



CROSS CONNECTION CONTROL PLAN

For the City of Dover

State Approved:

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1. INTRODUCTION

In accordance with the requirements set forth by the Ohio Environmental Protection Agency. The City of Dover will refer to the State of Ohio cross-connection rules to protect the public water supply system. A cross-connection is defined as a connection or arrangement of piping or apparatuses through which a backflow could occur. Backflow is defined as the undesirable reversal of flow of water of questionable quality, wastes or other contaminants into a public water supply. The purpose of this program is to avoid contamination of the public water supply by preventing and eliminating cross-connections. It is The City of Dover's intent to carry out a comprehensive and effective cross-connection control program (CCCP) to ensure public health is protected and the requirements of the Ohio Environmental Protection Agency are complied with.

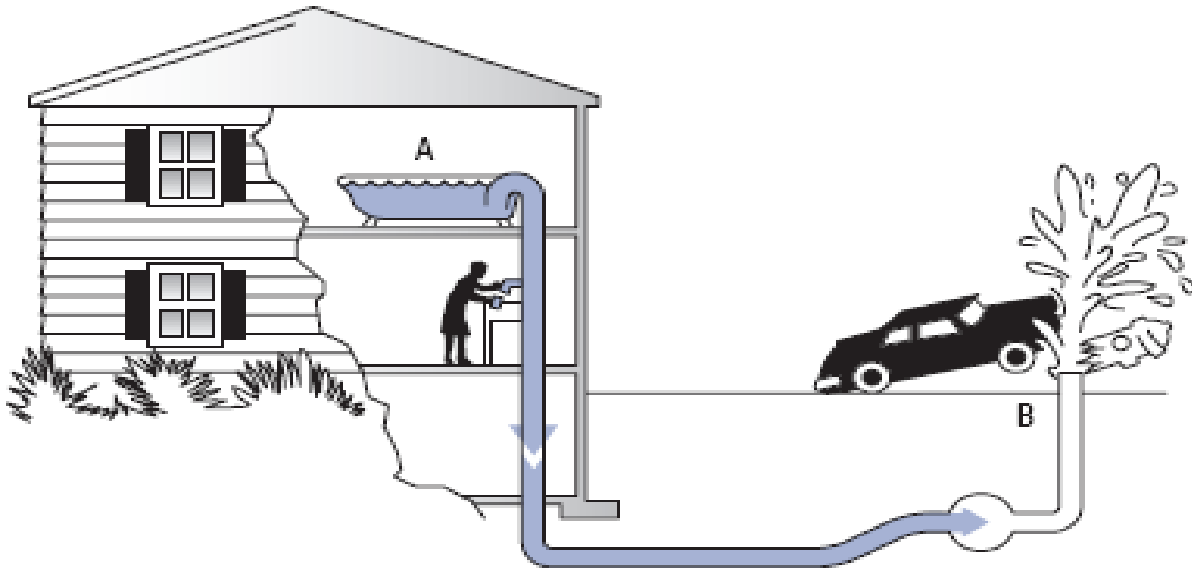
- Two basic types of backflow conditions exist. One is caused by the cross-connection of a public water system with another pressurized system (Backpressure). The other is caused by a vacuum from siphon action (Back Siphonage). It is obvious that when a second system's pressure is higher than the pressure in the public water system, the contents of the second system will be forced into the public water system. A closed valve or check valve in the system cannot be relied on to stop this flow. Valves are not watertight 100% of the time. Valves can develop leaks due to normal wear. A leaky valve may pose a risk to human health.
- The hazard created by a connection between two pressurized systems is compounded when the pressure in the public water system drops. The problem is further aggravated if the public water system develops a vacuum. Many circumstances can cause a drop in pressure or the development of a vacuum in a pressurized water system and these conditions do develop periodically and unexpectedly.
- A vacuum condition may develop in portions of a distribution system by high-volume water use or by a broken water main or an open fire hydrant. These vacuum conditions not only compound the problems between pressure systems but also may contaminate systems by allowing flow through any unprotected opening connected to the public water supply. Common examples include hose bibs or threaded faucets where a hose is attached.
- Many hazards can be found in industrial plants, factories, schools, hospitals or any location that is served by a public water system.

The following are some examples of cross-connections where conditions for potential back siphonage exist. Many of these can be found in homes.

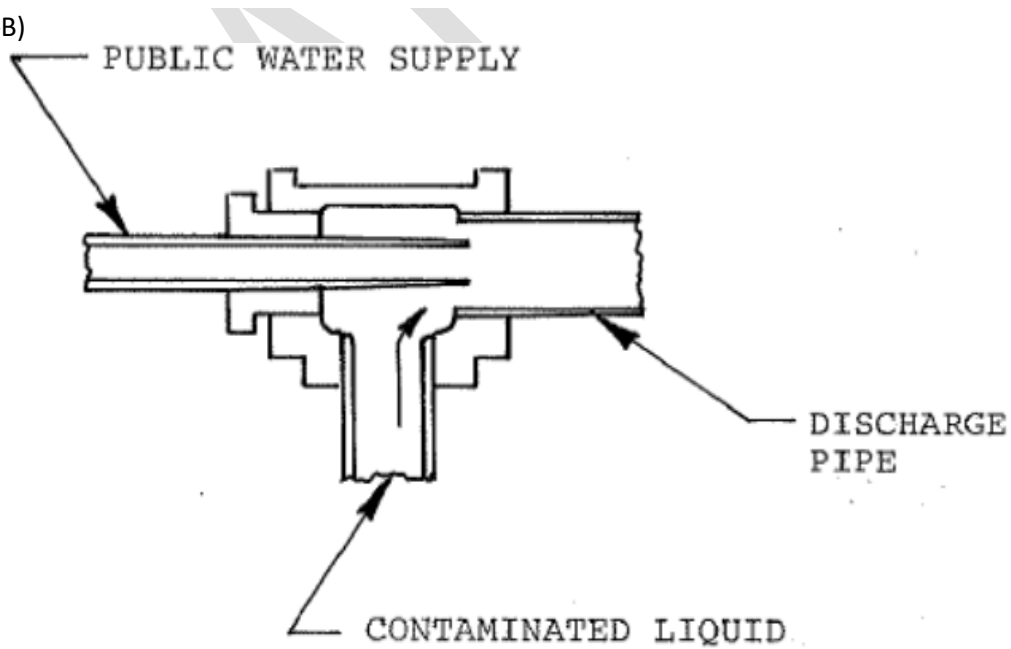
Many old commercial sinks, old soda fountains, old dishwashers and automatic laundry machines may have submerged water supply inlets. When the water supply inlet is located below the flood level rim of the basin and a vacuum occurs in the potable water supply, wastewater can be siphoned back into the potable or public water supply through open or leaking supply valves. This is also true for the old-style bathtubs, which have the fill spout below the flood level rim of the tub. A situation where a car runs into and breaks off a fire hydrant causing a sudden loss of water and low or negative pressure in the main line, can make it possible for contaminated water to back siphon from the tub into the public water supply.



Suction Tee or Aspirator Vats or containers used in industry are often emptied by means of suction tees, which are operated with the aid of water pressure from the public water system. If a vacuum should occur in the potable water supply line, then the liquid in the vats could be backsiphoned into the potable water supply and then into the public water system. Aspirators are also widely used by the medical profession and in mortuaries (Figures 13A, B and C).



(FIG 13A-B)



(FIG 13C)

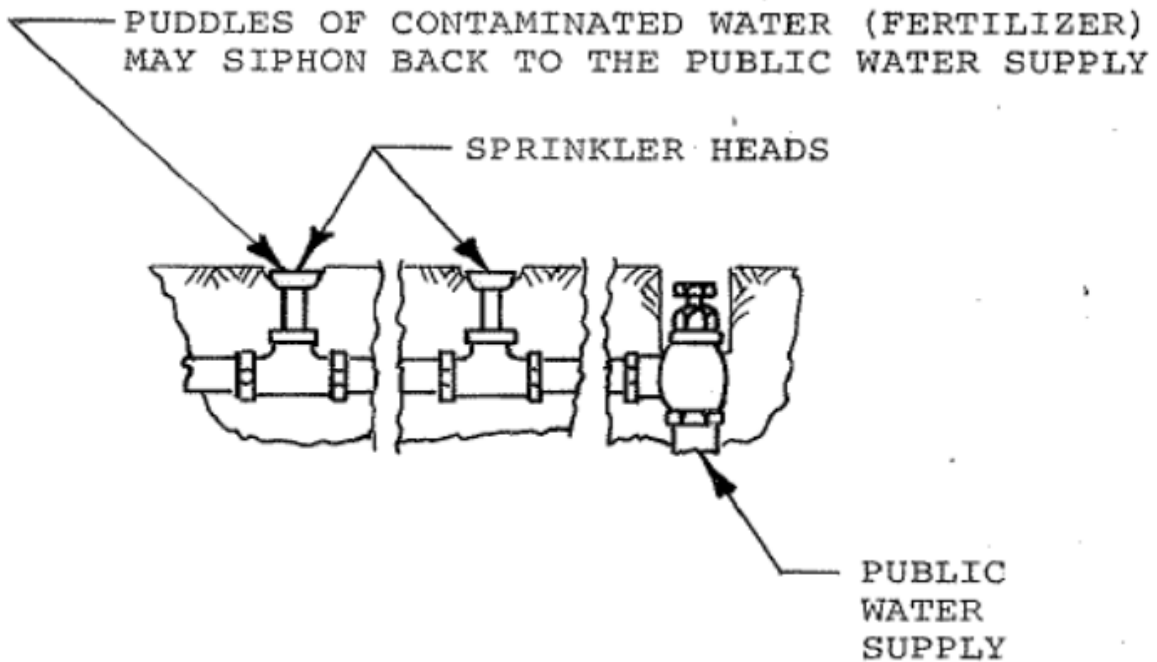


Cleaning fluids diluted and dispersed using water pressure. Type of aspirator at a dental office



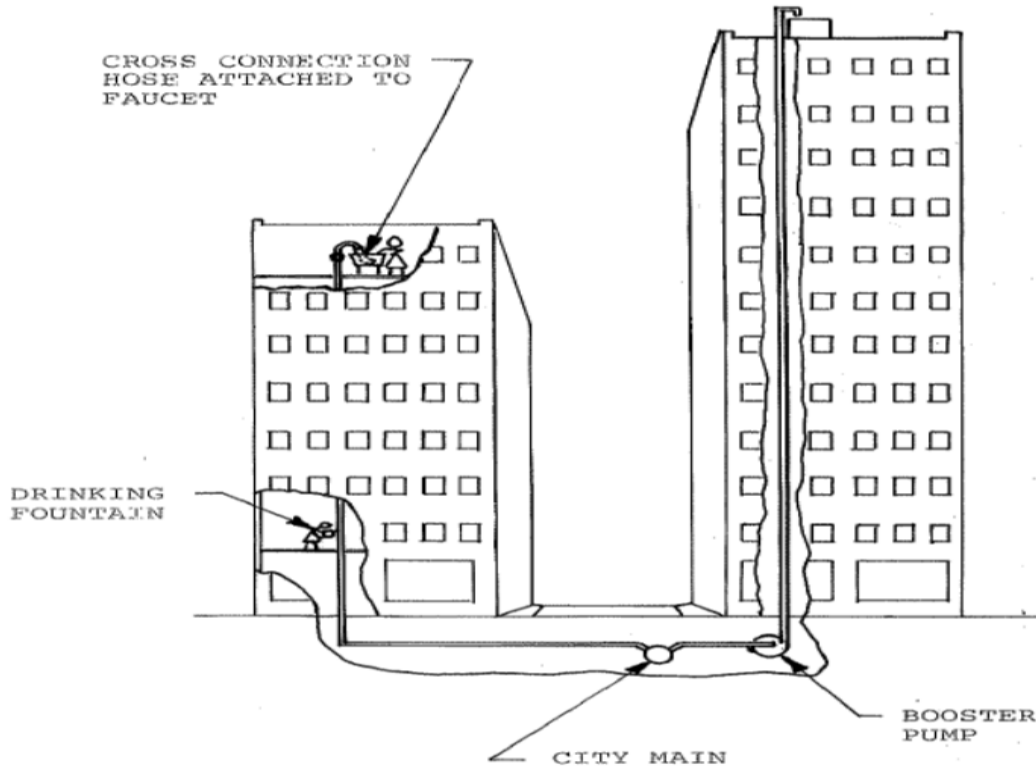
Lawn Sprinklers

Water that has been in contact with fertilizers, herbicides and/or pesticides may pond around the sprinkler heads of an irrigation system and may be drawn back into the potable or public water system.





Two adjacent multi-story buildings are connected to the same water main, which under high demand conditions lacks adequate pressure. The one building has installed a booster pump. When the pressure is inadequate in the main, the building's booster pump starts pumping which produces a low pressure in the main and causes a reversal of flow in the adjacent building. Again, any cross-connected fixtures can back siphon into lower floors and possibly into the city main.



To address the hazard associated with backflow of unwanted fluids or gases into the potable water supply through cross-connections, both within consumers' plumbing and the public water systems, a systematic approach must be taken. A cross-connection control program must be implemented to address these hazards. Aside from not creating cross-connections, two methods used to mitigate any hazards are to 'contain' any potential cross-connection hazards to the service connection to protect the public water supply and to 'isolate' cross-connections at individual fixtures to protect the consumer's water supply. Backflow prevention assemblies or devices are used to provide containment or isolation.



2. AUTHORITY

The responsibility for backflow prevention and cross-connection control rests jointly with the supplier of water, the water consumer, and the regulatory agencies. The regulatory agencies may include the Ohio Environmental Protection Agency, the Ohio Department of Commerce, the local health department, and the certified local building departments. Each has specific responsibilities and each must carry out its phase of a coordinated program to obtain cross-connection control.

Backflow prevention and cross-connection control may be divided into two areas of protection. One is backflow prevention for the protection of the public water system, which is the responsibility of the supplier of water. The other is cross-connection control for the protection of the consumer's potable water system, which is the responsibility of the customer-owner of the premises. The regulatory agencies have the basic responsibility of promulgating and enforcing laws and regulations for the protection of both the public water system and the consumer water system.

2.1. Inspector/Designated Agent

The City of Dover or Designated Agent (Authority/Agent) conducting inspections on behalf of The City of Dover must be designated/approved by The City of Dover. The Authority/Agent must meet both 1) an experience component and 2) a certification/training component. Acceptable components are as follows:

Experience

- Be employed by a Utility, Water Purveyor, Building Department, or body of jurisdiction and must meet the qualifications and training requirements as dictated by the Authority conducting inspections/surveys on behalf of The City of Dover.
- Have held a similar position (CCC Inspector) with a previous municipality
- Five years' full-time experience conducting cross-connection control inspections in commercial, institutional, and industrial facilities

Certification/Training

- The Ohio Department of Commerce (ODOC) licensed tester.
- Other approved cross-connection courses for surveying, as approved by the Authority for conducting inspections/surveys on behalf of the City/Township/Village. Submission requirements for approval must include the following:
 - Course outline
 - Date of attendance
 - Outline of test questions
 - Categories and grading criteria
 - Certificate of satisfactory completion



3. PROGRAM APPROACH

The Supplier of Water

The supplier of water has the primary responsibility for providing the consumer with a safe and potable water supply. This responsibility begins at the source, includes all the public water distribution system and ends at the point of delivery to the consumer, which is typically at the curb box valve. In the exercise of this responsibility, the supplier of water must use reasonable care and vigilance to protect the public water system from hazards originating on the consumer's premises that could contaminate the water in the public potable water system. The responsibilities of the supplier of water in a backflow prevention program may be divided into four functions:

1. The supplier of water must conduct or cause to be conducted periodic surveys of the consumer's water system to determine the degree of hazard to the public water system.
2. The supplier of water must determine the degree of hazard to the public water system for new water service installations. This can be achieved by reviewing all plans for new installations prior to their construction to determine the degree of hazard to the public water system and by performance of site inspections during construction or immediately thereafter.
3. When the supplier of water finds that there are uncontrolled cross-connections on the premises or that the consumer is operating his/her system in a manner that could adversely affect the public water system, the supplier of water must require the consumer to eliminate the hazard or to adequately protect the public water system against possible backflow by the installation of suitable containment backflow prevention assemblies at each service connection to the premises.
4. The supplier of water is responsible for requiring the consumer to prove that the backflow prevention assemblies are maintained by the water consumer in proper working order.

The Water Customer

The water consumer has the dual responsibility of protecting the water users on his/her own premises and of protecting the quality of water in the public water system from contamination originating from conditions on his/her premises. This responsibility begins at the point of delivery to the premises and includes the entire consumer's water system.

To fulfill this responsibility, the water consumer must use reasonable care and vigilance to protect the public water system and consumer's water supply from contamination originating on the premises.

The water consumer is liable for any installation on his/her premises that could endanger the quality of the public or consumer's water supply. The consumer may supposedly use the water as he/she sees fit on his property, but he/she has no right to maintain any condition that could permit contamination to backflow into his/her own water supply or to reach the public water system through service connections to his/her property.

The responsibilities of the water consumer in a backflow prevention and cross-connection control program may be divided into five functions:



1. The water consumer should conduct or cause periodic surveys of the water system to be conducted on his/her premises to determine if there are cross-connections, actual or potential.
2. The water consumer should study all plans for new piping installations to determine the degree of hazard to the potable water supply and should inspect the complete piping installations to ensure that the system is free of cross-connections.
3. When the water consumer finds that, there are cross-connections on the premises or that the consumer's water system is being operated in a manner that could adversely affect the consumer's water supply, he/she should either eliminate the hazards or adequately protect the potable water system against backflow by the installation of backflow prevention isolation devices or containment assemblies.
4. The water consumer should protect the consumer's potable water system by compliance with plumbing regulations.

The water consumer is responsible for maintaining all backflow prevention assemblies in proper working order and for reporting to the supplier of water the tests and maintenance performed

The Regulatory Agencies

The regulatory agencies are responsible for enforcing laws, rules and regulations on backflow prevention and cross-connection control. This responsibility is exercised by:

1. **Establishing laws, rules and regulations for the protection of the public water system and the potable water system from the hazards of cross-connections.**
2. **Requiring plans for new or altered plumbing installations and public water supply systems to be submitted.**
3. **Inspecting plumbing installations and public water supply systems to determine compliance with state and local laws, rules, and regulations; and**
4. **Requiring the supplier of water and the water consumer to establish an effective backflow prevention and cross-connection control program.**

In the State of Ohio, backflow prevention and cross-connection control is a divided responsibility. No single agency has complete authority or responsibility from the source to the sewer. The State regulatory agencies involved in backflow prevention and cross-connection control are the Ohio Department of Commerce and the Ohio Environmental Protection Agency.

Housed within the Ohio Department of Commerce, the Ohio Board of Building Standards (OBBS) is responsible for formulating and adopting rules governing the construction, repair, alteration and maintenance of buildings, including plumbing for non-residential and residential buildings. Such rules are applicable throughout the state and cover all homes and all public, commercial and industrial buildings. The OBBS is also responsible for the certification of building departments that enforce the plumbing code and for the certification of personnel that work in or for the building departments, including plumbing inspectors. The Department of Commerce's Division of Industrial



Compliance, plumbing section, is charged with the responsibility of enforcing the rules adopted by the Ohio Board of Building Standards in state owned buildings and non-residential buildings where there is no certified local building department or local health district enforcing the plumbing code rules adopted by the OBBS.

For residential buildings (one-, two-, and three-family dwellings), the OBBS adopted residential plumbing rules are applicable statewide. However, the rules are only enforced in areas where the local government has chosen to pursue certification for its building department to enforce the residential plumbing rules or where there is a local health district enforcing the residential plumbing rules.

The plumbing enforcement authorities are responsible for inspecting the consumer's water system on the premises to ensure that cross-connections have the appropriate backflow prevention. They inspect the consumer's potable water system, share the liability with the owner, and building design professional in the protection of the internal water distribution system. The plumbing inspection authorities inspect all new construction and review plans for plumbing permits to ensure that no new cross-connections are installed without the appropriate protection.

☒☒The Ohio Environmental Protection Agency has the responsibility for both adopting rules regarding public water systems and for providing general supervision of public water systems. These rules include cross-connection control and backflow prevention for the protection of the public water supply. The supplier of water is responsible for ensuring compliance with these rules.

Although the supplier of water may have no direct authority over the consumer's water system, the supplier of water is required to conduct surveys and investigations of the consumer's premises to determine if a consumer's water use practices pose a backflow hazard and if cross-connections exist that must be mitigated. In addition to the dwelling, the supplier of water needs to consider water use outside a dwelling, which is still considered part of the consumer's premises. The supplier of water must implement a backflow prevention program to protect the public water supply from contamination. This program includes requiring the consumer to install a backflow preventer when a hazard has been identified and to correct an auxiliary water system cross-connection, to receive service from the public water supply.

In general, and usually depending upon the location of the meter, the Ohio Department of Commerce Division of Industrial Compliance plumbing section has authority for planning review and inspection of plumbing systems within the building. The Ohio EPA and the supplier of water have authority up to the water meter or main shutoff inside the building, and over all auxiliary water supplies no matter where they are connected to the consumer's water system.



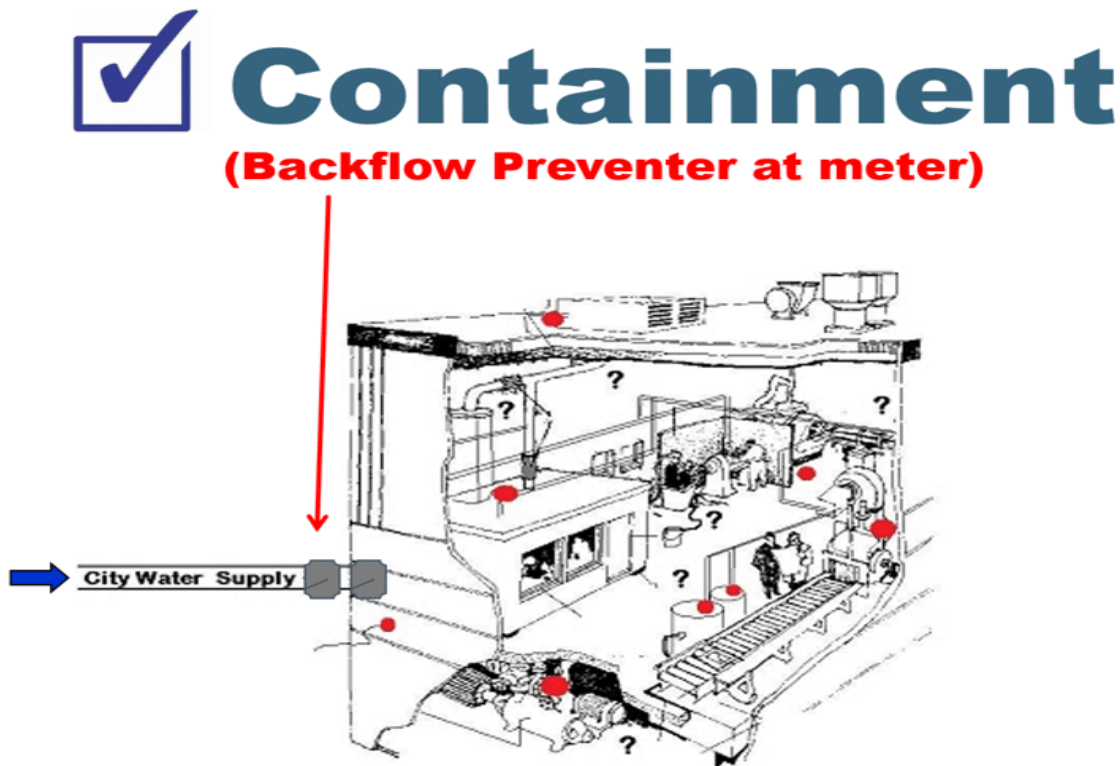
Types of Protection

The following figure provides an illustration depicting typical jurisdictional boundaries. The local building department, local health department or Ohio Department of Commerce's Plumbing Section use the isolation principle of backflow prevention to protect the consumer's water system. The water supplier uses the containment principle of backflow prevention to protect the public water supply from backflow.

