies include the following:

- double check valve assemblies (DCVA)
- reduced pressure principle backflow assemblies (RPBA)
- spill resistant vacuum breaker assemblies (SVBA)
- pressure vacuum breaker assemblies (PVBA)

10. Who may install Backflow Prevention Assemblies or Devices?

Water purveyors may install backflow prevention assemblies or devices. Before installing backflow preventers (assemblies or devices), water purveyors must make sure they are selected from an appropriate reference material deemed acceptable by the Idaho Department of Environmental Quality. (See the Idaho Rules for Public Drinking Water Systems, section 58.01 .08.552.06.b.) The installation of any backflow assembly or devices must also comply with any local ordinances.

Backflow *assembly* types must pass a performance test conducted by the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research (USC Foundation). In addition, all double check valve and reduced pressure principle backflow assemblies used must meet American Water Works Association (AWWA) Standards C-510 and C-511, respectively.

Some types of backflow prevention *devices* such as atmospheric vacuum breakers (AVB) must be approved by either the International Association of Plumbing and Mechanical Officials (IAPMO) or the American Society of Sanitation Engineers (ASSE).

The Idaho Rules for Public Drinking Water Systems (IDAPA 58.01.08) contain the full text and complete requirements for cross- connection control programs.

For additional information or to download the entire manual, visit EPA's Cross Connection Control Manual page http://water.epa.gov/infrastructure/drinkingwater/pws/crossconnectioncontrol/crossconnectioncontrol_manual.cfm