Containment

The installation of an approved backflow prevention assembly on the consumer's service connection to protect the public water system from possible contamination is known as containment.

A procedure known as "control by containment" involves the installation of a backflow prevention assembly on the consumer's supply line. Such an installation may be required by the supplier of water when, in the opinion of the supplier of water, additional protection of the public water supply system is required. Certain types of facilities are required by rule to install such containment backflow prevention assemblies on the service connection. The use of such an assembly does not eliminate the requirements for individual fixture devices or "air gaps" which isolate the cross-connection at the possible source of contamination or the consumer's responsibility to prevent the installation of illegal cross-connections. An evaluation of water uses practices at a facility, as well as the isolation devices in place, are integral in determining the level of protection and type of backflow preventer necessary for containment purposes.



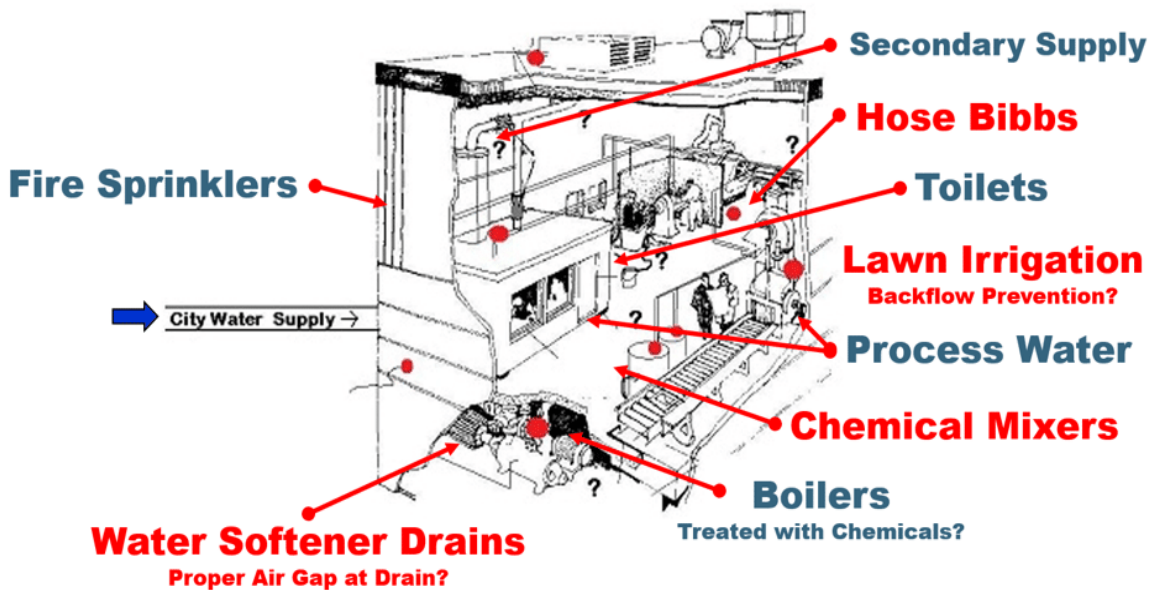


Isolation

While the installation of a backflow prevention assembly on the consumer's service line will protect the public water system, it will not protect those persons within the plant or building who drink the water. To protect those persons within the plant or building, the containment concept can be utilized within the consumer's water system by isolating portions of the plumbing. The consumer may install a backflow prevention device on the water line leading to those portions of his/her plant or building where there are actual or potential hazards to the potable water supply. In some large plants, devices might be installed on several such branches. The concept of containment within a plant or building is very important since, in a large installation, several thousand people might be employed. Installation of a device to address a cross-connection at the point of possible contamination within the plumbing is referred to as an isolation device.

Isolation

(Backflow Prevention at points of use)





BACKFLOW PREVENTION AND CROSS-CONNECTION CONTROL PROGRAM

A backflow prevention and cross-connection control program requires the full cooperation of the supplier of water, the water consumer, the plumbing and health inspection authorities and the other regulatory agencies. Each share, to some degree, the responsibility for protecting the health and safety of individuals and the public from the hazards of contaminated water.

All public water supply systems, large and small, shall have a backflow prevention program. This program must include the following segments:

1. An initial survey and inventory of hazards at existing installations.
2. The inspection of new installations for hazards.
3. Installation of backflow preventers acceptable to the degree of hazard identified.
4. Periodic surveys and re-inspections to detect new hazards and to verify improvements or the lack of improvement.
5. A maintenance and testing program for backflow prevention assemblies/devices.
6. An enforcement program to see that hazards are eliminated.
7. Records. Surveys and inventory of hazards, backflow preventer installations and test results must be maintained by the consumer and the supplier of water.



4. INSPECTIONS

A survey and on-site investigation must be conducted on the consumer's premises to determine the hazard to the public water system. The survey must determine:

1. The water is used on the consumer's premises.
2. The existence of cross-connections.
3. The existence of any auxiliary water supplies.
4. The use or availability of any pollutants, contaminants or other liquid, solid or gaseous substances.

The scheduling of surveys and on-site investigations should be prioritized based on known hazards and the degree of hazard associated with certain industries and buildings.

Operational Procedures:

Prepare a Street and Area Map - This map should show property lines, street locations, street names and numbers, the location and size of street water mains and the location, number and size of each of the water services and meters.

Prepare Field Survey and Investigation Sheet - The field survey and investigation sheet should show the meter number and size, the location and type of backflow prevention assemblies, the owner's name and address, and other pertinent data.

Contact the Owner - Contact the owner or manager of the premises to inform him/her why it is necessary to survey and investigate his/her water uses and in-plant water system. The owner should be informed of the relationship between cross-connections and water-borne diseases; the types of health hazards and cross-connections normally found in this type of operation; the methods for cross-connection control and elimination; the duties and liabilities of the owner; and the laws; regulations, rules and policies relating to water use and the cross-connection control program. Permission to conduct the survey and investigation should be obtained. The owner should be asked to participate in the survey and investigation or to furnish a competent engineer or supervisor who is familiar with the water system. The owner's blueprints, when such are available, may be helpful. In every case the information provided by the owner must be field checked during the survey and investigation.

Make a Survey and On-site Investigation of the Premises - A survey and on-site investigation should be conducted of exposed piping. The underground system should be checked as accurately as possible. A sketch should be made of the in-plant water system. Each water line should be followed to its end and a survey made to determine whether there are actual or potential cross-connections or conditions that might tend to contaminate the potable water system.



Prepare a Summary of Findings - The individual performing the survey and on-site investigation should prepare a list of all cross-connections found and recommend methods for their elimination or control. The recommendations must be practical and realistic.

CONTROL OF NEW INSTALLATIONS

Backflow prevention and cross-connection control for new installations must be addressed and should be accomplished by a combination of plan reviews and field inspections.

Plans for new installations should be evaluated prior to construction to determine the degree of hazard to the potable water system.

Field inspections during or immediately after construction will serve to identify hazards that were not apparent during plan reviews or were introduced during construction.

The regulatory agency having jurisdiction is responsible for field inspection to determine compliance with plumbing regulations.

When a continuous supply is deemed necessary for industrial or fire protection purposes, plans for inter-connections to auxiliary water supplies as a secondary source must be submitted to the supplier of water and to the Ohio Environmental Protection Agency for review and approval before such connections are installed. The connections are only allowed for industrial use with an approved interchangeable connection for continuous supply, but not a simultaneous supply, from both sources. Connections for fire protection are permitted if the water supply is only used for the fire protection system and the potable water supply is protected with an acceptable backflow prevention assembly on the service line to the fire protection system and at the service connection.

Plans for the installation of backflow prevention assemblies for the purpose of containment must be submitted to the supplier of water for review and approval.

An effective program for the control of new installations requires cooperation between the supplier of water, the water consumer, and the regulatory agencies.

GUIDELINES FOR INSTALLATION OF BACKFLOW PREVENTION ASSEMBLIES

The guidelines for the installation of backflow prevention assemblies can be summarized as follows:



1. The assemblies should be installed between 12 and 30 inches above the finished floor. Assemblies installed higher than 30 inches above a floor should be provided with a service platform and access ladder or stairs.
2. The installation of the assembly should allow for at least 12 inches clearance behind the assembly and at least 48 inches of clearance in front of the assemblies.
3. If the assembly is to be installed in the enclosure, the enclosure should have a ceiling height of at least 6.5 feet to allow for standing room while servicing the

INSPECTION AND MAINTENANCE OF BACKFLOW PREVENTION ASSEMBLIES

Regular inspection, testing and maintenance of backflow prevention assemblies and appropriate records of the results of these tests are essential parts of a backflow prevention program.

The water consumer is responsible for maintaining the backflow prevention assemblies and devices in proper working order. This requires frequent inspections of all backflow prevention devices, periodic testing of vacuum breakers, double check valve assemblies and reduced pressure principal backflow prevention assemblies. Records of inspections, testing, and repairs must be maintained as evidence of having met this responsibility.

The water consumer is responsible for reporting to the supplier of water the operating status of the backflow prevention assemblies installed on the consumer's water system. The method must be inspected, or the assembly must be tested by an individual acceptable to the public water system. A complete record of each method or assembly must be maintained by the water consumer. This shall include a comprehensive log from purchase to retirement of all tests, inspections and repairs.

Air Gap Devices - All air gap devices must be inspected at least every 12 months to determine that they have not been bypassed.

Pressure Vacuum Breakers - All pressure vacuum breakers must be tested at least every 12 months for evidence of mechanical failure and for proper installation.

Double Check Valve Assemblies - All double check valve assemblies must be tested before they are placed in service. The frequency of testing shall be a maximum of twelve (12) months between tests. If the test shows that leakage occurs, the assembly must be dismantled, internally inspected and repaired immediately.

Reduced Pressure Principal Backflow Prevention Assemblies - All reduced pressure principal backflow prevention assemblies should be observed periodically for evidence of leakage through the relief valve port.



They must be tested at the time they are placed in service or repaired, and at least every twelve months thereafter. More frequent tests may be required where the assembly shows evidence of deterioration due to water quality, operating conditions, age or other causes. If continued dumping of water occurs the assembly shall be immediately dismantled, inspected internally, and repaired or replaced by a new or rebuilt unit.

Interchangeable Connections - All interchangeable connections must be inspected at least every 12 months to determine that they have not been improperly modified and that no piping connection has been made to the tell-tale port of a four-way valve.

Booster Pump Low Suction Pressure Cut-off Devices, Low Suction Throttling Valves and Variable Speed Suction Limiting Controls - All booster pump low pressure cut-off devices, low suction throttling valves and variable speed suction limiting control systems, must be inspected and tested for proper operation at the time of installation and at the time of installation and at least every 12 months thereafter.

FREQUENCY OF REINSPECTION

Ohio EPA regulations require that periodic surveys and investigations of water use practices within a consumer's premises be conducted to determine whether there are actual or potential cross-connections to the consumer's water system through which contaminants or pollutants could backflow into the public water system. Such actions are necessary to ensure the proper containment backflow preventer is in place for the water use practices at the service connection. New and existing service connections need to be under this program.

An onsite investigation must be conducted for all service connections likely to have a pollution, system, health or severe health hazard, every five years. The supplier of water may document, in writing, a different methodology to identify, on an on-going basis, changes in water use practices at consumer premises that potentially or, represent a new or increased hazard to the potable water supply. This methodology could include survey questionnaires filled out by the consumer or supplier of water or include triggers to identify water use practices and hazards likely. Triggers may include notification from other local licensing agencies typically involved when a change in water use practice occurs, such as building, zoning, health or fire protection or those which are under the jurisdiction of the supplier of water including, a new or additional meter request or a new or additional service line. A survey or trigger indicating a likely water use practice that would result in the need for additional or higher levels of backflow prevention must be followed up with an on-site investigation to ensure the hazard has been adequately addressed. For residential premises, without a likely hazard, an ongoing educational campaign,



in accordance with OAC Rule 3745-95-03 can be used to fulfill the rule requirement for periodic surveys and investigations.

RECORDKEEPING

The supplier of water must maintain comprehensive records to support their due diligence in carrying out the requirements of a backflow prevention and cross-connection control program. Such records include reports of surveys and investigations conducted and required backflow preventer installations for as long as they remain relevant. Forms outlining testing results, inspection or related repairs to required backflow preventers must be maintained. These forms must be kept for a minimum of a rolling five-year period and should be kept for the service life of the backflow preventer to provide a history of performance. Records should facilitate recalling the hazards onsite, locating backflow prevention device installations and verifying the make and model numbers of containment devices. Pictures and drawings gathered at the time of the survey are helpful.

QUALIFICATIONS FOR INDIVIDUALS WHO OVERSEE A BACKFLOW PREVENTION PROGRAM AND TEST BACKFLOW PREVENTERS

The individual in charge of a backflow prevention program at a public water system must either be the 'operator of record' or under the authority of the 'operator of record'. Ohio EPA recommends that an individual in charge of a backflow prevention program has successfully completed a training course about backflow prevention theory and containment backflow prevention assembly testing procedures.

The Ohio Department of Commerce (ODOC) is the state's licensing agency for backflow prevention device testers and Ohio EPA recommends that an ODOC certified tester provide for testing of containment assemblies under the public water system's jurisdiction.

Individuals should meet the criteria for eligibility to take the certification exam which includes holding a minimum of a Class 1, Ohio EPA Water Treatment Operator, or Water Distribution System Operator, license and have five years' experience in water distribution, or as specified under the ODOC rules. Individuals tasked to test isolation devices within plumbing systems will have to meet the requirements outlined in the ODOC Division of Industrial Compliance regulations regarding plumbing found in OAC Rule 1301:3-7-02 and ORC 3703.21.

In addition, if a backflow prevention assembly is installed within a fire protection system, the tester may also have to have certification from the state fire marshal to test and repair the backflow prevention assembly. Typically, the location of the backflow preventer will dictate who the qualified tester is. It is recommended that the water purveyor consult with the state fire marshal to ensure that the installer is certified when a fire suppression system may be impacted. It is also recommended



that the pressure loss through the backflow prevention assembly has been accounted for in the design of the suppression system.

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4 APPLICATION OF BACKFLOW PREVENTERS

Unfortunately, all backflow preventers that are used for the control of backflow are limited in their ability to provide protection from backflow. It is important that the limitations of each backflow preventer be understood since the degree of protection provided will depend on the type of backflow preventer and the maintenance program employed.

There are two types of mechanical backflow preventers to choose from, assemblies and devices. Assemblies are backflow preventers that have test cocks and shut-off valves enabling them to be tested inline. Backflow devices are not designed for field testing and the standards for assemblies and devices differ.

Ohio EPA requires the use of assemblies to satisfy regulatory requirements. Ohio EPA requires these backflow preventers to be of a type that has been investigated and approved by the supplier of water and that meets the rule requirements. Ohio EPA requires these assemblies to be used for containment purposes. These assemblies are usually installed just beyond the meter to contain any contamination and prevent it from entering the public water supply distribution system.

The plumbing code rules adopted by the Ohio Board of Building Standards prescribe the type of backflow preventers to be used for isolation purposes within buildings. These backflow preventers act to isolate any contamination to a fixture or portion of plumbing.

Backflow prevention can be approached through the application of the following:

1. Air gap
2. Backflow prevention assemblies
3. Backflow prevention devices
4. Specific valving and/or piping configurations.

The following table outlines acceptable backflow protection for certain types of cross-connection conditions that may be encountered. The table is to be used as a guideline in determining adequate cross-connection control measures, not as an absolute requirement, see Appendix G for sample installation schematics.

Backflow Preventer Type	Degree of Hazard	Application	Applicable Standard
Backflow prevention assemblies:			
Double Check Valve Assembly (DCV)	Low hazard	Backpressure or backsiphonage	ASSE 1015, AWWA C510, CSA B64.5, CSA B64.5.1
Double Check Detector Assembly (DCDA)	Low hazard	Backpressure or backsiphonage	ASSE 1048
Pressure Vacuum Breaker Assembly (PVB)	High or low hazard	Backsiphonage	ASSE 1020, CSA B64.1.2
Reduced Pressure Principle Backflow Prevention Assembly (RPBP)	High or low hazard	Backpressure or backsiphonage	ASSE 1013, AWWA C5411, CSA B64.4, CSA B64.4.1



Reduced Pressure Detector Assembly (RPDA)	High or low hazard	Backsiphonage	ASSE 1047
Spill-resistant Vacuum Breaker Assembly (SVB)	High or low hazard	Backsiphonage	ASSE 1056
Backflow prevention devices:			
Antiphon-type Fill Valve (FV)	High hazard	Backsiphonage	ASSE 1002, CSA B125.3
Atmospheric Vacuum Breaker (AVB)	High hazard	Backsiphonage	ASSE 1001, CSA B64.1.1
Backflow Preventer for Carbonated Beverage Equipment (VMBP)	Low hazard	Backpressure or backsiphonage	ASSE 1022
Backflow Preventer with Intermediate Atmospheric Vent (VDCV)	Low hazard	Backpressure or backsiphonage	ASSE 1012, CSA B64.3
Dual Check (DC)	Low hazard	Backpressure or backsiphonage	ASSE 1024, CSA B64.6
Hose Connection Backflow Preventer (HCBP)	High or low hazard	Low head backpressure or backsiphonage	ASSE 1052, ASME A112.21.3, CSA B64.2.1.1
Hose Bibb Vacuum Breaker (HBVB)	High or low hazard	Low head backpressure or backsiphonage	ASSE 1011, ASME A112.21.3, CSA B64.2, CSA B64.2.1
Anti-frost Hoe Bibb Vacuum Breaker	High or low hazard	Low head backpressure or backsiphonage	ASSE 1011, ASME A112.21.3, CSA B64.2, CSA B64.2.1
Lab Faucet Vacuum Breaker (LFVB)	High or low hazard	Backsiphonage	ASSE 1035, CSA B64.7
Backflow Preventer Type	Degree of Hazard	Application	Applicable Standard
Backflow prevention devices:			
Vacuum Breaker Wall Hydrants (HBIVB)	High or low hazard	Low head backpressure or backsiphonage	ASSE 1019, ASME A112.21.3, CSA B64.2.2
Other means or methods:			
Air Gap (AG)	High or low hazard	Backsiphonage	ASME A112.1.2
Air Gap Fittings for use with Plumbing Fixtures, Appliances and Appurtenances	High or low hazard	Backsiphonage	ASME A112.1.3
Barometric Loop	High or low hazard	Backsiphonage	



There should never be a negative pressure in a water supply piping system. Unfortunately combinations of events and circumstances sometimes are such that low or negative pressure may occur. Plumbing fixtures represent cross-connection hazards which must be mitigated through the use of isolation devices or methods to protect against backflow through backsiphonage.

Rule 4101:3-6-01, Section 608 of the Ohio Administrative Code covers acceptable methods to be used in preventing backflow from plumbing fixtures for protection of the potable water supply. The local building departments, local health departments, or the Division of Industrial Compliance generally have jurisdiction over plumbing downstream of the service connection (and required meters and containment backflow prevention assemblies). The type of isolation device and level of protection required is outlined in the plumbing code. Acceptable methods of protecting water supplies from backflow from plumbing fixtures and similar storage containers include:

☒☒ Method A – Air Gap Separation – The preferable method for all installations is an air gap separation where the water supply discharge is above the flood rim of the fixture or equipment as described by the American National Standards Institute Standard A112.1.2 under the conditions of Rule 4101:3-6-01, Section 608.13.1 of the Ohio Administrative Code.

☒☒ Method B – Pressure Type Vacuum Breaker – Where the use of an air gap is not possible, or may be circumvented, the use of a pressure type vacuum breaker meeting American Society of Sanitary Engineering Standard 1020 or Canadian Standards Association B64.1.2 under the conditions of Rule 4101:3-6-01, Section 608.13.5 of the OAC is satisfactory.

☒☒ Method C – Atmospheric Type Vacuum Breaker – When neither Method A nor B protection (as indicated above) is practical, an atmospheric type vacuum breaker meeting ASSE Standard 1001 or CSA B64.1.1 under the conditions of Rule 4101:3-6-01, Section 608.13.6 of the OAC may be installed on the discharge side of the manually controlled valve used to control the discharge of water to the fixture or equipment.

☒☒ Method D – Double Check Valve Assembly or Reduced Pressure Principle Backflow Prevention – When none of Methods A, B or C protection (as indicated above) is practical, a double check valve assembly meeting ASSE Standard 1015, CSA B64.5 or AWWA C510, or a reduced pressure principle backflow prevention device meeting ASSE Standard 1013, CSA B64.4 or AWWA C511 respectively, may be installed under the conditions of Rule 4101:3-6-01, Section 608.13.2 and Section 608.13.7 of the OAC.

APPROVED BACKFLOW PREVENTERS FOR CONTAINMENT

Ohio EPA Division of Drinking and Ground Waters now recognizes an “approval by rule” process for acceptable backflow prevention for containment

A backflow prevention air gap or assembly is approved for use as containment provided:

1. The backflow prevention air gap or assembly is certified against one of the standards listed in OAC Rule 3745-95-06, and
2. It is acceptable to the supplier of water.



Ohio EPA no longer maintains a list of approved devices. The manufacturer and/or supplier of the backflow preventer will be able to provide a copy of a certificate from one of the accredited testing agencies indicating the assembly has met one of the listed standards for the particular make, model, size and installation type (horizontal and/or vertical).

AIR GAP SEPARATION An air gap separation provides a complete physical separation between the potable water system and a non-potable system. The removal of the cross-connection by means of an air gap separation is the preferred means of preventing backflow as long as the air gap has been properly installed and maintained

Minimum Air Gap

An air gap is measured vertically from the lowest end of a potable water outlet to the flood rim or highest possible water level of the tank or receiving basin into which it discharges.

Where the potable water outlet terminates above the rim of a tank or receiving basin, the minimum air gap must be at least twice the effective opening of the potable water outlet or one inch, whichever is greater, and at least the minimum distance shown in table below. Effective opening refers to the actual opening size at the discharge location. If not round, the diameter is determined by taking the minimum cross-sectional area at the point of potable water supply discharge and expressing it in terms of the diameter of a circle.

Where the potable water outlet is above the spill rim but adjacent to a sidewall, the minimum air gap shall be as indicated in Table 1, which should represent the Ohio plumbing code requirement.

Minimum Air Gaps For Potable Water Outlets

Outlet Size

Minimum Air Gap	
	When not Affected
	Near Wall (*)
	(Inches)
	When Affected
	By Near Wall (**)
	(Inches)

Lavatories with effective openings not greater than 1/2 inch diameter

1.0 1.5

Sinks, laundry trays, and gooseneck bath faucets with effective openings not greater than 3/4 inch diameter

1.5 2.25

Over-rim bath fillers with effective openings not greater than 1 inch diameter

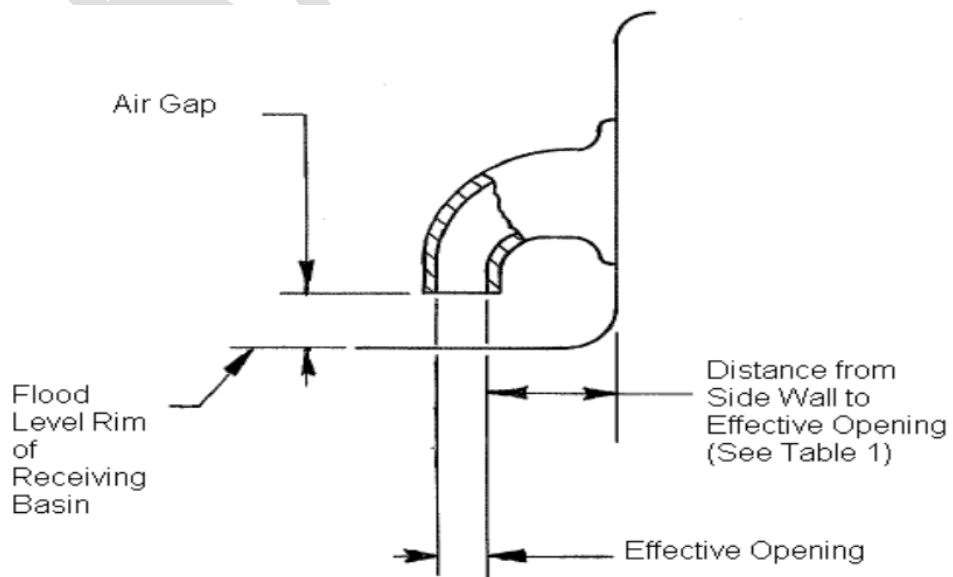
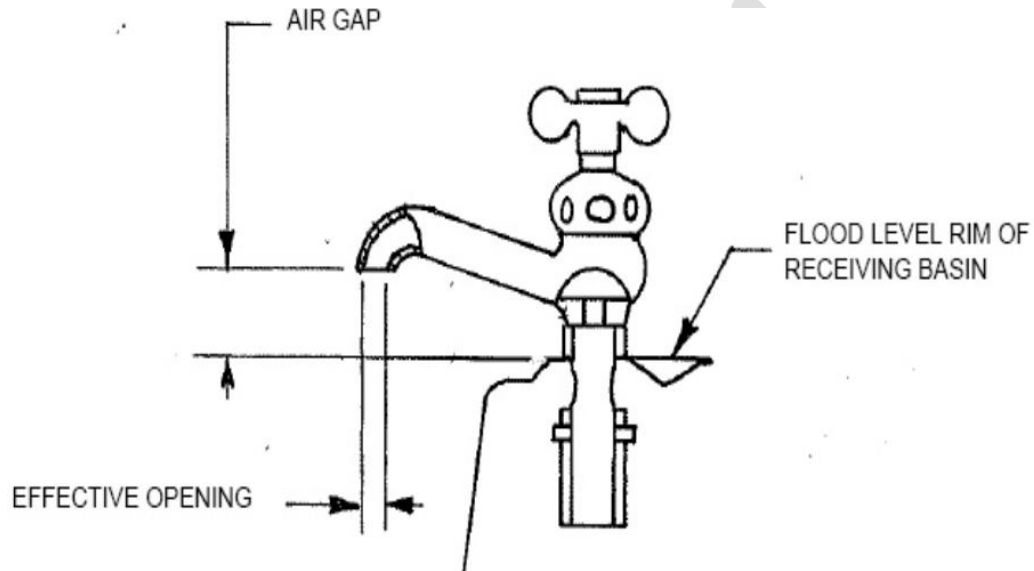
2.0 3.0

Effective openings greater than 1/2 inch 2X Diameter of effective openings 3X Diameter of effective openings



* Side walls, ribs or similar obstructions do not affect air gaps when spaced from inside edge of spout opening a distance greater than three times the diameter of the effective opening for a single wall, or a distance greater than four times the diameter of the effective opening for two intersecting walls.

** Vertical walls, ribs, or similar obstructions extending from the water surface to or above the horizontal plane of the spout opening require a greater air gap when spaced closer to the nearest inside edge of spout opening than specified in (*) above. The effect of three or more such vertical walls or ribs has not been determined. In such cases, the air gap shall be measured from the top of the wall.

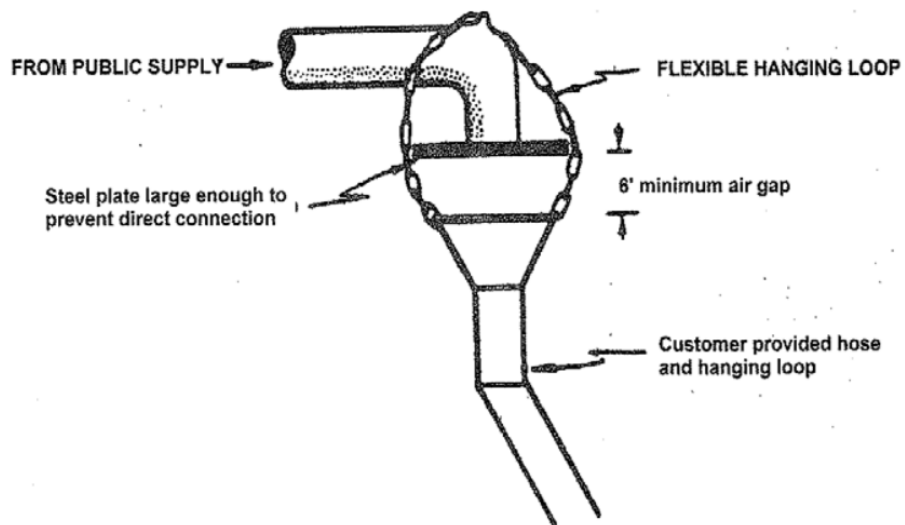
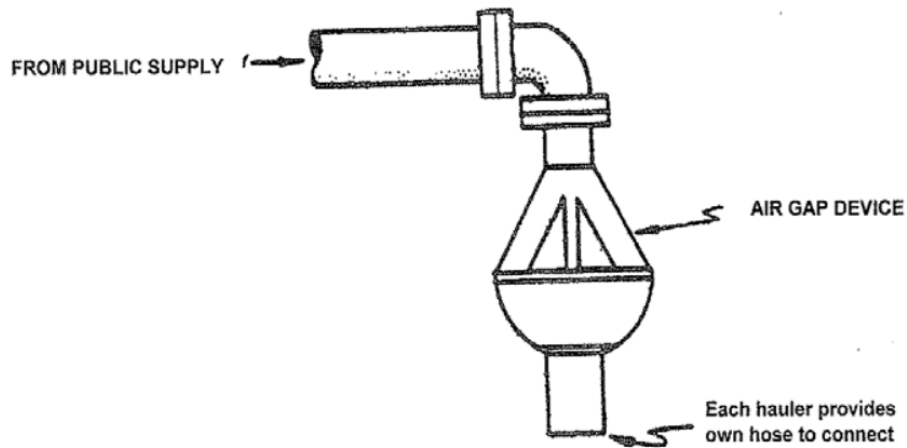




Water Loading Station Air Gap Devices

Figure shows two types of air gap devices that are acceptable for use at water loading stations where water hauling tank trucks are filled from the potable water system. It is important that each water hauler provides their own filling hose to prevent cross-contamination among tank trucks.

Figures 22A and 22B show the application of an air gap device at a water loading station.





Example of acceptable water loading station air gap device and filling line at water loading station. Shared hose connection is discouraged due to risk of cross-contamination.

ASSESSING SEVERE HEALTH HAZARDS AND USE OF AIR GAP ISOLATION IN DETERMINING LEVEL OF CONTAINMENT

Ohio EPA regulations require that a severe health hazard be protected by placing an air gap at the point of connection to the public water system. A public water purveyor may determine that the installation of a reduced pressure principal backflow prevention assembly (RP) at the service connection is sufficient mitigation of a severe health hazard if an air gap is also established at the point of isolation of the severe health hazard process. Such a decision would allow water pressure to be maintained to the service connection for other water use practices while isolating the severe health hazard process from the rest of the customer's water system and the public water distribution system. An understanding between the customer and the public water purveyor must be in place such that at the time the containment device, or RP, is tested, a certification that the air gap is still maintained must also be made. Both test results and air gap certification must be submitted to the public water system every 12 months.



BACKFLOW PREVENTION ASSEMBLIES

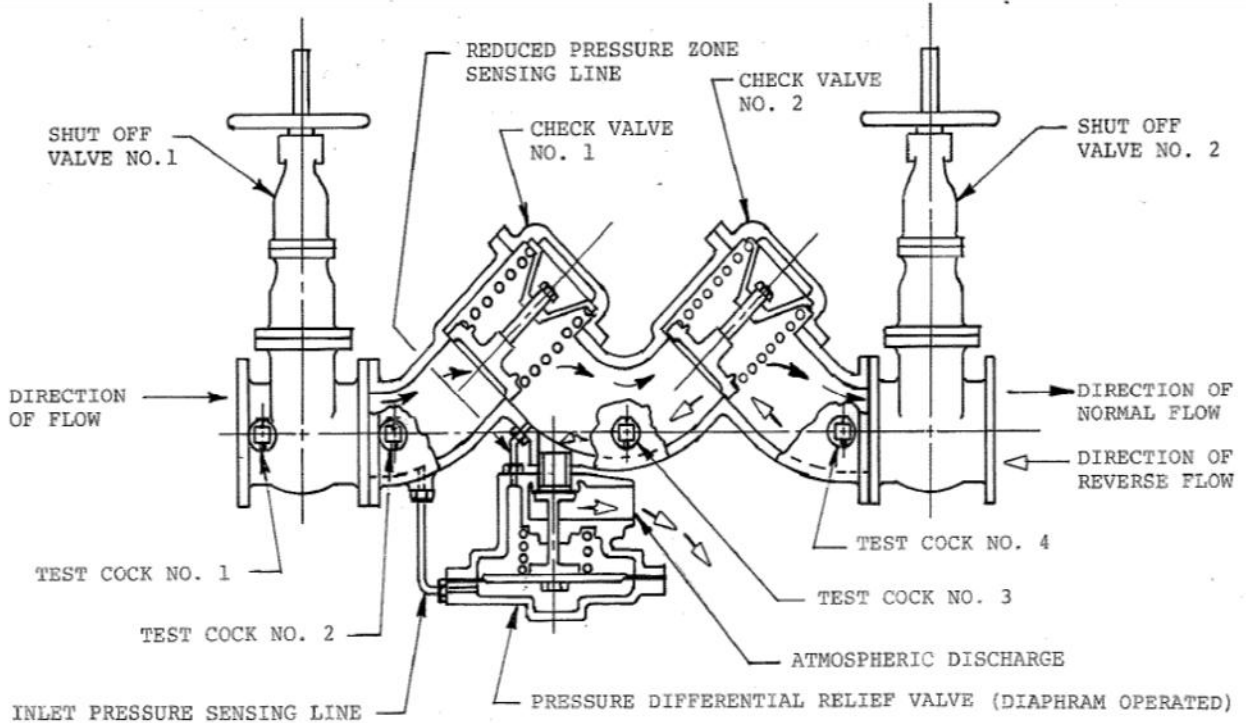
Reduced Pressure Principal Backflow Prevention Assemblies and Reduced Pressure Principal Detector Assemblies

The reduced pressure principal backflow prevention assembly consists of two spring-loaded check valves operating in series, and a spring-loaded/diaphragm-activated differential pressure relief valve located in the zone between the check valves. Two (2) tightly closing shutoff valves and four (4) test cocks complete the assembly. Figure 23 provides a schematic of a reduced pressure principal backflow prevention assembly.

The reduced pressure principal detector assembly is a specially designed assembly composed of a line-size reduced pressure principal backflow prevention assembly with a specific bypass water meter and a meter sized approved reduced pressure principle backflow prevention assembly. The meter registers accurately for low rates of flow and registers for all rates of flow. Figure 24 provides an example of a type of reduced pressure principle detector assembly.

These assemblies will indicate leakage through one or both check valves or the relief valve by the discharge of water from the relief valve port. This factor is an important advantage over the double check valve assembly. The reduced pressure principal detector assemblies are generally used on fire suppression systems. Their specific design warns the user if flow is detected through a fire suppression system. It is a way to monitor use (authorized or unauthorized) or leaks in the system.

Reduced Pressure Principal Backflow Prevention Assembly





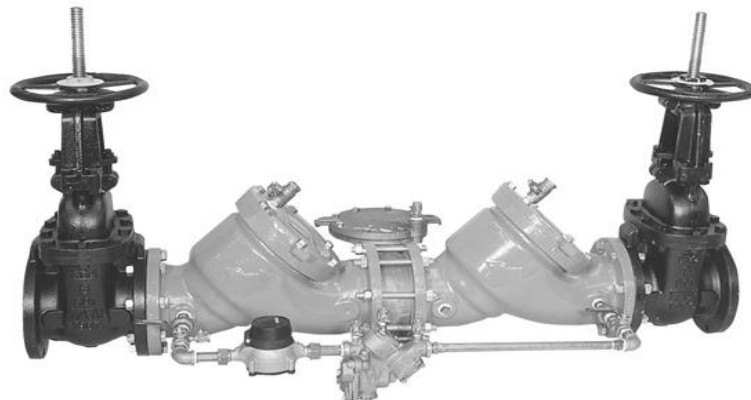
Operation - The reduced pressure principle backflow prevention assembly and the reduced pressure principle detector assembly are designed to operate as follows:

Normal Condition - Both check valves remain closed until there is a demand for water. In opening and crossing the first check valve, water is reduced in pressure by a predetermined amount by means of the spring loading on the check valve. The differential pressure relief valve remains in a closed position because the inlet pressure is higher than the pressure in the intermediate zone. The second check valve is lightly loaded and remains open as water flows through the assembly in the normal direction.

Backpressure Condition - In the event pressure increases downstream of the assembly, tending to reverse the direction of flow, both check valves close to prevent backflow. Since any check valve may leak because of wear or obstruction, the protection provided by check valves alone is not sufficient where there is a health hazard. If the second check valve is prevented from closing tightly, leakage back into the zone increases the zone pressure to within a few pounds per square inch of the supply pressure; unbalanced pressure on a diaphragm will cause the relief valve to open; and water from the zone is discharged to atmosphere. The diaphragm causes the relief valve to operate automatically to maintain pressure within the zone at a lower pressure than the supply pressure.

Back siphonage Condition - In a back siphonage condition, when the supply pressure drops, the relief valve opens automatically and drains enough water from the zone to atmosphere to maintain the pressure in the zone at a lower pressure than the supply pressure. Both the first and second check valves will close. The second check valve will close to keep the downstream water from the system from draining through the relief valve. If the supply pressure drops below the minimum pressure that is required to close the relief valve, the pressure in the zone will be atmospheric, and the relief valve will remain fully open.

Below is an example of a reduced pressure principle detector assembly which consists of a full size reduced pressure principle backflow prevention assembly with a bypass line equipped with a meter to register flow and a bypass line-sized RP.

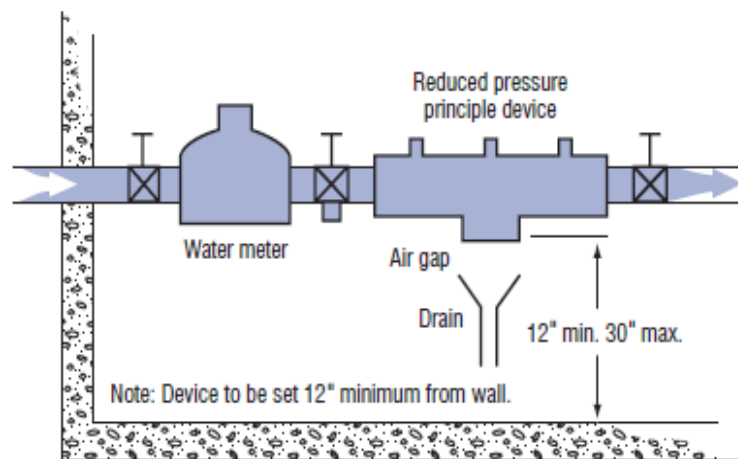




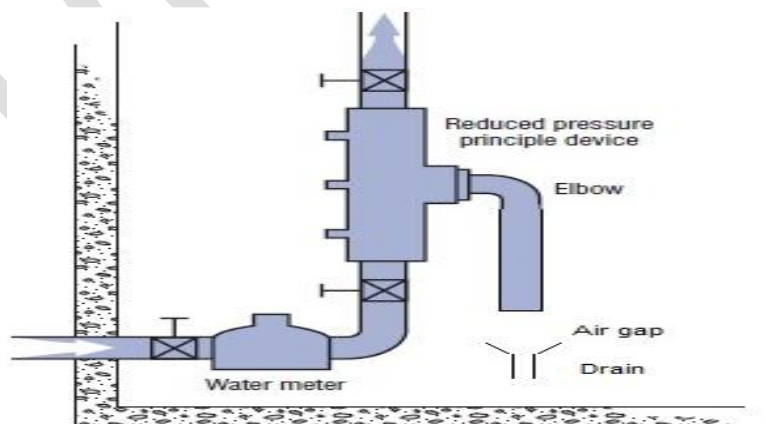
Responsibility for installing and maintaining the backflow preventer rests with the water consumer. Each backflow preventer must be inspected at regular intervals and records of the inspection, testing, and repairs made available to the supplier of water and/or the regulatory agency.

The supplier of water and the regulatory agency should be prepared to give technical assistance in the installation of the backflow preventer. For example, the following figures, show proper installation of an RP in a horizontal position and in a vertical position. Assemblies must be installed to allow access for testing and repair.

Horizontal installation of a reduced pressure principle backflow prevention assembly. The clearance dimensions indicated are recommended to provide access for testing and repair.



Vertical installation should only be used if horizontal installation is not feasible and upon approval of the water purveyor. The assembly must also be certified effective by the manufacturer if installed in the vertical position.



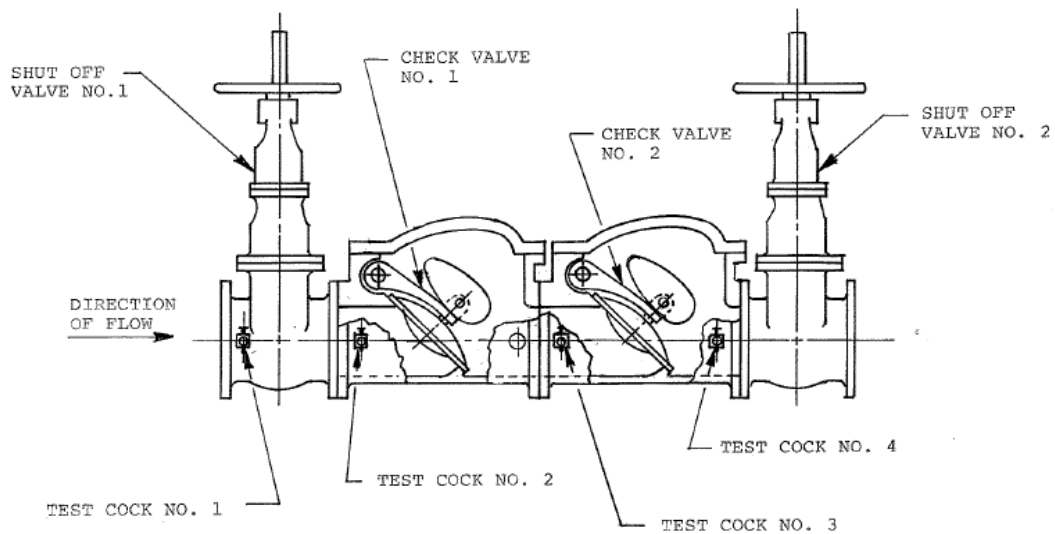


Below is a picture of reduced pressure principle backflow prevention assembly installed in a heated enclosure. The relief valve has an air gap device attachment to prevent direct connection to the relief valve opening.



Double-Check Valve Assemblies and Double Check-Detector Check Valve Assemblies

A double check valve assembly consists of an assembly of two independently acting check valves mounted between two tightly closing shut-off valves and fitted with four properly located test cocks. Figure below provides a schematic of a double check valve assembly.





One type of double check valve assembly.



A double check-detector check valve assembly consists of a specially designed assembly composed of a line-size approved double check valve assembly with a specific bypass water meter and a meter-sized approved double check valve assembly. The meter registers accurately for only very low rates of flow and shows registration for all rates of flow. These assemblies are generally used on fire suppression systems. Their specific design warns the user if flow is detected through a fire suppression system. It is a way to monitor use (authorized or unauthorized) or leaks in the system.

The use of two check valves in series provides more reliable protection against backflow than a single check valve. The double check valve assembly is very useful, and when properly maintained, reliable means for backflow protection from aesthetically objectionable or degrading materials which are not actually dangerous to health or to the public water system. These assemblies must not be used where protection against backflow is essential for the protection of a severe health, health or system hazards.

Design and Construction - The design and construction of approved double check valve assemblies must conform to the requirements of the American National Standards Institute/American Water Works Association standard C510, or American Society of Sanitary Engineering standard 1015, or Canadian Standards Association standard B64.5, or Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California Specifications of Backflow Assemblies for Double Check Valve Assemblies;

The design and construction of approved double check-detector check valve assemblies must conform to the requirements of the American National Standards Institute/American Society of Sanitary Engineering standard 1048, or Canadian Standards Association standard B64.5.1, or Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California Specifications of Backflow Assemblies for Double Check-Detector Assemblies.

These assemblies must receive the approval of the supplier of water, as well as meet the rule requirements of the Ohio EPA as outlined above and in OAC Rule 3745-95-06.



The referenced edition of these standards in rule must be used to determine if an assembly is acceptable.

If the assembly is installed as an isolation device within the building, it is required to comply with the rules of the OBBS and the referenced standards and editions cited.

Installation Requirements

Double check valve assemblies must be located so as to:

1. Permit easy access.
2. Provide adequate space for maintenance, inspection, testing and disassembly.
3. Prevent submergence
4. Be protected from freezing temperatures by installation within a heated building or heated enclosure. Heated enclosures must meet the ASSE 1060 standard. A list of ASSE 1060 Approved enclosures can be found at: http://www.asse-plumbing.org/Backflow/BackflowResources.htm#ASSE_Approved_Enclosures

Installation above ground level is preferred. Where above ground installations are not reasonably practical, a pit or vault may be used.

The pit or vault must be:

1. Installed to ensure watertight construction.
2. Constructed so that it will not flood. Surrounding grade shall slope away from the pit or vault to drain water away from the area.
3. Designed with a sump if subjected to ground water.
4. Provided with an access ladder and adequate natural or artificial light to permit maintenance, inspecting and testing.
5. Protected against sanitary sewage. Pit drains shall not be connected to a sanitary sewer.

BACKFLOW PREVENTION DEVICES

The following paragraphs on backflow prevention devices are provided for informational purposes only. These devices are not recognized to be used for containment at the service connection. Please refer to the Ohio Department of Commerce's Backflow Prevention and Cross-Connection Control Manual, or contact the Industrial Compliance, Plumbing Division, Backflow Section for further information and requirements related to devices used for isolation purposes in plumbing systems.



Vacuum Breaker Device

A vacuum breaker is a device or means for preventing back siphonage by admitting atmospheric pressure to a piping system that is under a vacuum or negative pressure so that a siphon cannot be created. Devices of this nature are commonly identified by several different names such as vacuum breaker, anti-siphon, valve, anti-siphon vacuum breaker, siphon breaker and back siphonage preventer. Vacuum breakers do not provide protection against backflow resulting from backpressure.

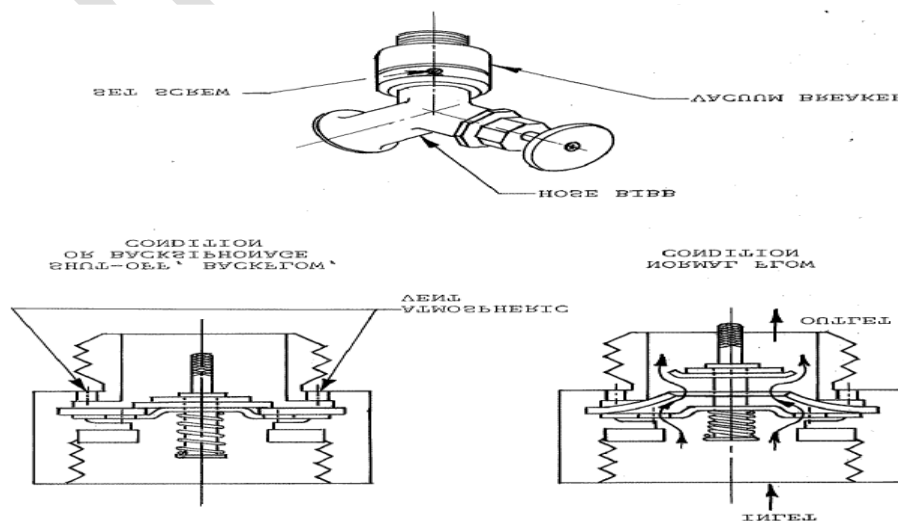
Current practice requires that all vacuum breakers contain two essential parts: an air inlet valve and an upstream check valve. In the past air inlet valves, also known as atmospheric vents, have occasionally been used alone for protection from back siphonage. This practice is no longer permitted by the Ohio Plumbing Code. These devices may be used alone for such purposes as protecting pressure vessels from collapse during vacuum situations, but not for protection from back siphonage.

Hose Bibb Vacuum Breaker

The hose bibb vacuum breaker is designed specifically to be mounted on a faucet to prevent back siphonage. It may be used on a wash basin or laboratory faucet or outside hose bib. This unit can readily be subjected to backpressure by simply having the hose outlet higher than the faucet; however this device is better than no protection at all. A typical hose bibb vacuum breaker is shown in Figure 34 and an example in Figure

Advantages - The principle advantages of hose bibb vacuum breakers are their low cost and their ready availability.

Limitations - Hose bibb vacuum breakers do not provide protection against backflow resulting from backpressure. Hose bibb vacuum breakers are mechanical devices that require periodic inspection and maintenance.





Pressure Vacuum Breaker

A pressure vacuum breaker may be acceptable as an isolation device only. Ohio EPA does not recognize a pressure vacuum breaker as a containment backflow preventer.

Pressure vacuum breakers are assemblies as they contain inlet and outlet shut-off valves and have two appropriately located test cocks for testing purposes. It contains a check valve located downstream of an inlet valve. The check valve is spring loaded and is in a normally closed position. The air inlet valve is also spring loaded and is in a normally open position. During periods of flow, water pressure opens the check valve and closes the air inlet valve. During periods of no flow (depressurization) or back siphonage conditions, the check valve closes and the air inlet valve opens to introduce air and return the system to atmospheric pressure.

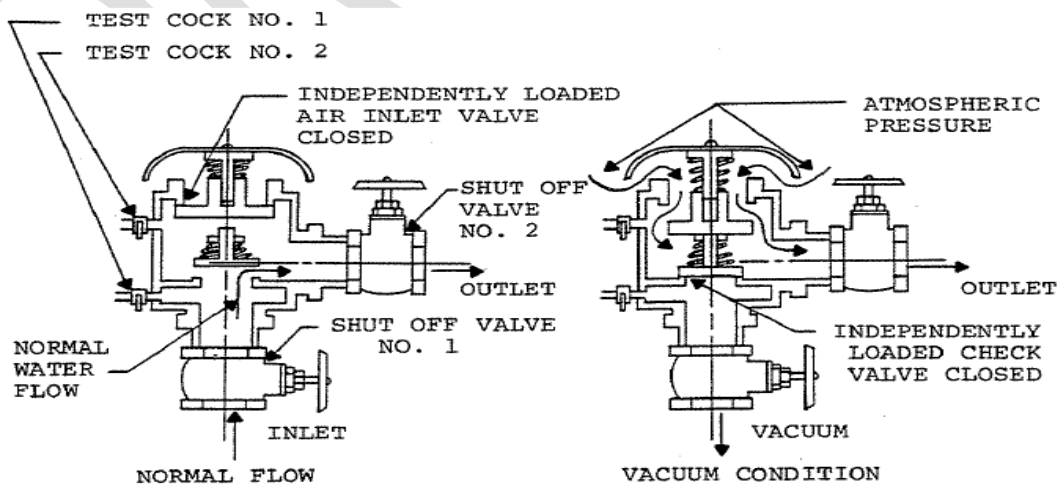
The pressure type vacuum breaker is designed to be installed in a pressurized system with shut-off valves downstream from the device. Under conditions of continuous pressure for long periods of time, the valve elements would tend to stick closed. Spring loading counteracts this effect.

In a pressure type vacuum breaker, the air inlet valve and the check valve must be independently operating. In some older models of pressure vacuum breakers, only the check valve is spring loaded; in newer models both the air inlet valve and the upstream check valve are spring loaded.

Figure shows the design of a pressure vacuum breaker. These are generally available in sizes 1/2 through 2 inches. Figure provides an illustration of a pressure vacuum breaker installation.

Advantages - The principle advantages of vacuum breakers are their low cost and their ready availability. They may be subject to continuous pressure, unlike other vacuum breakers.

Limitations - Vacuum breakers do not provide protection against backflow resulting from backpressure. Vacuum breakers are mechanical devices that require periodic inspection and maintenance.





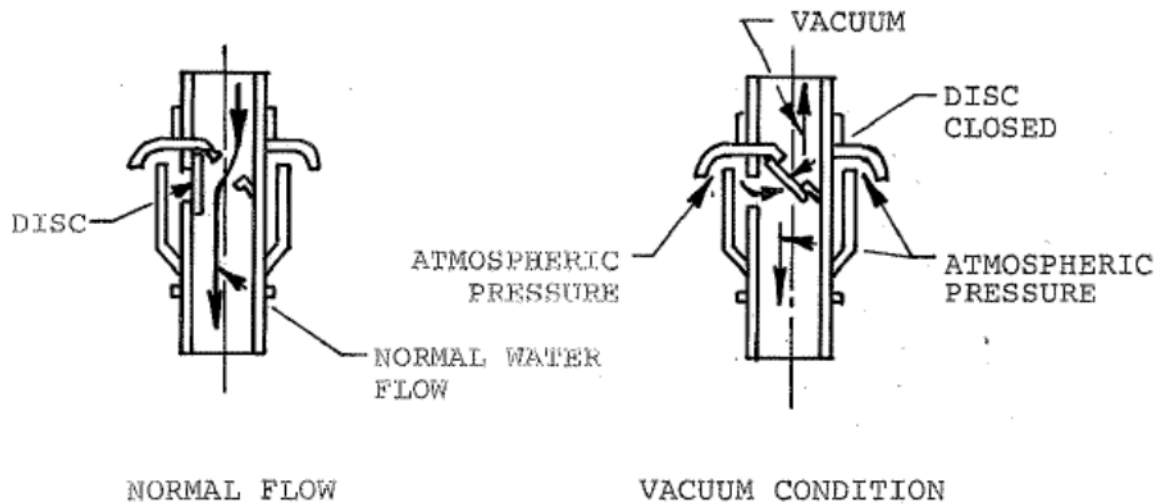
Atmospheric Vacuum Breaker

The atmospheric type of vacuum breaker, also called the non-pressure type, is the most widely used type of vacuum breaker. It is designed to be installed on the downstream (or atmospheric) side of the last valve in the system and to be operated under pressure not more than twelve hours in any twenty-four-hour period.

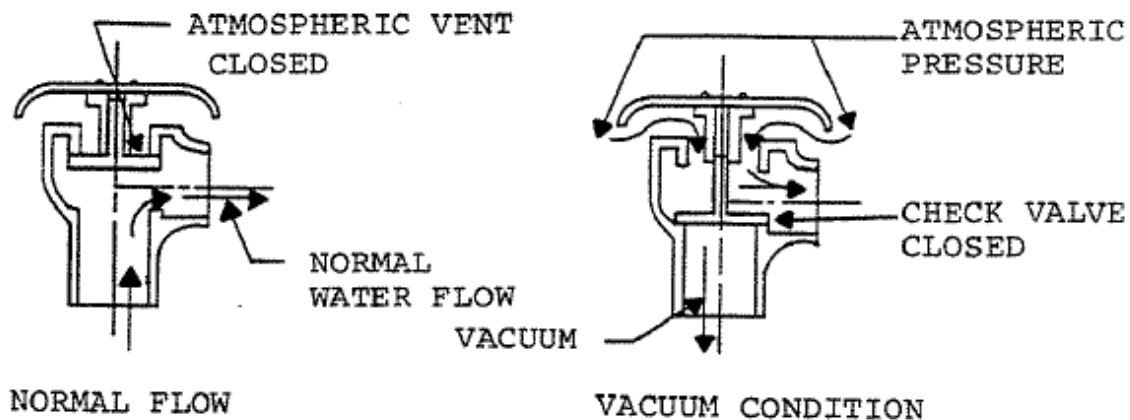
This unit does not contain springs but utilizes gravity to actuate the air inlet valve whenever the flow stops or during a back siphonage situation. In most atmospheric vacuum breakers, the air inlet valve and the upstream check valve share a common disc or float as the closing element.

Figure 32 shows the design of an atmospheric vacuum breaker and the principle of operation during a vacuum condition (A) for general use and (B) for use on urinals and water closets. The general use type is typically available in sizes 1/4 inch through 3 inches.

A. General use type

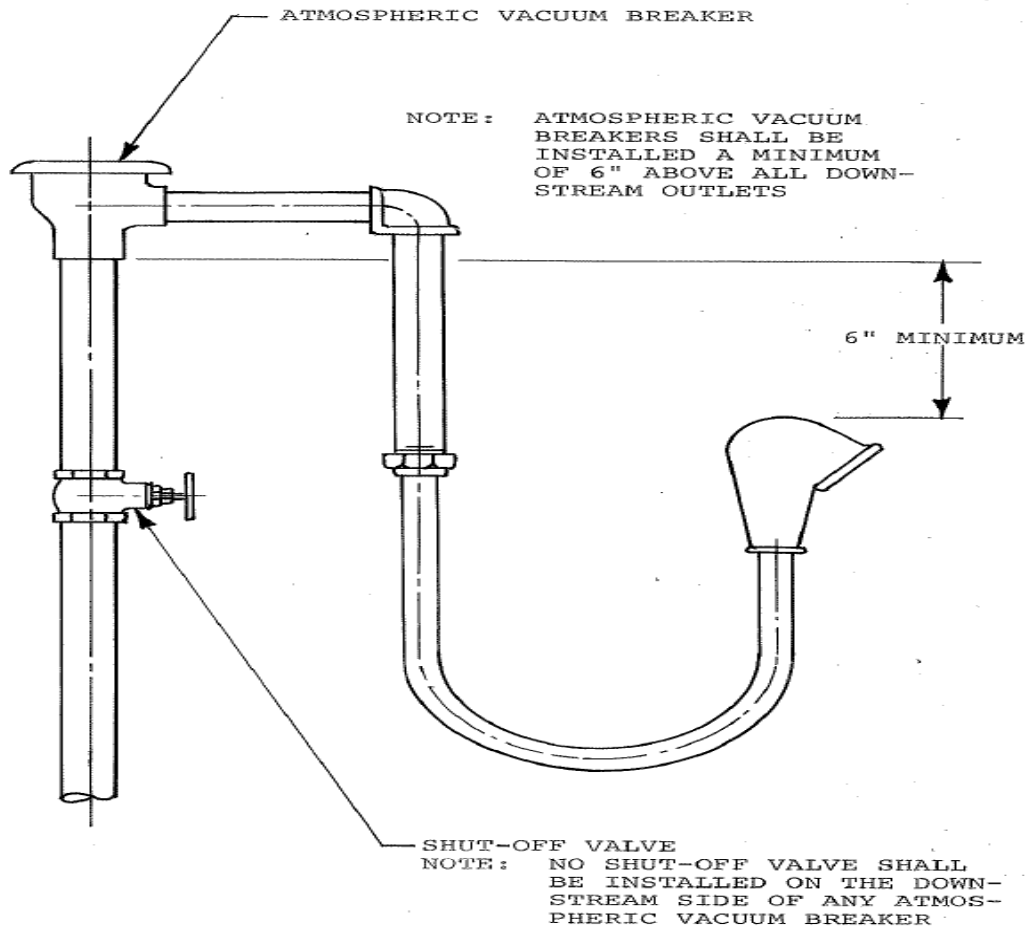


B. For Use on Urinals And Water Closets





Atmospheric vacuum breaker designs and principle of operation during vacuum conditions.
Typical atmospheric type vacuum breaker installation.



Advantages - The principle advantages of atmospheric vacuum breakers are their low cost and their ready availability.

Limitations - Atmospheric vacuum breakers do not provide protection against backflow resulting from backpressure.

Atmospheric vacuum breakers are mechanical devices that require periodic inspection and maintenance. Failure of a vacuum breaker normally occurs because of a rupture of the rubber membrane in devices using a rubber check valve or failure of the disc type device. Corrosion or build-up of lime deposits on the vacuum breaker seat can cause leakage or sticking of the device.



Dual Check Valve

The dual check valve is made up of two internally spring-loaded, independently operating check valves. It may be subjected to backpressure or backsiphonage. During a backpressure condition, the increase in pressure will cause the valves to close. During a backsiphonage condition, the spring-loading of the check valves will cause them to close. It may be sufficient to be used as an isolation device to protect against a low hazard provided the device is certified to ASSE 1024. Typically dual check valves can be found on residential water service connections or on individual outlets. A typical dual check valve is shown in Figure



Advantages - With two check valves in series, this configuration provides a backup if one check valve fails during a backflow situation.

Limitations - Dual check valves do not provide protection against a health or high hazard. Dual check valves are not testable devices, do not meet the requirements of a backflow prevention assembly and therefore, are not acceptable for containment purposes. Dual check valves are mechanical devices that require periodic inspection and maintenance.

SPECIFIC VALVING AND PIPING CONFIGURATIONS

Interchangeable Connections

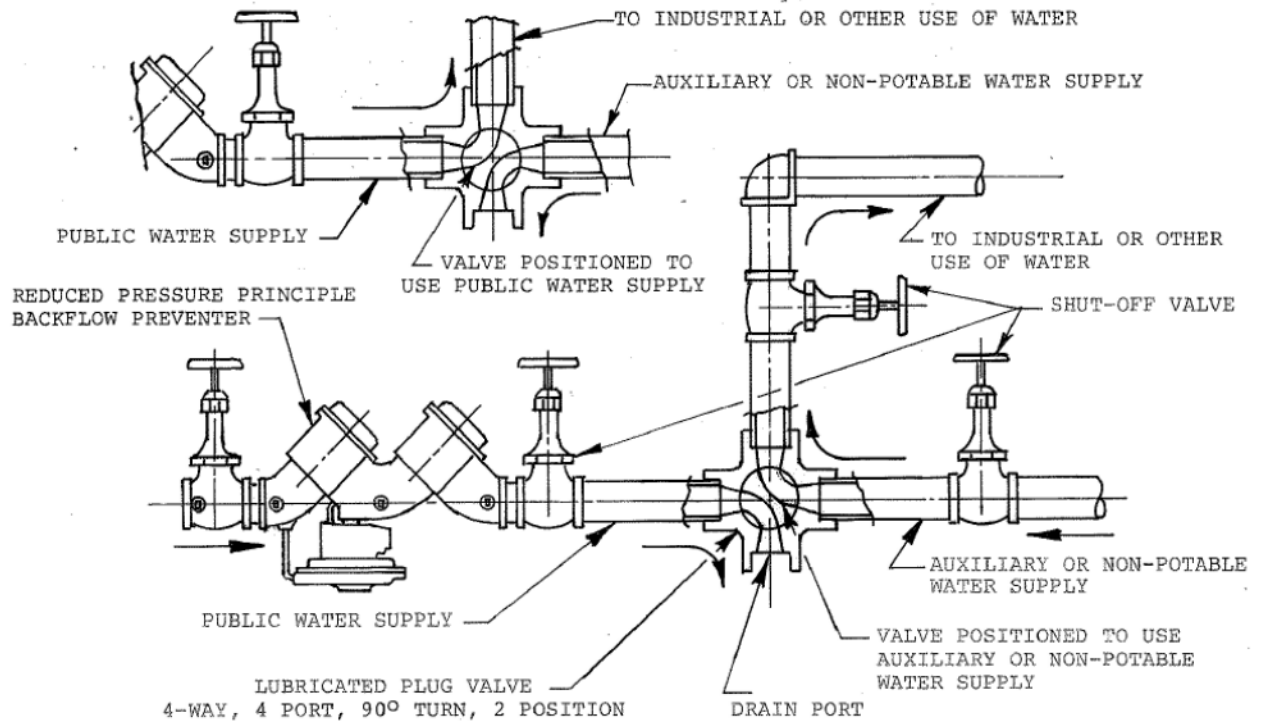
Interchangeable connections, also known as swivel or change-over devices, include swing connectors and four-way valves. These devices operate to provide alternative, but not simultaneous, supply from either a potable or non-potable source.

These devices do not offer complete protection against backflow between the two systems which are interconnected. When used, the potable water system must be protected by an approved reduced pressure principle backflow preventer.



Two major types of interchangeable connections are as follows:

- **Four-way Valves**



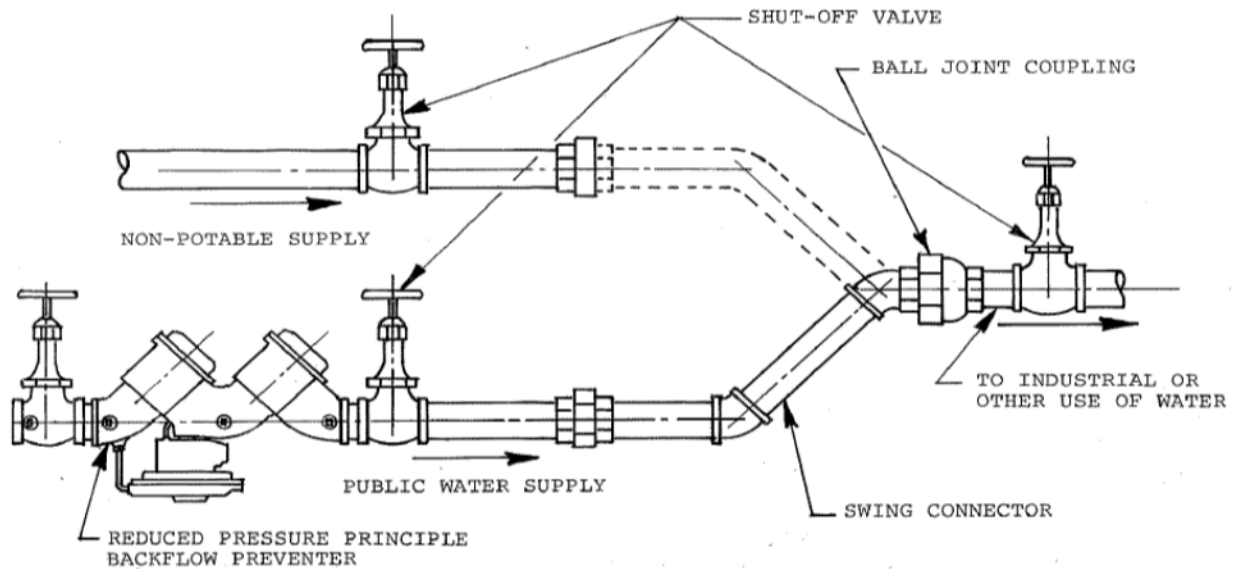
Where four-way valves are used for interchangeable connections, such valves must be of the lubricated plug type or of the type that operates through a mechanism which unseats the plug, turns it 90 degrees and reseats the plug. The ordinary plug cock, in which there is metal-to-metal contact, is unsatisfactory due to the tendency for the plug to freeze in one position when there are long periods between operations of the valve.

Advantages - The four-way valve is simple, compact, and has easy quarter-turn operation. The swing connector has low head loss and a minimum of required maintenance.

Limitations - Pressure loss may be high through the backflow preventer, four-way valve, and shut-off valves.



- **Swing Connectors**



The swing connector has been used quite frequently in the past as a device to separate the public water supply from a secondary supply. The unit offers low head loss but is difficult and unhandy to change from one position to another, and therefore, is being replaced by the four-way valve.



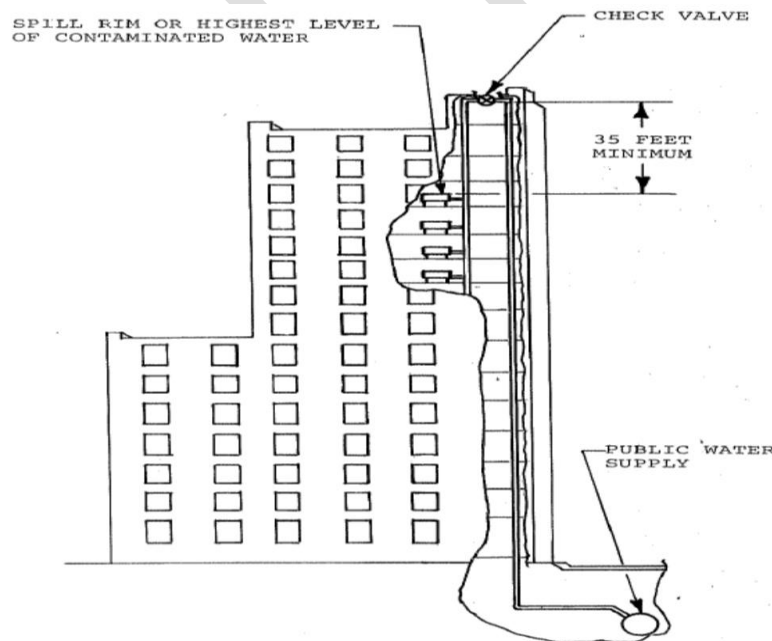
Barometric Loop

The barometric loop as shown below can be installed to protect the potable water supply from back siphonage. If there is any possibility of backpressure, some other type of protection against backflow will be required.

Atmospheric pressure, at sea level, will push a column of water approximately 34 feet high in a perfect vacuum. Therefore, the top leg of the loop must be a minimum of 35 feet above the spill rim of the highest free water surface downstream from the loop.

A single check valve is installed at the high point of a barometric loop to minimize the potential for air lift, which could occur under certain conditions. Air lift may occur when air drawn in through an un-submerged outlet during a back siphonage condition entrains contaminants at a submerged outlet and carries them over the loop by action like that of a jet pump or lifts them by action similar to an air-lift pump.

The device must be properly designed, must be installed so that it is adequately protected against freezing and must not be used in a position where it could be subjected to backpressure. This configuration is not recognized as a containment device and additional protection may be necessary depending on the degree of hazard.



Advantages - It does not require maintenance checks.

Limitations - Space and installation may be a problem. It is subject to changes or modifications that may destroy the effectiveness of the device.



AUXILIARY WATER SYSTEMS

Any water system on or available to the premises other than the public water system is called an auxiliary water system. Auxiliary water systems include used water or water from a source other than the public water system such as wells, cisterns or open reservoirs that are equipped with pumps or other prime movers, including gravity. Premises means any building, structure, dwelling or area containing plumbing or piping supplied from a public water system.

At a minimum, an auxiliary water system is considered a health hazard. When possible, the auxiliary water system should be eliminated or properly abandoned. With few exceptions, there are two protective mechanisms which must be implemented to help ensure the public water systems remain protected from auxiliary systems on the consumer's property.

First, auxiliary water system piping must remain physically disconnected from all piping through which the public water system flows. The physical separation must be visually observed and verified in writing every 12 months.

Second, a reduced pressure principle backflow prevention assembly must be installed at the meter on the public water system. This assembly must be tested every 12 months and written verification must be maintained by the purveyor of water.

DUAL WATER SUPPLIES (BACKPRESSURE)

Acceptable methods for controlling cross-connections between a consumer's water system and any other pressurized system depends on the liquid or gas that is contained in the other pressurized system, but in most cases the selection of the method of control is very easy. The basic rule is – DO NOT MAKE ANY CONNECTION BETWEEN A PIPE CARRYING THE POTABLE WATER SUPPLY AND ANY PIPE THAT MAY CARRY ANY OTHER GAS OR LIQUID UNDER PRESSURE.

Necessity for Dual Water Supplies

THE PUBLIC HEALTH AND THE SAFETY OF THE PUBLIC WATER SUPPLY MUST RECEIVE FIRST CONSIDERATION in determining the conditions under which an auxiliary water supply is to be made available at any given place. Economic considerations must be of secondary consideration. Vigilance on the part of water works officials, building inspectors, industrial plant managers, maintenance personnel, plumbers and persons with similar responsibility is required at all times to avoid improper connections between approved and auxiliary water supplies.

Methods of Making Two Water Supplies Available for Industrial Use

The Ohio Environmental Protection Agency recognizes certain methods of making dual water supplies available, where necessary, in a safe manner. These various methods have particular applications and restrictions, depending upon the conditions surrounding each installation. It is important to note that gate valves and ordinary check valves do not, of themselves, assure the separation of two water supplies and are not approved by the Ohio Environmental Protection Agency for such purpose.

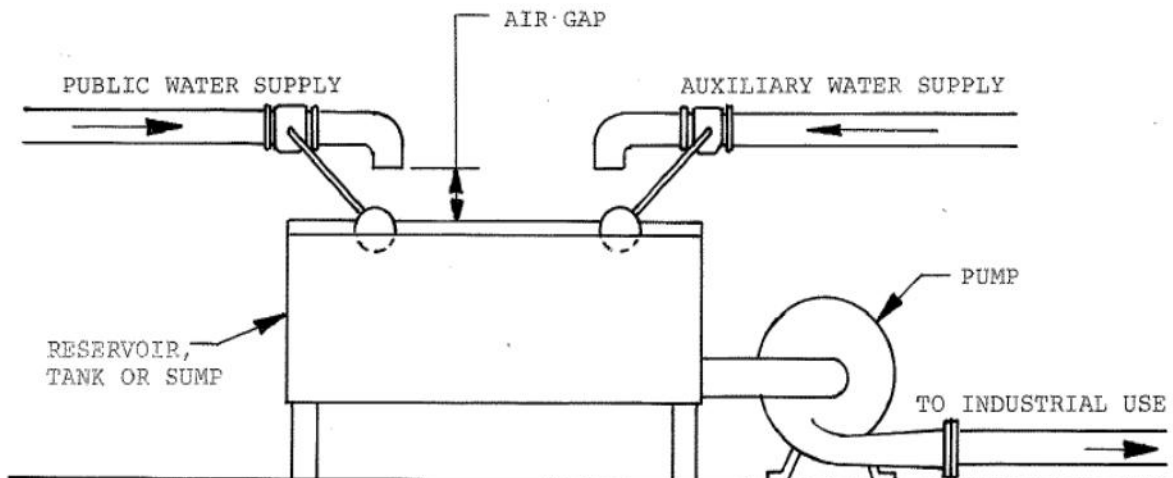
Four acceptable methods for the use of dual water supplies are outlined below. Methods 1 and 2 can be used for routine situations in which it is absolutely necessary to provide dual water supplies.



Method 3 and Method 4 are acceptable where the auxiliary water supply is to be used only for fire protection.

Any proposed installation that connects an auxiliary water supply to a public water supply, except those using method No. 1 indicated below, must be submitted to the supplier of water and to the Director of the Ohio Environmental Protection Agency for approval in accordance with the requirements of Ohio Revised Code Section 6109.13 and Ohio Administrative Code Rule 3745-95-02(B). An application for detail plan approval, made in accordance with the requirements of Ohio Administrative Code 3745-91-02, along with a letter of approval from the supplier of water for the dual water supply configuration, must be submitted to Ohio Environmental Protection Agency for review and approval before installation.

Method #1 Air Gap Separation – The public water supply may be discharged to a reservoir, tank or sump through a pipe which terminates a minimum of two pipe diameters above the highest possible water level in such reservoir, tank, or sump. The auxiliary water supply may also discharge to this basin. The water supply, whether pumped or gravitated from this tank, must not be available for drinking, culinary use, or any other potable purpose. Drinking fountains, showers, and wash room facilities must be connected to the public water supply ahead of the air gap



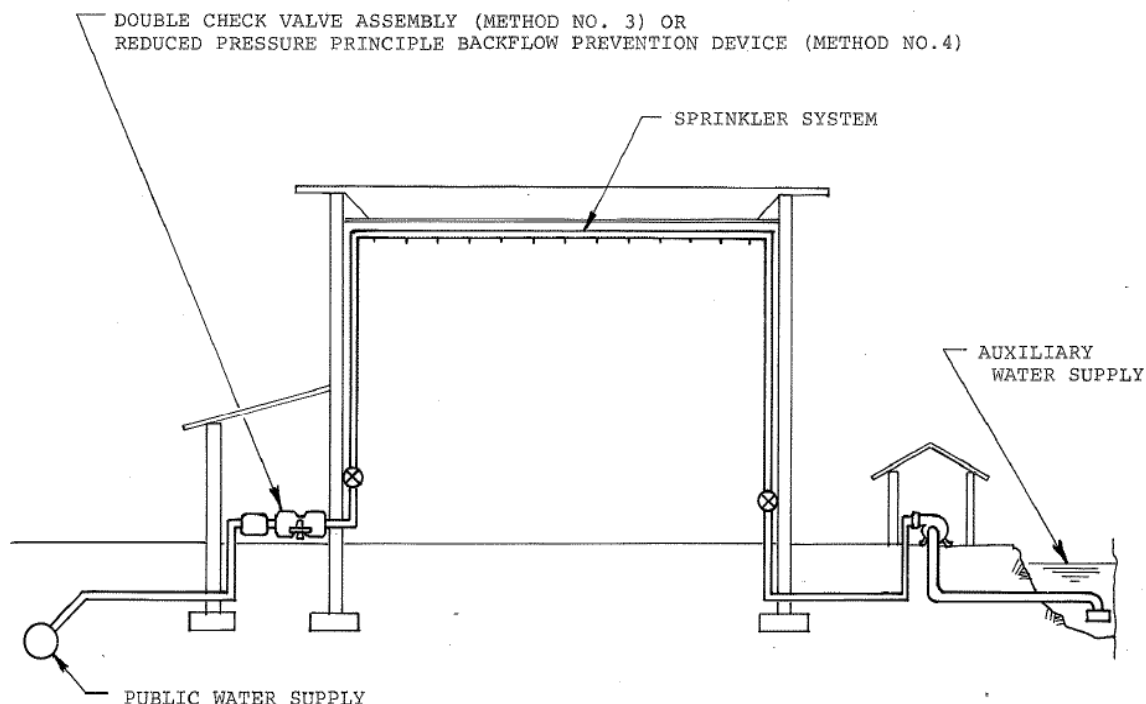
Method #2 Interchangeable Connections – The consumer’s water system and the private water supply may be brought to a common location. At this point, an interchangeable connection is used to alternatively connect one or the other of the supplies to the pipe leading to the industrial or non-potable water requirement. Four-way valves used for interchangeable connections should be of the “lubricated plug type” or of the type that operates through a mechanism which unseats the plug, turns it 90o and reseats it. The ordinary plug clock in which there is metal-to-metal contact is unsatisfactory due to the tendency for plugs to “freeze” in one position when there are long periods between operations of the valve. Four-way valves must never be used as stop valves but must have separate stop valves on each line connected to it. The threads or flange on the drain port must be destroyed so that a connection cannot be made to this port.



Methods of Making Two Water Supplies Available for Fire Protection Only

In addition to the two methods previously listed, there are two additional methods that are acceptable to the Ohio Environmental Protection Agency for making water from both a public water supply and an auxiliary source available for fire protection. These acceptable methods are by the use of a double check valve assembly or the use of a reduced pressure principle backflow prevention assembly. The following two methods are acceptable for fire protection piping systems only, with no use of the water other than for fire protection

permitted. Plans for all installations proposed under the provisions of this section must be submitted to and have received the approval of the supplier of water and the Ohio Environmental Protection Agency under the provision of Section 6109.13 of the Ohio Revised Code and Rule 3745-95-02(B) of the Ohio Administrative Code.



Method #3 Fire Protection Only – Double Check Valve Assembly – Plans for a fire protection system with an auxiliary water supply proposing the use of a double check valve assembly must meet all of the following requirements before it will be considered for approval by the Ohio Environmental Protection Agency:

1. Water from the downstream side of the double check valve assembly shall be used for fire protection only.
2. There shall be no regular use of water downstream from the double check valve assembly other than for fire system make-up water.



3. The fire system shall be filled with water from the public water supply.
4. The public water supply must be the primary source of water for fighting any fire.
5. The water in the fire system must contain no additives.
6. The auxiliary water supply must not contain any substance that could cause a system or health hazard.
7. All double check valve assemblies shall be tested at least every twelve months using the testing procedure listed in. Records of tests and inspections shall be filed with the supplier or water. Unless no hazard greater than a pollution hazard can be guaranteed, Method #4 must be applied instead.

Method 4 Fire Protection Only – Reduced Pressure Principle Backflow Prevention Assembly – Plans for a fire protection system with an auxiliary water supply proposing the use of a reduced pressure principle backflow prevention assembly must meet all of the following requirements before it will be considered for approval by the Ohio Environmental Protection Agency:

1. Water from the downstream side of the reduced pressure principle backflow prevention assembly shall be used for fire protection only.
2. There shall be no regular use of water downstream from the reduced pressure principle backflow prevention assembly other than for fire system make-up water.
3. The fire system shall be filled with water from the public water supply.
4. The public water supply must be the primary source of water for fighting any fire.
5. The reduced pressure principle backflow prevention assembly shall be tested for tightness at least every twelve months. Records of tests and inspections shall be filed with the supplier of water.
6. The reduced pressure principle backflow prevention assembly shall be located above ground level or floor level.
7. There shall be no connection or plug placed in the relief port of the reduced pressure principle backflow prevention assembly.

FIRE SYSTEM NOT USING AUXILIARY WATER SUPPLIES

The protection against backflow required on fire protection systems which do not include the use of auxiliary water supplies will depend on the details of the specific installation. Each installation must be evaluated individually on the basis of the degree of hazard it presents to the public water



system. While the following does not cover all situations, it summarizes some typical requirements:

1. The installation of an approved backflow prevention assembly is usually not required for simple fire protection systems which contain no additives, are not equipped with booster pumps or jockey pumps, and cannot be connected to an auxiliary water supply. These are usually provided with either a simple sanitary check valve or a detector check valve. However, the supplier of water may require the installation of an approved double check valve assembly to prevent taste and odor problems from the “breathing” of these fire systems due to water main pressure fluctuations.
2. An approved double check valve assembly is required on the public water supply line for a fire system containing a jockey pump which could cause backpressure into a public water supply connection downstream from the jockey pump, or for a system with a properly constructed auxiliary water tank filled from the public water system and equipped with a booster pump.
3. An approved reduced pressure principle backflow prevention assembly is required on the public water supply line serving a fire system containing any additive (even propylene glycol) or which can be connected to an auxiliary water supply.

In determining the degree of hazard, the local fire department may be consulted to determine their practices in regard to their use of additives and whether they connect water from auxiliary supplies through their pumps into Siamese connections.

In addition, if a backflow prevention assembly is installed within a fire protection system, the individual qualified to test the unit may also need to have certification from the state fire marshal to test the backflow prevention assembly. It is recommended that the water purveyor contact the local/state fire marshal for advice on how to proceed.

POLICY ON THE USE OF ANITFREEZE IN FIRE PROTECTION SYSTEMS

The following information is provided as general information and to assist in the protection of a public water supply when an antifreeze solution is required to prevent freezing of fire protection systems:

1. Antifreeze solutions can consist of either a pure glycerine solution, provided the glycerine is of 96.5% United States pharmacopoeia grade, or of food grade propylene glycol base.
2. Propylene glycol plus dipotassium phosphate is acceptable for use as an antifreeze solution. The propylene glycol is the antifreeze component; the dipotassium phosphate functions as a bacterial inhibitor.
3. The antifreeze manufacturers must furnish proof to the water purveyor that the product is of pharmaceutical grade or of food grade quality and that the product contains no harmful or toxic substances.



4. All antifreeze products used in potable water systems shall be approved by the supplier of water prior to use.
5. All fire protection sprinkler systems that contain approved antifreeze solutions (meets all the requirements above), shall have an approved reduced pressure principle backflow prevention device on that leg of the system or on the complete sprinkler system.
6. If a fire protection system contains ethylene glycol-based antifreeze, it is considered a severe health hazard and must be separated from the public water supply/consumer's water system by an approved air gap.



Jockey Pumps

Fire protection systems that require additional backflow prevention and use a “jockey pump” (an auxiliary pump with high head and low capacity characteristics) to maintain elevated pressure in the fire protection system must arrange the pump to take suction from the public water supply system on the down-stream side of any double check valve assembly or reduced pressure principle backflow prevention assembly. A meter should be installed in series with the pump and the quantity of water used to maintain pressure in the fire system should be recorded. Below is an installation of a jockey pump in a fire suppression system.



BOOSTER PUMPS/LOW PRESSURE CUT-OFFS

Booster pumps should be installed only in cases where additional pressure is needed (i.e., high rise buildings and fire protection sprinkler systems at service connections and at public water system booster pump stations) and not where additional quantities of water are required. The need for additional quantities of water should be resolved by the installation of larger service lines and/or water mains in the area.

Where booster pumps are necessary at service connections, the preferred solution is to install a storage tank supplied by the public system through an acceptable air gap and then pumped to the consumer’s system. This arrangement will prevent the booster pump from reducing the service line or main pressure to a level where backsiphonage may occur. Direct connections of booster pumps to a service line or main should consider the hydraulic impacts on the distribution system in the affected area.



For a booster pump not intended to be used for fire suppression, and if it is necessary and acceptable to directly connect the suction side of a booster pump to a service line receiving water from a public water system, a low suction pressure cut-off device must be installed to prevent the pump from reducing the service line pressure below 10 psig.

For a booster pump used in a fire suppression system, also referred to as a fire pump, if it is necessary to directly connect the suction side of a fire pump to a service line receiving water from a public water system, an approved method must be in place and operational such that a minimum suction pressure of at least 10 psig is maintained. The methods acceptable under OAC Rule 3745-95-07 are: a low suction pressure cut-off device (only for installations prior to August 8, 2008 which are not or will not be significantly modified); or, a low suction throttling valve; or, a variable speed suction limiting control system installed to prevent the pump from reducing the service line pressure below 10 psig.

See Ohio Administrative Code Rule 3745-95-07 for detailed rule language. (See LAW Writer® Ohio Laws and Rules website at <http://codes.ohio.gov/> to view this rule and other regulations in Ohio.)

The water purveyor may require additional containment backflow prevention, specifically a reduced pressure principle backflow preventer at the service connection, to maintain sanitary control of their water system.

Yard Hydrants

Yard hydrants are commonly used in areas where water is needed away from a building. The standard yard hydrant consists of a head for attaching a hose, a riser pipe and a shutoff valve below the frost level. Yard hydrants are often equipped with weep holes below ground. When the hydrant is shut off, the weep holes in the valve open, allowing the water from the riser to drain into the soil below the frost line. The self-draining yard hydrant inherently provides protection against freezing.

Yard hydrants, in general, create a potential for back siphonage every time they are shut off, as the draining riser creates a siphon at the hose bib. Protection should be provided by installing a hose bib vacuum breaker on all yard hydrants where a hose can be attached.

The self-draining yard hydrants with weep holes are a hazard because of the potential for contamination associated with the weep hole being in contact with the soil. If the stopper in a standard hydrant with weep holes leaks, it is likely to be undetectable at ground level as it is leaking out the weep hole into the ground. When a back siphonage condition occurs, the leak 'out' becomes a leak 'in', siphoning contaminated water into the public water system. Also, if the ground water level fluctuates where the water table rises above the weep hole, the riser will fill with contaminated water. Each time the hydrant is shut off, and the weep hole opens, contaminated water could migrate into the hydrant. Each time the hydrant is turned on, contaminated water could enter the public water system.

The most practical solution is to install a yard hydrant that does not have a weep hole. Freeze protection can be provided by manually draining the hydrant seasonally, or utilizing a type of hydrant referred to as a sanitary yard hydrant that is freeze resistant or frost proof. Those that meet American Society of Sanitary Engineers (ASSE) Sanitary Yard Hydrant Standard 1057 are examples of hydrants that do not utilize weep holes.

The ASSE Sanitary Yard Hydrant Standard 1057 requires that yard hydrants not drain directly into the ground, and it must have a backflow preventer if a hose is capable of attachment. It also stipulates



minimum required pressure and flow capabilities and ensures proper freeze protection. Yard hydrants that meet the requirements of ASSE Standard 1057 can be accepted by the public water system.



The public water system has jurisdiction over yard hydrants which they own as part of the distribution system and must ensure the requirements for yard hydrants are met according to OEPA rule. These requirements include no weep holes on yard hydrants used or accessible for potable purposes. This includes those located in public cemeteries, parks, on public buildings property, etc. Also, public water systems such as campgrounds, schools or mobile home parks, have the responsibility to ensure the requirements for yard hydrants are met. Yard hydrant requirements are fully outlined in Ohio Administrative Code Rule 3745-95-09. (See LAW Writer® Ohio Laws and Rules website at <http://codes.ohio.gov/> to view this rule and other regulations in Ohio.)



Yard hydrants located on private property served by a public water system must be considered when determining the degree of hazard and the necessary backflow prevention required at the meter. Yard hydrants with weep holes present a hazard as well as those with unprotected hose bibb connections.



Weep Hole Stopper exposes weep holes when hydrant valve is in closed position to allow water to drain from post to prevent freezing.



Geothermal Heating and Cooling Systems

If a geothermal heating and/or cooling system is installed at a premises served by the public water system, the system must be considered when identifying any hazards to the public water system. Two different scenarios have been identified:

In a closed loop system, heat transfer fluid is recirculated through a loop of piping installed below ground or within a surface water body. No withdrawal of groundwater is involved. An antifreeze additive may be used to facilitate the heat exchange which may be toxic. The components of the geothermal heating and/or cooling system must be kept completely separate, physically, from any plumbing or fixtures supplied by the public water system. If the potential exists such that the heat transfer fluid from the geothermal system can be introduced into the plumbing supplied by the public water system, a reduced pressure principle backflow prevention assembly must be installed at the service connection.

If a geothermal system is an open loop system, such that water for circulation is pumped from a well and discharged to another well or surface water, consideration must be given to whether or not the non-potable supply can be introduced into the potable water supply provided by the public water system. The potable and non-potable supply piping must be completely separated, physically, and an appropriate backflow preventer installed at the service connection. If the potential exists such that fluid from the geothermal system (including the water source, circulating fluid, or discharge) can be introduced into the plumbing supplied by the public water system, a reduced pressure principle backflow prevention assembly must be installed at the service connection.

For a public water system that uses an approved well for both a source of drinking water and a source for the heat exchange fluid in an open-looped geothermal system, a reduced pressure principle backflow prevention assembly must be installed on the leg to the geothermal system supply. In addition, no toxic additives can be used in direct contact with the water. Discharge to surface water must also be through an air gap.



5 TESTING BACKFLOW PREVENTION ASSEMBLIES

When inspections have been completed, a comprehensive list of backflow preventers installed on customer plumbing systems will be on record. The backflow preventers that are testable assemblies shall be placed on a routine testing schedule. All testable assemblies will be tested upon installation, upon repair and on an annual basis.

Upon notice from The City of Dover, it shall be the responsibility of the water customer to arrange and absorb any costs associated with assembly testing and subsequent repair/replacement of backflow prevention assemblies.

Following the initial cross-connection inspections and subsequent classification of accounts (e.g., assigning a degree of hazard), assembly testing notices shall be sent to non-residential and residential water customers as needed. The notices shall be sent out in a timely manner to provide adequate time for customers to comply, and the timing will consider seasonal assemblies. Template notices in Appendix D may be used to inform customers of testing requirements. These notices will:

- Clearly identify the assembly requiring testing (size, make, model, location, etc.)
- Stipulate the date by which the assembly must be tested.
- Indicate that tests must be completed by a certified tester. A list of approved testers may be provided and updated lists may be obtained from the Ohio Environmental Protection Agency.
- Enclose either a standard test form (see Appendix E) or a list of testable backflow prevention assemblies.

When assembly testing reports are received by the utility, they will be checked for the following:

- All the necessary information was provided
- Name and certification number of the tester is provided
- The test results appear valid
- The assembly tested matches the assembly requiring testing (Make, Model, etc.)
- The assembly is approved

Testing and repairing of backflow prevention assemblies and backflow prevention devices shall be performed by a certified person who holds a valid Backflow Technician Certification issued by the Ohio Department of Commerce, Division of Industrial Compliance.

Cross connection control program staff will follow up with the owner or tester on questionable test forms. A customer may be asked to have an assembly retested if the original test results do not appear valid. Test forms must be received and kept on record for each required test.



6 RECORD KEEPING

A system of cross-connection record-keeping shall be maintained. Special software specifically for cross-connections may be used for:

- Efficient record searches
- Easy reporting
- Simple updating
- Automatic letter generation
- Automatic deadline notification

All cross-connections account information must be in the records including:

- Address and location
- Owner name and contact information
- List of testable assemblies
- Description of other cross-connections within the facility
 - Air gaps
 - Non-testable assemblies
- Degree of hazard classification and basis
- Required re-inspection frequency
- Photos or sketches if available

All testable assemblies must be in the records including:

- Location of the assembly
- Name and contact information of assembly owner
- Make, model, and size of assembly
- Degree of Hazard Classification
- Required testing frequency and basis

Tracking changes in water use or tracking new customers is a critical part of the cross-connection program. The City of Dover shall make every attempt to prevent/eliminate cross-connections at installations to ensure future compliance. An effort shall be made to cooperate and communicate with the local plumbing code inspector to better accomplish this goal.

Standard letter, form, and report templates may be used to simplify the program requirements including:

- Inspection forms
- Assembly testing forms
- Inspection and/or assembly testing notification letters
- Noncompliance letters
- Water service termination notice

Copies of the written cross-connection control program, and ordinance, should be kept on file. Copies of annual reports shall be kept for a minimum of 10 years.



7 ENFORCEMENT

To protect public health, water customers found to be in violation of the cross-connection rules will be brought into compliance in a timely manner or lose their privilege to be connected to the public water system. To properly enforce these rules The City of Dover ordinance provides authority to inspect facilities, terminate water service, and assess fines.

Following an inspection, the customer will be sent either a compliance notice or a non-compliance notice. The period to complete the necessary corrective actions is at the discretion of the utility and will be based primarily on the degree of risk posed by the violation but should also consider the complexity/cost of the necessary corrective actions. Cross connections that pose an imminent and extreme hazard shall be disconnected immediately and so maintained until proper protection is in place. Cross connections that do not pose an extreme hazard are expected to be eliminated within 30-60 days. The necessary corrective action and deadline shall be described in the non-compliance notice to the customer.

Any owner of properties served by a connection to the waterworks found guilty of violating any of the provisions of this article or any written order of the Director of Public Works or designee in pursuance thereof, shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished by a fine of not less than fifty dollars (\$50.00) or more than three hundred dollars (\$300.00) for each violation. Each day upon which a violation of the provisions of this act shall occur shall be deemed a separate and additional violation for the purposes of this article.

The City of Dover is hereby authorized and directed to discontinue water service after reasonable notice to any property wherein any connection in violation exists and to take other precautionary measures deemed necessary to eliminate any danger of contamination of the public water supply system. Water service to such property shall not be restored until the cross connection(s) has been eliminated in compliance with the provisions of this ordinance

Failure to submit a test form for a backflow prevention assembly that has successfully passed testing requirements constitutes a cross-connection and must be corrected and may result in the termination of water service and/or the assessment of a fine(s).

If water shut off is necessary to protect the public water system, the local health department, fire department, local law enforcement, and The City of Dover Director of Public Works may need to be notified.



8 NEW SERVICE INSPECTION

8.1 Procedures

All plumbing plans and permits for a proposed building shall be reviewed by the Authority, Plumbing Inspector, Building Inspector and building contractor(s). The Authority's Cross Connection Control Plan and Backflow Prevention requirements will be reviewed with the party responsible.

8.2 Inspections

The Authority/Designated Agent conducting the cross-connection control inspection shall inspect the building for compliance with the Cross Connection Control Program.

8.3 Compliance

Upon completion of the cross-connection control inspection and determination that the building is in compliance and has met any required actions of this plan, a certificate of occupancy and water service may be initiated as applicable.

8.4 Non-Compliance

If the building does not comply with the Cross Connection Control Program the Authority shall enforce this plan as required. The water service and the certificate of occupancy will not be initiated until compliance is achieved and approved.



9 PUBLIC EDUCATION

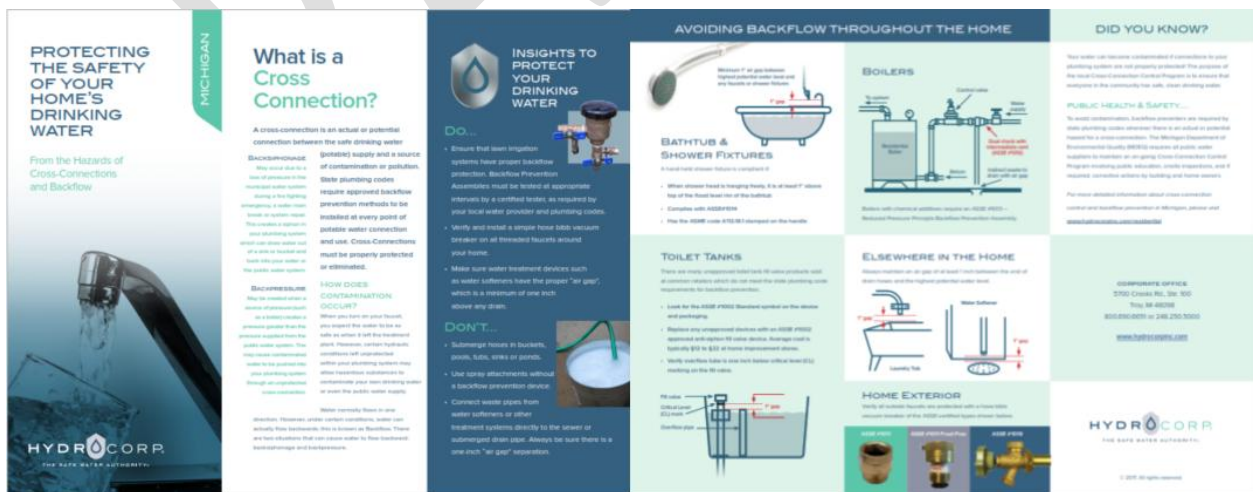
The cross-connection control program staff must have a good understanding of the program. The City of Dover shall ensure their cross-connection control staff receives proper in-the-field training and classroom education focusing on terminology, backflow prevention devices/assemblies, regulations, and hydraulic concepts. In addition, cross-connection control staff will be encouraged to receive continuing education to be made aware of new backflow prevention devices/assemblies, regulation changes (i.e., plumbing code updates), new water use devices that pose cross-connection concerns, etc.

Furthermore, attempts to educate the public about cross-connections will be made by distributing pamphlets on common residential cross-connections, visiting schools, providing onsite education of facility management and maintenance staff during routine inspections, speaking at condominium association meetings, showing videos on local access channels, social media outreach or posting newspaper announcements.

Additional information about The City of Dover’s Cross Connection Control program can be found online at <https://watercustomer.com/Dover/>

Cross connection staff shall also be available upon request to provide backflow prevention education to pertinent community officials and City of Dover employees.

A sample of the brochure distributed during onsite inspections are available online at the above website and at selected municipal building(s) is shown below:





10 ANNUAL REPORT

The report summarizes testing, inspection, and corrective action efforts. Cross connection records shall be on file to document each number in the report. The annual report form shall be filled out completely and submitted by the deadline. A narrative description shall be included explaining any unusual numbers or noteworthy events such as:

- The addition or loss of a cross-connection staff person
- Greatly expanded/contracted number of cross-connection accounts
- Status of accounts not currently in compliance

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APPENDIX A - LOCAL ORDINANCE

925.15 BACKFLOW PREVENTION.

(a) If in the judgment of the Water/Wastewater Superintendent, an approved backflow prevention device is necessary for the safety of the public water system, the Water/Wastewater Superintendent or his representative will give notice to the water consumer to install such an approved device immediately. The water consumer shall, at his own expense, install such an approved device at a location and in a manner approved by the Water/Wastewater Superintendent and shall have inspections and tests made of such approved devices as required by the Water/Wastewater Superintendent.

(b) No person, firm or corporation shall establish or permit to be established or maintain or permit to be maintained any connection whereby a private, auxiliary or emergency water supply other than the regular public water supply of the City may enter the supply or distributing system of the City unless such private, auxiliary or emergency water supply and the method of connection and use of such supply shall have been approved by the Water/Wastewater Superintendent and by the Ohio Environmental Protection Agency.

(c) It shall be the duty of the Water/Wastewater Superintendent to cause surveys and investigations to be made of industrial and other properties served by the public water supply where actual or potential hazards to the public water supply may exist. Such surveys and investigations shall be made a matter of public record and shall be repeated as often as the Water/Wastewater Superintendent shall deem necessary.

(d) The Water/Wastewater Superintendent or his or the City's duly authorized representative shall have the right to enter at any reasonable time any property served by a connection to the public water supply or distributing system of the City for the purpose of inspecting the piping system or systems thereof. On demand the owner, lessees or occupant of any property so served shall furnish to the Water/Wastewater Superintendent any information which he may request regarding the piping system or systems or water use on such property. The refusal of such information when demanded shall, within the



discretion of the Water/Wastewater Superintendent, be deemed evidence of the presence of improper connections as provided in this section.

(e) The Water/Wastewater Superintendent is hereby authorized and directed to discontinue, after reasonable notice to the occupant thereof, the water service to any property wherein any connection in violation of the provisions of this section is known to exist, and to take such other precautionary measures as he may deem necessary to eliminate any danger of contamination of the public water supply distribution mains. Water service to such property shall not be restored until such conditions have been eliminated or corrected in compliance with the provisions of this section.

(Ord. 38-81. Passed 9-21-81; Ord. 54-88. Passed 9-26-88.)

STATE OF OHIO LAWS AND RULES PERTAINING TO BACKFLOW PREVENTION AND CROSS-CONNECTION CONTROL

Ohio state laws and Ohio state rules pertaining to backflow prevention and cross-connection control are contained in the Revised Code and in rules of the Ohio Environmental Protection Agency and Ohio Department of Commerce - Division of Industrial Compliance and the Ohio Building Code. Those statutes and rules which appear to be directly concerned with backflow prevention are listed below. For an up-to-date listing and for the text of the regulations, see LAW Writer® Ohio Laws and Rules website at <http://codes.ohio.gov/>.

[Chapter 4101:3-6 (the Ohio Plumbing Code) of the Ohio Administrative Code, entitled Plumbing, is part of the Ohio Basic Building Code and contains rules on water supply and distribution that are directly concerned with backflow prevention and cross-connection control. Rules are provided for informational purposes only. See Ohio Department of Commerce, Industrial Compliance, Plumbing website for the most up-to-date and complete listing of these rules at <http://www.com.ohio.gov/dico/> Another web link resource is from the International Code Council Online Library, under electronic products tab, free resources heading, then free codes, state of Ohio code, at: <http://publicecodes.cyberregs.com/st/oh/st/OH-P-2011-000004.htm>]

[Chapter 3745-95 (Ohio EPA, Backflow Prevention and Cross-Connection Control) of the Ohio Administrative Code became effective on July 1, 1972. The rules undergo a review every five years. These rules are provided for informational purposes only. See Ohio EPA's Division of Drinking and Ground Waters website for an up-to-date and complete listing of the rules by clicking on the tab, "Effective Rules" at <http://epa.ohio.gov/ddagw/rules.aspx>.



Ohio Board of Building Standards

Ohio Revised Code

Section 3781.03 – Enforcement of building standards

3781.06 – Jurisdiction of the building standards; definitions

3781.10 – Duties of the Board of Building Standards

3781.11 – Rules and regulations of the Board of Building Standards

3791.01 – General prohibitions

3791.02 – Prohibition: owner’s failure to obey orders; penalty

3791.03 – Prohibitions: others; penalty

3791.04 – Submission of plans; approvals

Ohio Administrative Code

Division 4101:3 Ohio Plumbing Code

4101:7 Certification Rules

Rule 4101:8-25-01 Residential Code of Ohio, “Plumbing Systems” chapter

Ohio Division of Industrial Compliance

Ohio Revised Code

Section 3703.01 – Division of Industrial Compliance powers and duties

3703.03 – Division to enforce rules governing plumbing and plan approval

3703.05 – Right of entry for plumbing inspectors

3703.06 – Plumbing certificates: issuance, posting, revocation

3703.07 – Plumbing permit required; fee

3703.08 – Duty of the owner to comply with notices

3703.10 – Prosecutions and proceedings for violations

3703.21 – Backflow advisory board; Certification of backflow technicians; civil penalty

3703.99 – Penalties

Ohio Administrative Code

Rule 1301:3-2-02 – Definitions

1301:3-2-03 – Examination for Plumbing Inspector Certification

1301:3-2-04 – Jurisdiction of Plumbing Inspector

1301:3-2-05 – Certificate required for Plumbing inspector

1301:3-2-06 – Certificate Renewal

1301:3-2-07 – Fees for Plumbing inspectors

1301:3-2-08 – Denial, revocation or suspension of a Plumbing inspectors certificate

1301:3-2-09 – Appeals for Plumbing inspector certificates

Rule 1301:3-7-01 – Definitions

1301:3-7-02 – Certification as a Backflow Technician

1301:3-7-03 – Backflow Technician Examination

1301:3.7.04 – Fees for backflow application and examination

1301:3.7.05 – Renewal of Certificate as a Backflow Technician

1301:3.7.06 – Training agency for backflow technician education

1301:3.7.07 – Denial, revocation or suspension of a backflow certificate

1301:3.7.08 – Appeal for backflow technician



Ohio Environmental Protection Agency

Ohio Revised Code

Section 6109.04 – Control of public water systems

6109.07 – Plan submittal and approval

6109.13 – Auxiliary water systems

6109.14 – Notice of the danger of contamination

6109.15 – Orders to make improvements, corrections and changes

6109.31 – Violations

6109.33 – Penalties

6109.34 – Access for inspections and investigations

Ohio Administrative Code

Rule 3745-95-01 – Backflow prevention and cross-connection control definitions

3745-95-02 – Cross-connections

3745-95-03 – Surveys and investigations

3745-95-04 – Where protection is required

3745-95-05 – Type of protection required

3745-95-06 – Backflow prevention devices

3745-95-07 – Booster pumps

3745-95-08 – Violations

3745-95-09 – Requirement for yard hydrants

Chapter 3745-91 – Plan Approval (Rules 3745-91-01 through 3745-91-09)

Ohio Department of Health

Ohio Revised Code

Chapter 3729. – Recreational vehicle parks, recreation camps, combined and temporary park-camps

Ohio Administrative Code

Chapter 3701-25 – Camps

Chapter 3701-26 – Recreational vehicle park, combined park-camps and temporary park-camps (i.e., rule on park or camp water supply; backflow prevention on water supply)

The following portions of the Ohio Revised Code concern the powers and duties of political subdivisions and private companies in Ohio regarding the establishment, operation, maintenance and protection of public water systems and the regulation of plumbing systems within buildings.

County Systems

Section 307.15 – Board of county commissioners; contracts with other units of Government

307.37 – Construction in unincorporated areas

307.38 – County building inspector; duties; hearings

307.381 – County board of appeals may be established

307.40 – Unlawful construction may be enjoyed

Chapter 6103. – County water supply systems; definitions

Section 6115.04 – Sanitary districts: organization and purposes



- 6115.18 – Sanitary districts: powers of the board of directors
- 6115.19 – Sanitary districts: organized to provide a water supply
- 6115.23 – Sanitary districts: board of directors may make and enforce Regulations; noncompliance

Municipal Corporations

- Section 715.01 – General powers
- 715.08 – Water supply
- 715.26 – Building regulation: erection; inspection; removal; repair
- 715.29 – Sanitation
- 717.01 – Specific powers: acquisition of public works
- 731.17 – Procedures for legislation
- 735.02 – Director of Public Service: duties
- 735.03 – Board of Public Utilities
- 735.27 – Villages: care of public institutions
- 735.273 – Village Administrator: powers and duties
- 735.29 – Board of Public Affairs: powers and duties
- 743.02 – Utilities: bylaws and regulations
- 743.12 through 743.16 – Extension of water service outside the corporation limits; supervision; protection
- 743.17 – Water works in a contiguous municipal corporation; protection
- 743.24 – Contract for a water supply; protection

PUCO Regulated Utility Companies

- Chapter 4933. – PUCO regulated utility companies

Conservancy Districts

- Section 6101.04 – Conservancy districts: organizations and purposes
- 6101.13 – Official plan; execution
- 6101.15 – Powers of the board of directors
- 6101.19 – Board of directors may make and enforce rules and regulations

Regional Water and Sewer Districts

- Section 6119.01 – Organization; purpose
- 6119.06 – Rights, powers and duties
- 6119.07 – Powers vested in a board of trustees
- 6119.08 – Rules and regulations
- 6119.35 – Approval or rejection of plans by the Ohio Environmental Protection Agency



APPENDIX B - FIELD FORMS

STATE OF OHIO

Annual Test & Maintenance Report for Backflow Prevention Assemblies

Facility Name: _____ Contact Person: _____
Address: _____

Assembly Information		Installation Information	
Make: _____	_____	Containment _____	Isolation _____
Model: _____	_____	Meter Pit _____	Basement _____ Floor Number: _____
Size: _____	_____	Penthouse _____	Boiler Room _____ Room Number: _____
Serial Number: _____	_____	Mechanical Room _____	Protection Provided: _____

Double Check Assembly			
Initial Test	Outlet Valve		Pass _ Fail _
	1 st Check Valve	___psid	Pass _ Fail _
Date	2 nd Check Valve	___psid	Pass _ Fail _

Reduced Pressure Assembly		
1 st Check Valve	___psid	Pass _ Fail _
Relief Valve Opening Point	___psid	Pass _ Fail _
2 nd Check Valve		Pass _ Fail _
Outlet Valve	Pass _	Fail _

Pressure Vacuum Breaker		
Air Inlet Valve	___psig	Pass _ Fail _
Check Valve	___psig	Pass _ Fail _

Repairs & Materials Used	
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Double Check Assembly			
Re-Test After	Outlet Valve		Pass _ Fail _
	1 st Check Valve	___psid	Pass _ Fail _
Date	2 nd Check Valve	___psid	Pass _ Fail _

Reduced Pressure Assembly		
1 st Check Valve	___psid	Pass _ Fail _
Relief Valve Opening Point	___psid	Pass _ Fail _
2 nd Check Valve		Pass _ Fail _
Outlet Valve	Pass _	Fail _

Pressure Vacuum Breaker		
Air Inlet Valve	___psig	Pass _ Fail _
Check Valve	___psig	Pass _ Fail _

Comments: _____

TESTER CERTIFICATION: *I hereby certify that the above data is correct and that the backflow prevention device is in proper working condition.*

Tester Name (Printed) _____ Signature _____

Company Name _____ Ohio Cert. No. _____ Contractor No _____ Date _____

I hereby certify that the above backflow prevention device has been in constant use at this location during the entire prescribed interval between test periods and during that period this device was not bypassed, made inoperative or removed without proper authorization. I further certify that I have the authority and responsibility to ensure the above.

Owner/Officer (Printed) _____ Signature _____

Title: _____ Date: _____

(D1CL3102)Updated 11/11



TEST REPORT FOR LOW SUCTION PRESSURE CUT-OFF CONTROLLER ON BOOSTER PUMP

Premises Address _____ Company Name _____
Contact Name _____ Contact Phone No: _____
Type of Controller: Fire Pump _____ Domestic Booster Pump _____
Pressure Sustaining Valve _____ Manuf. _____
Model Number Serial Number _____
Type of Inspection: Initial Annual Date of Inspection _____

Yes No
_____ Found the sensing line seal intact
_____ Found the normal power light (green) on

MANUAL START

_____ Low suction light (red) comes on when suction pressure reaches 10 psig
_____ The alarm sounds after a minimum 30 second delay
_____ The pump shuts off immediately after the low suction pressure alarm sounds
_____ The pump has automatic restart when the sensing line is recharged

AUTOMATIC START

_____ Low suction light (red) comes on when suction pressure reaches 10 psig
_____ The alarm sounds after a minimum 30 second delay
_____ The pump shuts off immediately after the low suction pressure alarm sounds
_____ The pump has automatic restart when the sensing line is recharged

RESET PUMP

_____ Opened outlet valve at pump discharge
_____ Pump restarted in manual start mode
_____ Pump restarted in automatic start mode
_____ Resealed sensing line valve in open position

I certify that the low pressure cut-off controller test as described above was performed by me on the date indicated and the findings were as indicated.

INSPECTOR: Signature _____ Printed Name _____

Cert. Tester No _____ Date _____

I certify that the inspection was performed on the date indicated and that the following statement is true:
The low suction pressure cut-off controller has been in uninterrupted use during the interval between inspections and during that period has not been bypassed or otherwise made ineffective.

Company Representative: (Print Name) _____ Date _____

Signature _____ Title _____



CROSS-CONNECTION CONTROL SURVEYS

This form is intended for use as a generic survey form:

Company Name:															
Address:															
Type of Business:															
Contact Person:															
Contact Person's Phone Number:															
Meter Number:															
Meter Size:															
Existing Backflow Preventer Installed	<table border="1"> <thead> <tr> <th>Yes</th> <th>No</th> <th>Size</th> <th>Manufacturer</th> <th>Model</th> <th>Serial Number</th> <th>Date Last Tested</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Yes	No	Size	Manufacturer	Model	Serial Number	Date Last Tested							
Yes	No	Size	Manufacturer	Model	Serial Number	Date Last Tested									

HEATING
<input type="checkbox"/> Forced Air
<input type="checkbox"/> Electric
<input type="checkbox"/> Solar
<input type="checkbox"/> Boiler
<input type="checkbox"/> Chemically Treated
<input type="checkbox"/> Make-up Water From City Water
<input type="checkbox"/> Feed from Chemical Feed Tank
<input type="checkbox"/> ASSE 1013 Installed at Make-up

KITCHEN	
<input type="checkbox"/> Dishwasher	<input type="checkbox"/> ASSE 1001 Installed
<input type="checkbox"/> Soap Eductor	<input type="checkbox"/> ASSE 1001 Installed
<input type="checkbox"/> Garbage Disposal	<input type="checkbox"/> ASSE 1001 Installed
<input type="checkbox"/> CO2 Dispenser	<input type="checkbox"/> ASSE 1032 Installed
<input type="checkbox"/> Ice Machine	<input type="checkbox"/> Air-Gap at Drain Line
<input type="checkbox"/> Hose Bibs	<input type="checkbox"/> ASSE 1011 Installed
<input type="checkbox"/> Other	
<input type="checkbox"/> Other	
<input type="checkbox"/> Other	

MISC EQUIPMENT	
<input type="checkbox"/> Hose Bibs	<input type="checkbox"/> ASSE 1011
<input type="checkbox"/> Eductor	<input type="checkbox"/> ASSE 1001
<input type="checkbox"/> Aspirator	<input type="checkbox"/> ASSE 1001
<input type="checkbox"/> Lab Faucet	<input type="checkbox"/> ASSE 1001
<input type="checkbox"/> Shampoo Hose	<input type="checkbox"/> ASSE 1001
<input type="checkbox"/> Wax Eductor	<input type="checkbox"/> ASSE 1001
<input type="checkbox"/> Thermal Expansion Tank	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Other	
<input type="checkbox"/> Other	

COOLING
<input type="checkbox"/> None
<input type="checkbox"/> Forced Air
<input type="checkbox"/> Chiller
<input type="checkbox"/> Cooling Tower
<input type="checkbox"/> Chemically Treated
<input type="checkbox"/> Make-up Water From City Water
<input type="checkbox"/> Feed from Chemical Feed Tank
<input type="checkbox"/> ASSE 1013 Installed at Make-up
<input type="checkbox"/> Air-Gap at Make-up

THERAPY/POOLS/TANKS/RESERVOIRS	
<input type="checkbox"/> Sitz/ Sonic Bath	<input type="checkbox"/> ASSE 1001 Installed
<input type="checkbox"/> Jacuzzi	<input type="checkbox"/> Air-Gap at Make-Up Line
<input type="checkbox"/> Whirlpool	<input type="checkbox"/> Air-Gap at Make-Up Line
<input type="checkbox"/> Fountain	<input type="checkbox"/> Air-Gap at Make-Up Line
<input type="checkbox"/> Irrigation	<input type="checkbox"/> ASSE 1013 Installed
<input type="checkbox"/> Comm Laundry	<input type="checkbox"/> ASSE 1001 Installed
<input type="checkbox"/> Swimming Pool	<input type="checkbox"/> ASSE 1013 Installed <input type="checkbox"/> Air-Gap at Make-Up Line
<input type="checkbox"/> Wash, Dip, or Rinse Tanks	<input type="checkbox"/> Air-Gap at Make-Up Line
<input type="checkbox"/> Plating or Coolant Tanks	<input type="checkbox"/> Air-Gap at Make-Up Line
<input type="checkbox"/> Other	
<input type="checkbox"/> Other	

AUXILIARY WATER	
<input type="checkbox"/> Well/Cistern	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Tower	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Reservoir	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Interconnected	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> 4-Way/Swing	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Domestic Pump LPS Serial Num.	<input type="checkbox"/> With LPS
<input type="checkbox"/> Fire Pump LPS Serial Num.	<input type="checkbox"/> With LPS
Backflow Preventer on Fire	<input type="checkbox"/> No ASSE _____
Model #of Device	
Serial Number	

Comments: _____

Survey by: _____ Date: _____

Company: _____ Company Phone Number: _____



CROSS-CONNECTION CONTROL SURVEYS

This form is intended for use in a car wash type facility:

Company Name							
Premises address:							
Contact Person:							
Contact Person's Phone Number:							
Meter Number:							
Meter Size:							
Meter Location:							
Existing Backflow Preventer Installed	Yes	No	Size	Manufacturer	Model	Serial Number	Date Last Tested

FACILITY	FIXTURE	Y/N	MIN FIXTURE PROTECTION	Y/N
Car Wash Truck Wash Detailing Shop	Hot water heater		Air gap at T&P valve drain line	
	Soap eductor for wash heads		Vacuum breaker upstream of feed line	
	Wax eductor for wash heads		Vacuum breaker upstream of feed line	
	Utility sink w/ detergent eductor		Vacuum breaker at hose connection or faucet	
	Hose bib		Non-removable vacuum breaker	
	Chemically treated boiler		Reduced pressure assembly on make-up line	
	Chemically treated air conditioning		Reduced pressure assembly on make-up line	
	Drinking Fountains		Air gap & non-self draining	
	Coffee, tea, or hot chocolate machine		Air gap at fill line	
	Sanitary facilities		Air gap at fixtures	
	Recycled wash or rinse reservoir		Air gap at reservoir make-up line	
	Irrigation system		Reduced pressure assembly or Pressure vacuum breaker	
	Murdock type hydrants		Non-self draining if used for sanitary or culinary purposes - Hose bib vacuum breaker if not used for sanitary or culinary purposes	
	Auxiliary water not connected to city water line(tank, reservoir, well, lagoon)		Reduced pressure assembly at water meter	
	Auxiliary water connected to city water line (tank, reservoir, well, lagoon)		Requires Ohio EPA approval; four-way valve or swing connector	
	Backflow preventer, check valve or pressure regulator at meter		Thermal expansion device	
Other		SEE THE BACK OF THIS FORM		

Comments: _____

Survey by: _____ Date: _____
Company: _____ Company Phone Number: _____



CROSS-CONNECTION CONTROL SURVEYS

This form is intended for use in a restaurant type facility:

Company Name							
Premises address:							
Contact Person:							
Contact Person's Phone Number:							
Meter Number:							
Meter Size:							
Meter Location:							
Existing Backflow Preventer Installed	Yes	No	Size	Manufacturer	Model	Serial Number	Date Last Tested

FACILITY	FIXTURE	Y/N	MIN FIXTURE PROTECTION	Y/N
Restaurant	Hot water heater		Air gap at T&P valve drain line	
	Detergent feed to dishwasher		Vacuum breaker upstream of feed line	
Cafeteria	Booster heater to dishwasher		Air gap at drain line	
Lunchroom	Dish rinse unit with flex hose		Vacuum breaker or air gap	
Kitchen	Sink spout detergent eductor		Vacuum breaker	
Food Processing	Utility sink w/ detergent dispenser		Vacuum breaker at hose connection or faucet	
	Pot & pan washer w/ submerged inlet		Vacuum breaker	
	Garbage disposal w/ direct connection		Vacuum breaker	
	Garbage can washer, submerged jet		Vacuum breaker or rinse line 6" above rim	
	Ice machine & chests		Air gap at drain line	
	Hose bib		Non-removable vacuum breaker	
	Post mix carbonated beverage machine		Dual check w/ atmospheric vent	
	Coffee, tea or hot chocolate machine		Air gap at fill line	
	Chemically treated boiler		Reduced pressure assembly on make-up line	
	Chemically treated air conditioning		Reduced pressure assembly on make-up line	
	Sanitary facilities		Air gap at fixtures	
	Irrigation system		Reduced pressure assembly or Pressure vacuum breaker	
	Murdock type hydrants		Non-self draining if used for sanitary or culinary purposes - Hose bib vacuum breaker if not used for sanitary or culinary purposes	
	Drinking Fountains		Air gap & non-self draining	
	Auxiliary water not connected to city water line(tank, reservoir, well, lagoon)		Reduced pressure assembly at water meter	
	Auxiliary water connected to city water line (tank, reservoir, well, lagoon)		Requires Ohio EPA approval; four-way valve or swing connector	
	Backflow preventer, check valve or pressure regulator at meter		Thermal expansion device	
	Other		SEE THE BACK OF THIS FORM	

Comments: _____

Survey by: _____ Date: _____

Company: _____ Company Phone Number: _____



CROSS-CONNECTION CONTROL SURVEYS

This form is intended for use for a fire protection system:

Company Name _____
 Premises address: _____
 Contact Person: _____
 Contact Person's Phone Number: _____
 Meter Number: _____
 Meter Size: _____
 Meter Location: _____

Existing Backflow Preventer Installed	Yes	No	Size	Manufacturer	Model	Serial Number	Date Last Tested

FACILITY	FIXTURE	Y/N	MIN FIXTURE PROTECTION	Y/N
Fire Protection System	Limited area sprinkler (copper)		Check valve	
	Limited area sprinkler (black iron)		Double check valve assembly	
	Fire protection system, wet, no chemicals added		Double check detector check assembly	
	Fire protection system, wet, chemicals added		Reduced pressure detector check assembly	
	Fire protection system, Foamite		Reduced pressure detector check assembly	
	Fire protection system, dry		Check valve on riser prior to pressurized system	
	Fire hydrants, non-self draining		Double check detector check assembly	
	Fire hydrants, self draining		Reduced pressure detector check assembly	
	Antifreeze leg, propylene glycol		Reduced pressure detector check assembly	
	Antifreeze leg, ethylene glycol		Air gap at make-up line	
	Jockey pump only, no chemicals added		Double check detector check assembly	
	Jockey pump only, chemicals added		Reduced pressure detector check assembly	
	Fire protection Booster pump, no chemicals added		Double check detector check assembly & Low-suction pressure cut-off controller	
	Fire protection Booster pump, chemicals added		Reduced pressure detector check assembly & Low-suction pressure cut-off controller	
	Auxiliary water not connected to fire protection system (tank, tower, reservoir, well, lagoon)		Reduced pressure detector check assembly	
	Auxiliary water connected to fire protection system (tank, tower, reservoir, well, lagoon)		Requires Ohio EPA approval; a reduced pressure detector check assembly and a four-way valve or swing connector	
Other		SEE THE BACK OF THIS FORM		

Comments: _____

Survey by: _____ Date: _____
 Company: _____ Company Phone Number: _____



CROSS-CONNECTION CONTROL SURVEYS

This form is intended for use for a fire protection system:

Company Name							
Premises address:							
Contact Person:							
Contact Person's Phone Number:							
Meter Number:							
Meter Size:							
Meter Location:							
Existing Backflow Preventer Installed	Yes	No	Size	Manufacturer	Model	Serial Number	Date Last Tested

FACILITY	FIXTURE	Y/N	MIN FIXTURE PROTECTION	Y/N
Fire Protection System	Limited area sprinkler (copper)		Check valve	
	Limited area sprinkler (black iron)		Double check valve assembly	
	Fire protection system, wet, no chemicals added		Double check detector check assembly	
	Fire protection system, wet, chemicals added		Reduced pressure detector check assembly	
	Fire protection system, Foamite		Reduced pressure detector check assembly	
	Fire protection system, dry		Check valve on riser prior to pressurized system	
	Fire hydrants, non-self draining		Double check detector check assembly	
	Fire hydrants, self draining		Reduced pressure detector check assembly	
	Antifreeze leg, propylene glycol		Reduced pressure detector check assembly	
	Antifreeze leg, ethylene glycol		Air gap at make-up line	
	Jockey pump only, no chemicals added		Double check detector check assembly	
	Jockey pump only, chemicals added		Reduced pressure detector check assembly	
	Fire protection Booster pump, no chemicals added		Double check detector check assembly & Low-suction pressure cut-off controller	
	Fire protection Booster pump, chemicals added		Reduced pressure detector check assembly & Low-suction pressure cut-off controller	
	Auxiliary water not connected to fire protection system (tank, tower, reservoir, well, lagoon)		Reduced pressure detector check assembly	
	Auxiliary water connected to fire protection system (tank, tower, reservoir, well, lagoon)		Requires Ohio EPA approval; a reduced pressure detector check assembly and a four-way valve or swing connector	
	Other		SEE THE BACK OF THIS FORM	

Comments: _____

Survey by: _____ Date: _____
 Company: _____ Company Phone Number: _____



APPENDIX C ASSEMBLY AND DEVICE LEGEND

Backflow Preventer Legend			
A.S.S.E Standard	Legend	Acronym	Testable Device
1001	Atmospheric Type Vacuum Breakers	AVB	No
1002	Anti-siphon Fill Valves (Ballcocks)	ASBC	No
1011	Hose Connection Vacuum Breaker	HBVB	No
1012	Backflow Preventer w/Intermediate Atmospheric Vent	VDCV	No
1013	Reduced Pressure Backflow Prevention Assembly	RPBP	Yes
1015	Double Check Valve Backflow Prevention Assembly	DCV	Yes
1019	Vacuum Breaker Wall Hydrants	HBIVB	No
1020	Pressure Vacuum Breaker Assembly	PVB	Yes
1022	Backflow Preventer for Carbonated Beverage Machine	VMBP	No
1024	Dual Check Valve Type Backflow Preventers	DC	No
1024	Residential Dual Check	RDC	Yes/No
1035	Laboratory Faucet Backflow Preventer	LFVB	No
1037	Pressurized Flushing Devices (Flushometers)	PFD	No
1047	RP Detector Backflow Prevention Assembly	RPDA	Yes
1048	Double Check Detector Backflow Prevention Assembly	DDCV	Yes
1052	Hose Connection Backflow Preventer	HCBP	No
1055	Chemical Dispensing Systems	AG	No
1056	Spill Resistant Vacuum Breaker Assembly	SVB	Yes
1057	Freeze Resistant Yard Hydrant W/Backflow		No
A112.1.2	Air Gap	AG	No
	Single Check Valve	SCV	No



APPENDIX D – NON-RESIDENTIAL PROGRAM NOTICE TEMPLATES

DRAFT V1



Cross Connection Control Program Inspection Notice

RE: [FACILITYNAME] at [SERVICEADDRESS1]

Dear [GREETING]

The purpose of the [ORGNNAME]'s Cross Connection Control Program, as defined in local Ordinance [ORDINANCENUMBER], is to help eliminate possible contamination of the public water distribution system. There are two required components of the program; 1) site inspection and 2) testing of backflow prevention assemblies.

The [ORGNNAME] will be working jointly with inspectors from HydroCorp to conduct these inspections. Thank you in advance for your cooperation in this matter.

As part of this program, an inspection of your facility's internal water system is to be completed. Inspectors will be reviewing your water system for connections that could possibly contaminate the water distribution system. The inspection is tentatively scheduled for **[SCHEDULEDDATE]**. Our inspector will do their best to be on site this day, however, we may be on site the day before or after the scheduled date. The inspection must be completed during normal business hours of 8:00 AM to 5:00 PM, Mon-Fri. If you need a more specific time, please call to arrange an appointment.

Any costs associated with the replacement, modification(s), installation, and/or testing of backflow prevention assemblies is the responsibility of the property owner/manager and/or occupant.

You will be notified following the inspection if modification(s) and/or testing of backflow prevention assemblies are necessary. We look forward to working with you in protecting the drinking water supply. **If you have any questions or concerns, please contact HydroCorp at 1-844-493-7641 or visit their website at www.hydrocorpinc.com/resources/links/. HydroCorp customer service representatives are available Monday-Friday 8am-6pm EST.**



Cross Connection Control Program Inspection Compliance Notice

RE: [FACILITYNAME] at [SERVICEADDRESS1]

Dear [GREETING]

The purpose of the [ORGNNAME]'s Cross Connection Control Program, as defined in local ordinance [ORDINANCENUMBER], is to help eliminate possible contamination of the public water distribution system. There are two required components of the program; 1) site inspection and 2) testing of backflow prevention assemblies.

As part of this program, an inspection of your facility's internal water distribution system was completed on [SCHEDULEDDATE]. Inspectors reviewed your water distribution system for any piping or connections that could possibly contaminate the water distribution system.

Your facility was either found compliant and/or the necessary changes made to comply with local ordinance [ORDINANCENUMBER]. This inspection is valid until your facility's next scheduled inspection date. You will receive future notice for your next inspection date.

If your facility has backflow prevention assemblies requiring testing, you will be receiving additional notice detailing test requirements.

If you have any questions or require additional information, please contact **HydroCorp** at **1-844-493-7641** or visit their website at **www.hydrocorpinc.com**.



Cross Connection Control Program Containment Compliance Notification

RE: [FACILITYNAME] at [SERVICEADDRESS1]

Dear [GREETING]

A Cross Connection Control inspection was performed at your facility. At that time, it was determined that your facility's potable water system is "contained" by an approved, properly installed backflow prevention device or assembly at the main inlet which is intended to minimize the potential backflow threat to the [ORGNAME]'s public water system. Therefore, your facility has met the intent of the inspection portion of the Cross Connection Program as defined in local Ordinance [ORDINANCENUMBER]. Compliance with the inspection portion of the program requirements shall remain in effect until your facility's next scheduled inspection date.

However, to fully meet the intent of the CCC Program, two- (2) items must be addressed:

1. Inspection of the facility: Completed.
2. Successful annual testing of any existing testable backflow prevention assemblies within your facility.

This facility will be in Compliance with the Cross-Connection Control Program when the existing backflow prevention assemblies are tested this year and at yearly intervals hereafter. When it is necessary to test such assemblies, your facility will receive a notification letter in the mail. Testing of backflow prevention assemblies must be completed by a State approved certified tester. A partial listing of testers available in your area can be viewed on HydroCorp's website at watercustomer.com. Following completion of testing and/or repairs, all test results must be entered electronically by your plumber &/or certified tester at gethydrosoft.com.

Note, however, it is still possible for existing cross-connections within your facility to potentially affect the water quality within your internal plumbing system. The installation of an approved backflow preventer at the main inlet does not relieve your facility of the responsibility of providing potable water to your employees and the public. In order to comply with all applicable codes and laws, it is recommended that your facility:

- Have a cross-connection control survey of the potable water piping system performed within your facility.
- Ensure all piping systems downstream of the containment device/assembly are labeled properly.
- Ensure backflow prevention assemblies connected to the potable water supply within your facility are tested annually.

If you have any questions or require additional information, please contact HydroCorp at 1-844-493-7641.



Request for Internal Cross Connection Control Information Notice

RE: [FACILITYNAME] at [SERVICEADDRESS1]

Dear [GREETING]

The purpose of the [ORGNAME]'s Cross Connection Control Program, as defined in the local Ordinance [ORDINANCENUMBER] is to help eliminate direct and potential hazards to the public water distribution system. A cross-connection is an actual or potential connection between the potable water supply and any other environment which may introduce contaminants into the drinking water. We have hired a specialized consulting firm (HydroCorp) to assist in helping water customers comply with the CCC Program.

There are two required components of the CCC program; 1) Site inspection of your plumbing system, and 2) Compliance with the local CCC Ordinance and State Plumbing Code. HydroCorp conducted a cursory CCC assessment of your facility on [LASTSURVEYDATE]. At the time of that initial contact, it was indicated that your facility has not had a thorough cross-connection inspection. Due to the size and complexity of your building(s) and plumbing system(s) the Utility cannot undertake the responsibility of the inspection at your facility.

The [ORGNAME] recommends, but does not require, that your company contract HydroCorp for your initial CCC inspection. This recommendation is because HydroCorp ultimate role in this process would be to "protect the water system" and provide the most cost effective and unbiased opinion of how to correct any cross-connections. However, should you choose to select your own contractor, coordination of services is required with HydroCorp since they have ultimate approval of our CCC program.

If your company has had a complete Cross Connection Control Survey, please provide inspection/survey results of the entire potable water piping system within your facility along with the following required information:

- Testers Certification number of the person(s) conducting the inspection/survey
- A list of all testable backflow preventers with locations, serial # and Regulated Object #
- A list of all non-testable type backflow preventers with locations
- A list of all water connections with no backflow prevention with locations
- A written plan for correcting any cross-connections identified during inspection
- A copy of the survey performed and name and contact information of the company who performed it
- A time frame for correcting all cross-connections found during inspection.

If you have any questions or require additional information, please contact HydroCorp at 1.800.690.6651. Your facility's cooperation in this important safety program is greatly appreciated.



Containment Notice

RE: [FACILITYNAME] at [SERVICEADDRESS1]

Dear [GREETING]

The purpose of the [ORGNOME]'s Cross Connection Control Program, as defined in Ordinance [ORDINANCENUMBER], is to help eliminate possible contamination of the public water distribution system.

“Containment” is the installation of a backflow prevention device, or a testable assembly between the facility and the public water distribution system. Containment assures there is no chance for water of questionable quality to leave your facility and to enter the public water distribution system.

As authorized by Ordinance [ORDINANCENUMBER], the containment backflow prevention assemblies on the attached list are to be installed immediately after the municipal water meter and before the first tap. If a bypass around the backflow prevention assembly is required, the bypass shall also be protected with a backflow prevention assembly of equal protection. Your facility has 30 days to install the assemblies shown on the attached pages.

Please be advised that the installation of containment devices does not relieve your facility of the responsibility of providing potable water to its employees and visitors. To comply with applicable laws, and to ensure the integrity of your internal water distribution system, a comprehensive cross-connection inspection should be completed. If you have any questions, please contact HydroCorp at 1.800.690.6651.



Inspection Non-Compliance Notice 1

RE: [FACILITYNAME] at [SERVICEADDRESS1]

Dear [GREETING]

The purpose of the [ORGNOME]'s Cross Connection Control Program, as defined in the local Ordinance [ORDINANCENUMBER], is to help eliminate possible contamination of the public water distribution system. There are two required components of the program; 1) site inspection and 2) testing of backflow prevention assemblies.

An inspection of your facility's internal water distribution system was completed on [LASTSURVEYDATE]. Inspectors reviewing your water system found connections that could possibly contaminate the public water distribution system. A list of requirements is enclosed.

Requirements on this list must be addressed using only State approved backflow prevention devices. A licensed plumber should be able to assist you with acquiring approved backflow prevention devices. Some backflow prevention devices (assemblies) also require testing by a State Certified Tester. We suggest that the licensed plumber installing the testable assemblies also have the state certification to test assemblies. ***All testable assemblies must be tested immediately at the time of installation and submitted to Hydro Corp at gethydrosoft.com.***

These requirements must be completed within 30 days. After the requirements and devices have been installed (if applicable) please call the number below on or before the date listed above to schedule a compliance inspection. Failure to do so will result in future non-compliant notices.

To arrange for compliance review please contact HydroCorp at 1-844-493-7641. If you require additional information please visit their website at www.hydrocorpinc.com. HydroCorp customer service representatives are available Monday-Friday 8am-6pm EST.



Inspection Non-Compliance Notice 2

RE: [FACILITYNAME] at [SERVICEADDRESS1]

Dear [GREETING]

The purpose of the [ORGNOME]'s Cross Connection Control Program, as defined in local Ordinance [ORDINANCENUMBER], is to help eliminate possible contamination of the public water distribution system. There are two required components of the program; 1) site inspection and 2) testing of backflow prevention assemblies.

An inspection of your facility's internal water distribution system was completed on [LASTSURVEYDATE]. Inspectors reviewing your water system found connections that could possibly contaminate the public water distribution system. **A letter of notification was previously sent to you outlining the required corrective measures.** For your reference, a duplicate list of requirements is enclosed.

Requirements on this list must be addressed using only State approved backflow prevention devices. A licensed plumber should be able to assist you with acquiring approved backflow prevention devices. Some backflow prevention devices (assemblies) also require testing by a State Certified Tester. We suggest that the licensed plumber installing the testable assemblies also have the state certification to test assemblies. **All testable assemblies must be tested immediately at the time of installation and submitted to Hydro Corp at gethydrosoft.com.**

These requirements must be completed within 15 days. After the requirements and devices have been installed (if applicable) please call the number below on or before the date listed above to schedule a compliance inspection. Failure to do so will result in future non-compliant notices.

To arrange for compliance review please contact HydroCorp at 1-844-493-7641. If you require additional information please visit their website at www.hydrocorpinc.com. HydroCorp customer service representatives are available Monday-Friday 8am-6pm EST.



Inspection Non-Compliance – Shut-Off Notice

RE: [FACILITYNAME] at [SERVICEADDRESS1]

Dear [GREETING]

The purpose of the [ORGNAME]'s Cross Connection Control Program, as defined in local Ordinance [ORDINANCENUMBER] is to help eliminate possible contamination of the public water distribution system. There are two required components of the program; 1) site inspection and 2) testing of backflow prevention assemblies.

As part of this program, an inspection of your facility's internal water distribution system was completed on [LASTSURVEYDATE]. Inspectors reviewing your water system found connections that could possibly contaminate the public water distribution system. Two- (2) previous letters of notification were sent to you outlining the required corrective measures. For your reference, a duplicate list of requirements is attached.

We presently have no record or notification from you that the corrective action has been completed. If you have already completed the requirements, please call the number below to schedule a compliance inspection.

You are hereby notified that in accordance with the [ORGNAME]'s Ordinance, the water supply to the above noted premises will be discontinued as of [RESPONSEDATE]. Water service may not be resumed until corrective measures have been addressed.

To arrange for compliance review please contact HydroCorp at 1-844-493-7641. If you require additional information please visit their website at www.hydrocorpinc.com. HydroCorp customer service representatives are available Monday-Friday 8am-6pm EST.

Sincerely,

Name/Title



Cross Connection Control Program Testing Notice

RE: [FACILITYNAME] at [SERVICEADDRESS1] [SERVICEADDRESS2]

Reference #: [REFERENCENUMBER]

Dear [GREETING]

The purpose of the [ORGNAME]'s Cross Connection Control Program, as defined in local ordinance [ORDINANCENUMBER], is to help eliminate possible contamination of the public water distribution system. There are two required components of the program; 1) site inspection and 2) testing of backflow prevention assemblies.

This correspondence addresses testing of backflow prevention assemblies and is independent of previous correspondence pertaining to site inspection(s). Periodic testing of backflow prevention assemblies is required to ensure proper working order.

Our records indicate it is time for testing of backflow prevention assemblies at your facility. The assemblies required to be tested at this time are listed on the following page(s). Testing should be completed in advance of the completion date noted to allow for repair(s) should they be necessary. Testing of backflow prevention assemblies must be completed by a licensed plumber. A partial listing of plumbers available in your area can be viewed on HydroCorp's website at watercustomer.com.

Following completion of testing and/or repairs, all test results must be entered electronically by your plumber at gethydrosoft.com. Test forms will no longer be accepted via mail, fax or email.

Completed test forms are to be entered online by [RESPONSEDATE]. Please retain a copy of the report for your records.

If you have any questions or require additional information, please contact HydroCorp from 8am to 6pm EST Monday through Friday at 1-844-493-7641 or visit their website at hydrocorpinc.com.

REMINDER: HYDROCORP DOES NOT CONDUCT TESTING OF THE BACKFLOW DEVICES.

THE FOLLOWING PAGE(S) MUST BE FORWARDED TO YOUR PLUMBER.



INSERT CLIENT LOGO

Cross Connection Control Program Testing Notice

Sample Person
12345 Somewhere
City, St, Zip

Print Date: [PRINTDATE]

Dear Water Customer, please provide this page(s) to your plumber.

ATTENTION TESTERS ONLY: This correspondence addresses testing of backflow prevention assemblies. Following completion of testing and/or repairs, all test results must be submitted online at gethydrosoft.com. Test forms will no longer be accepted via mail, fax, or email. A one-time registration process must be completed by each tester before any test results are accepted. Assistance with the registration and test form entry process can also be found at gethydrosoft.com. Testers will be required to provide the reference number listed below upon submission of test results for each facility where testing has been completed. If you have any questions or require additional information, please contact HydroCorp at 1-844-493-7641.

Completed test forms are to be entered online by (Print Date).

RE: Facility For Sample Notice at 12345 Somewhere

Reference #: 4C5DA5A9E

Device	Protection	Manufacturer	Model	Serial #	Size	Test Date	Test Status
Location/Comments:							
Line PSI:		CV1:		CV2:		RV:	



Cross Connection Control Program Testing Notice #2

RE: [FACILITYNAME] at [SERVICEADDRESS1] [SERVICEADDRESS2]

Reference #: **[REFERENCENUMBER]**

Dear [GREETING]

The purpose of the [ORGNAME]'s Cross Connection Control Program, as defined in local ordinance [ORDINANCENUMBER], is to help eliminate possible contamination of the public water distribution system. There are two required components of the program; 1) site inspection and 2) testing of backflow prevention assemblies.

This is your second notice pertaining to testing of backflow prevention assemblies and is independent of previous correspondence pertaining to site inspection(s). Periodic testing of backflow prevention assemblies is required to ensure proper working order.

Our records indicate it is time for testing of backflow prevention assemblies at your facility. The assemblies required to be tested at this time are listed on the following page(s). Testing should be completed in advance of the completion date noted to allow for repair(s) should they be necessary. Testing of backflow prevention assemblies must be completed by a State approved certified tester. A partial listing of testers available in your area can be viewed on HydroCorp's website at watercustomer.com.

Following completion of testing and/or repairs, all test results must be entered electronically by your plumber &/or certified tester at gethydrosoft.com. Test forms will no longer be accepted via mail, fax or email.

Completed test forms are to be entered online by [RESPONSEDATE]. Please retain a copy of the report for your records.

If you have any questions or require additional information, please contact HydroCorp from 8am to 6pm EST Monday through Friday at 1-844-493-7641 or visit their website at hydrocorpinc.com.

REMINDER: HYDROCORN DOES NOT CONDUCT TESTING OF THE BACKFLOW DEVICES.

THE FOLLOWING PAGE(S) MUST BE FORWARDED TO YOUR PLUMBER.



INSERT CLIENT LOGO

Cross Connection Control Program Testing Notice

Sample Person
12345 Somewhere
City, St, Zip

Print Date: [PRINTDATE]

Dear Water Customer, please provide this page(s) to your plumber.

ATTENTION TESTERS ONLY: This correspondence addresses testing of backflow prevention assemblies. Following completion of testing and/or repairs, all test results must be submitted online at gethydrosoft.com. Test forms will no longer be accepted via mail, fax, or email. A one-time registration process must be completed by each tester before any test results are accepted. Assistance with the registration and test form entry process can also be found at gethydrosoft.com. Testers will be required to provide the reference number listed below upon submission of test results for each facility where testing has been completed. If you have any questions or require additional information, please contact HydroCorp at 1-844-493-7641.

Completed test forms are to be entered online by 09/15/2017.

RE: Facility For Sample Notice at 12345 Somewhere

Reference #: 4C5DA5A9E

Device	Protection	Manufacturer	Model	Serial #	Size	Test Date	Test Status
Location/Comments:							
Line PSI:		CV1:		CV2:		RV:	



Testing Shut-Off Notice

RE: [FACILITYNAME] at [SERVICEADDRESS1] [SERVICEADDRESS2]

Reference #: **[REFERENCENUMBER]**

Dear [GREETING]

The purpose of the [ORGNOME]'s Cross Connection Control Program, as defined in local ordinance [ORDINANCENUMBER], is to help eliminate possible contamination of the public water distribution system. There are two required components of the program; 1) site inspection, and 2) testing of backflow prevention assemblies.

This your third notice pertaining to testing of backflow prevention assemblies and is independent of previous correspondence pertaining to site inspection(s). Periodic testing of backflow prevention assemblies is required to ensure proper working order.

Our records indicate it is time for testing backflow prevention assemblies at your facility. The assemblies required to be tested are listed on the following page(s). Testing should be completed before the completion date noted to allow for repair(s) if necessary. Testing of backflow prevention assemblies must be completed by a State approved certified tester. A partial listing of testers available in your area can be viewed on HydroCorp's website at hydrocorpinc.com/resources/testers.

You are hereby notified that in accordance with local ordinance, the water supply to the above-mentioned premises will be discontinued as of **[RESPONSEDATE]**. Water service may not be resumed until corrective measures have been addressed.

Following completion of testing and/or repairs, all test results must be entered electronically by your plumber &/or certified tester at gethydrosoft.com. Test forms will no longer be accepted via mail, fax, or email.

If you have any questions or require additional information, please contact HydroCorp at 1.800.690.6651 or visit their website at hydrocorpinc.com.

Sincerely,

[NAME]
[TITLE]



INSERT CLIENT LOGO

Cross Connection Control Program Testing Notice

Sample Person
12345 Somewhere
City, St, Zip

Print Date: [PRINTDATE]

Dear Water Customer, please provide this page(s) to your Plumber.

ATTENTION TESTERS ONLY: This correspondence addresses testing of backflow prevention assemblies. Following completion of testing and/or repairs, all test results must be submitted online at gethydrosoft.com. Test forms will no longer be accepted via mail, fax, or email. A one-time registration process must be completed by each tester before any test results are accepted. Assistance with the registration and test form entry process can also be found at gethydrosoft.com. Testers will be required to provide the reference number listed below upon submission of test results for each facility where testing has been completed. If you have any questions or require additional information, please contact HydroCorp at 1-844-493-7641.

Completed test forms are to be entered online by 09/15/2017.

RE: Facility For Sample Notice at 12345 Somewhere

Reference #: 4C5DA5A9E

Device	Protection	Manufacturer	Model	Serial #	Size	Test Date	Test Status
Location/Comments:							
Line PSI:		CV1:		CV2:		RV:	



APPENDIX F – TEST FORM

STATE OF OHIO

Annual Test & Maintenance Report for Backflow Prevention Assemblies

Facility Name: _____
Address: _____ Contact Person: _____

Assembly Information

Make: _____
Model: _____
Size: _____
Serial Number: _____

Installation Information

Containment _____ Isolation _____
Meter Pit _____ Basement _____ Floor Number: _____
Penthouse _____ Boiler Room _____ Room Number: _____
Mechanical Room _____ Protection Provided: _____

Double Check Assembly			
Initial Test	Outlet Valve		Pass _ Fail _
	1 st Check Valve	___ psid	Pass _ Fail _
Date	2 nd Check Valve	___ psid	Pass _ Fail _

Reduced Pressure Assembly		
1 st Check Valve	___ psid	Pass _ Fail _
Relief Valve Opening Point	___ psid	Pass _ Fail _
2 nd Check Valve		Pass _ Fail _
Outlet Valve	Pass _	Fail _

Pressure Vacuum Breaker		
Air Inlet Valve	___ psig	Pass _ Fail _
Check Valve	___ psig	Pass _ Fail _

Repairs & Materials Used	
--------------------------	--

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Double Check Assembly			
Re-Test After Repairs	Outlet Valve		Pass _ Fail _
	1 st Check Valve	___ psid	Pass _ Fail _
Date	2 nd Check Valve	___ psid	Pass _ Fail _

Reduced Pressure Assembly		
1 st Check Valve	___ psid	Pass _ Fail _
Relief Valve Opening Point	___ psid	Pass _ Fail _
2 nd Check Valve		Pass _ Fail _
Outlet Valve	Pass _	Fail _

Pressure Vacuum Breaker		
Air Inlet Valve	___ psig	Pass _ Fail _
Check Valve	___ psig	Pass _ Fail _

Comments:

TESTER CERTIFICATION: *I hereby certify that the above data is correct and that the backflow prevention device is in proper working condition.*

Tester Name (Printed) _____ Signature _____

Company Name _____ Ohio Cert. No. _____ Contractor No _____ Date _____

I hereby certify that the above backflow prevention device has been in constant use at this location during the entire prescribed interval between test periods and during that period this device was not bypassed, made inoperative or removed without proper authorization. I further certify that I have the authority and responsibility to ensure the above.

Owner/Officer (Printed) _____ Signature _____

Title: _____ Date: _____

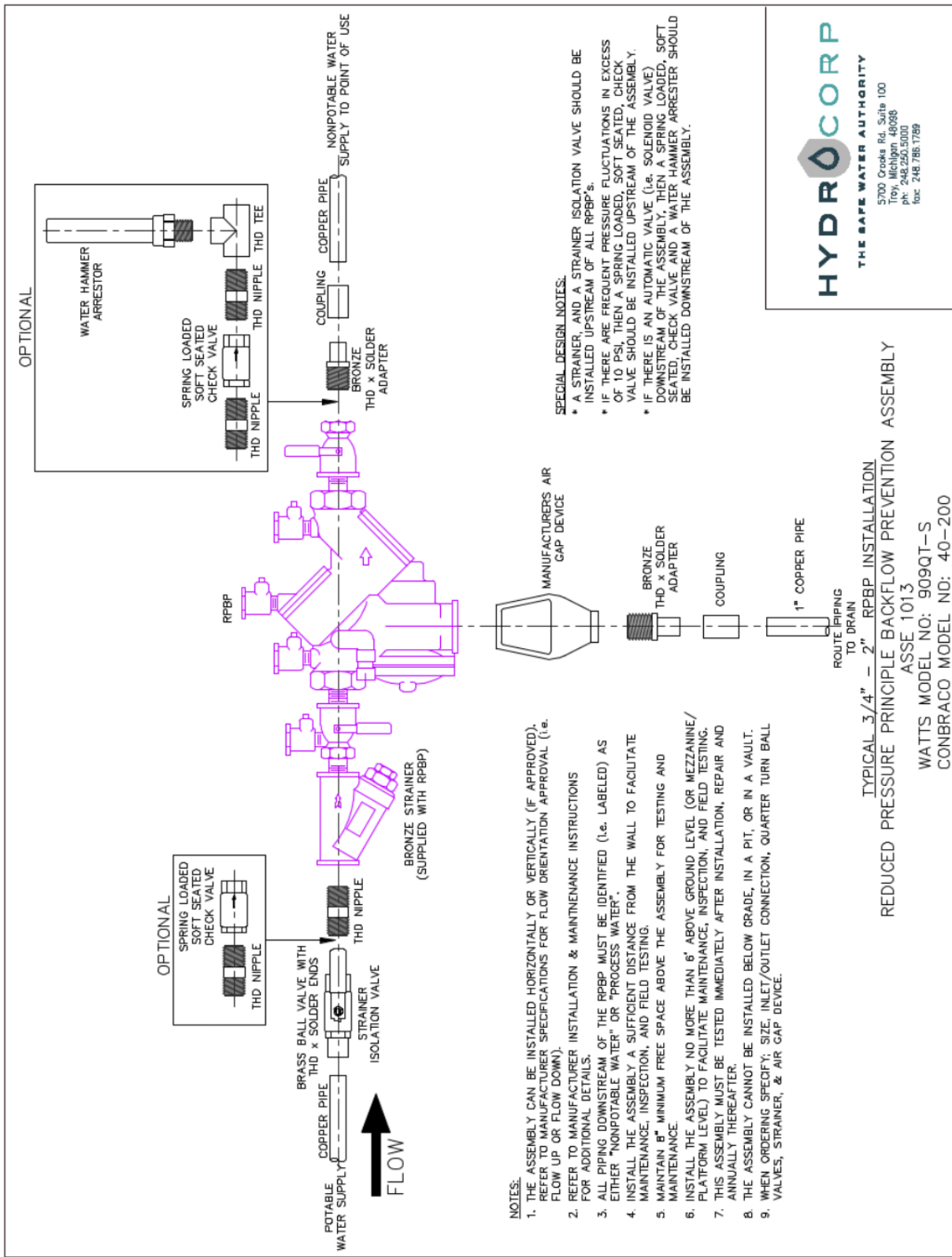
(D1CL3102)Updated 11/11



APPENDIX G – INSTALLATION SCHEMATICS

Drawings contained in this section are only “typical” installations for reference purposes. All new installations must be installed per code and manufacturer specifications.

DRAFT V1



- NOTES:**
1. THE ASSEMBLY CAN BE INSTALLED HORIZONTALLY OR VERTICALLY (IF APPROVED). REFER TO MANUFACTURER SPECIFICATIONS FOR FLOW ORIENTATION APPROVAL (I.e. FLOW UP OR FLOW DOWN).
 2. REFER TO MANUFACTURER INSTALLATION & MAINTENANCE INSTRUCTIONS FOR ADDITIONAL DETAILS.
 3. ALL PIPING DOWNSTREAM OF THE RPBP MUST BE IDENTIFIED (I.e. LABELED) AS EITHER "NONPOTABLE WATER" OR "PROCESS WATER".
 4. INSTALL THE ASSEMBLY A SUFFICIENT DISTANCE FROM THE WALL TO FACILITATE MAINTENANCE, INSPECTION, AND FIELD TESTING.
 5. MAINTAIN 6" MINIMUM FREE SPACE ABOVE THE ASSEMBLY FOR TESTING AND MAINTENANCE.
 6. INSTALL THE ASSEMBLY NO MORE THAN 6' ABOVE GROUND LEVEL (OR MEZZANINE/PLATFORM LEVEL) TO FACILITATE MAINTENANCE, INSPECTION, AND FIELD TESTING.
 7. THIS ASSEMBLY MUST BE TESTED IMMEDIATELY AFTER INSTALLATION, REPAIR AND ANNUALLY THEREAFTER.
 8. THE ASSEMBLY CANNOT BE INSTALLED BELOW GRADE, IN A PIT, OR IN A VAULT.
 9. WHEN ORDERING SPECIFY: SIZE, INLET/OUTLET CONNECTION, QUARTER TURN BALL VALVES, STRAINER, & AIR GAP DEVICE.

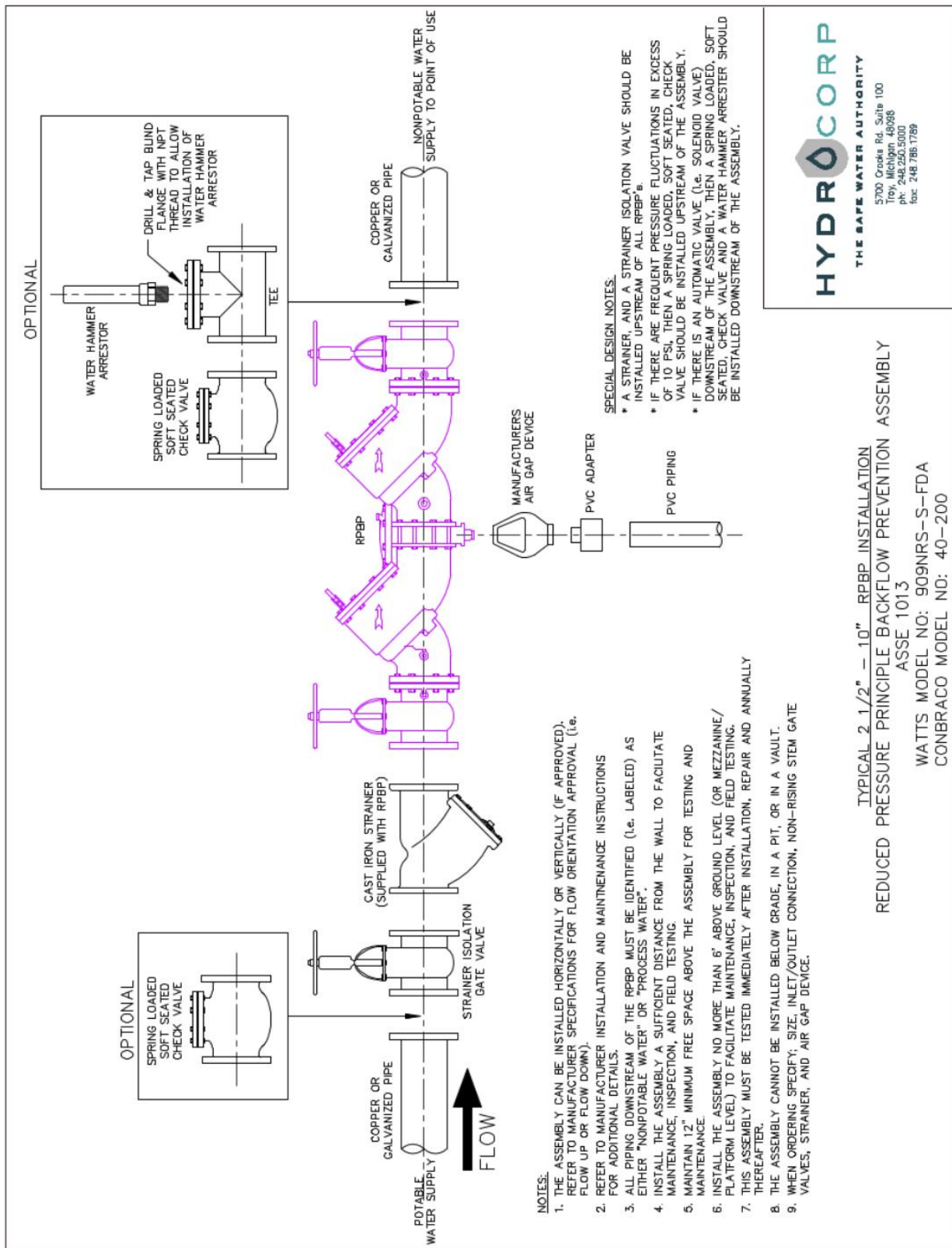
SPECIAL DESIGN NOTES:

- A STRAINER, AND A STRAINER ISOLATION VALVE SHOULD BE INSTALLED UPSTREAM OF ALL RPBP'S.
- IF THERE ARE FREQUENT PRESSURE FLUCTUATIONS IN EXCESS OF 10 PSI, THEN A SPRING LOADED, SOFT SEATED, CHECK VALVE SHOULD BE INSTALLED UPSTREAM OF THE ASSEMBLY.
- IF THERE IS AN AUTOMATIC VALVE (I.e. SOLENOID VALVE) DOWNSTREAM OF THE ASSEMBLY, THEN A SPRING LOADED, SOFT SEATED, CHECK VALVE AND A WATER HAMMER ARRESTER SHOULD BE INSTALLED DOWNSTREAM OF THE ASSEMBLY.

HYDRACORP
 THE SAFE WATER AUTHORITY
 5700 Crooks Rd, Suite 100
 Troy, Michigan 48068
 ph: 248.250.5000
 fax: 248.786.1789

TYPICAL 3/4" - 2" RPBP INSTALLATION
 REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY
 ASSE 1013
 WATTS MODEL NO: 909QT-S
 CONBRACO MODEL NO: 40-200

dwg. name: PWA.dwg effective: 2/27/02

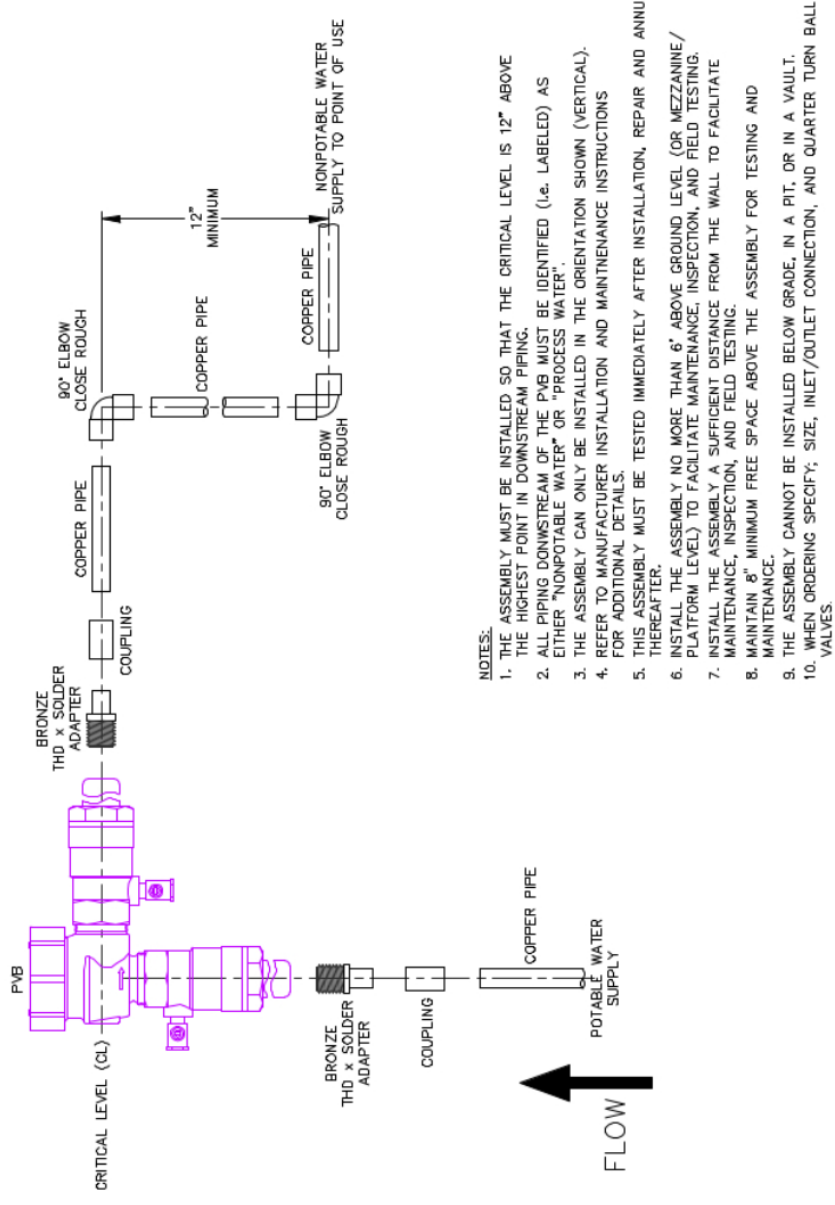


des. name: PW10.dwg eff: date: 2/27/02



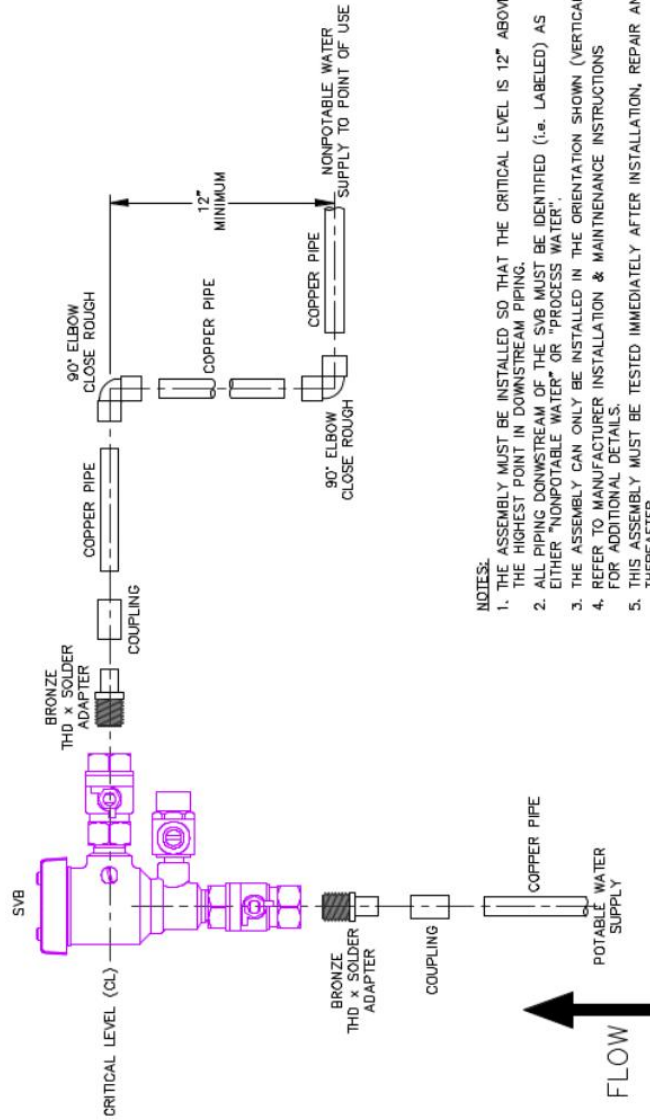
THE SAFE WATER AUTHORITY
 5700 Crooks Rd, Suite 100
 Troy, Michigan 48068
 ph: 248.250.5000
 fax: 248.786.1789

dwg. name: PWB.dwg effective: 2/27/02



- NOTES:**
1. THE ASSEMBLY MUST BE INSTALLED SO THAT THE CRITICAL LEVEL IS 12" ABOVE THE HIGHEST POINT IN DOWNSTREAM PIPING.
 2. ALL PIPING DOWNSTREAM OF THE PVB MUST BE IDENTIFIED (i.e. LABELED) AS EITHER "NONPOTABLE WATER" OR "PROCESS WATER".
 3. THE ASSEMBLY CAN ONLY BE INSTALLED IN THE ORIENTATION SHOWN (VERTICAL). REFER TO MANUFACTURER INSTALLATION AND MAINTENANCE INSTRUCTIONS FOR ADDITIONAL DETAILS.
 4. THIS ASSEMBLY MUST BE TESTED IMMEDIATELY AFTER INSTALLATION, REPAIR AND ANNUALLY THEREAFTER.
 5. INSTALL THE ASSEMBLY NO MORE THAN 6' ABOVE GROUND LEVEL (OR MEZZANINE/PLATFORM LEVEL) TO FACILITATE MAINTENANCE, INSPECTION, AND FIELD TESTING.
 6. INSTALL THE ASSEMBLY A SUFFICIENT DISTANCE FROM THE WALL TO FACILITATE MAINTENANCE, INSPECTION, AND FIELD TESTING.
 7. MAINTAIN 8" MINIMUM FREE SPACE ABOVE THE ASSEMBLY FOR TESTING AND MAINTENANCE.
 8. THE ASSEMBLY CANNOT BE INSTALLED BELOW GRADE, IN A PIT, OR IN A VAULT.
 9. WHEN ORDERING SPECIFY: SIZE, INLET/OUTLET CONNECTION, AND QUARTER TURN BALL VALVES.

TYPICAL PVB INSTALLATION
 PRESSURE VACUUM BREAKER ASSEMBLY
 ASSE 1020
 WATTS MODEL NO: 800M4QT
 CONBRACO MODEL NO: 40-500



NOTES:

1. THE ASSEMBLY MUST BE INSTALLED SO THAT THE CRITICAL LEVEL IS 12" ABOVE THE HIGHEST POINT IN DOWNSTREAM PIPING.
2. ALL PIPING DOWNSTREAM OF THE SVB MUST BE IDENTIFIED (i.e. LABELED) AS EITHER "NONPOTABLE WATER" OR "PROCESS WATER".
3. THE ASSEMBLY CAN ONLY BE INSTALLED IN THE ORIENTATION SHOWN (VERTICAL).
4. REFER TO MANUFACTURER INSTALLATION & MAINTENANCE INSTRUCTIONS FOR ADDITIONAL DETAILS.
5. THIS ASSEMBLY MUST BE TESTED IMMEDIATELY AFTER INSTALLATION, REPAIR AND ANNUALLY THEREAFTER.
6. INSTALL THE ASSEMBLY NO MORE THAN 6' ABOVE GROUND LEVEL (OR MEZZANINE / PLATFORM LEVEL) TO FACILITATE MAINTENANCE, INSPECTION, AND FIELD TESTING.
7. INSTALL THE ASSEMBLY A SUFFICIENT DISTANCE FROM THE WALL TO FACILITATE MAINTENANCE, INSPECTION, AND FIELD TESTING.
8. MAINTAIN 8" MINIMUM FREE SPACE ABOVE THE ASSEMBLY FOR TESTING AND MAINTENANCE.
9. THE ASSEMBLY CANNOT BE INSTALLED BELOW GRADE, IN A PIT, OR IN A VAULT.
10. WHEN ORDERING SPECIFY; SIZE, INLET/OUTLET CONNECTION, AND QUARTER TURN BALL VALVES.

TYPICAL SVB INSTALLATION
 SPILL RESISTANT VACUUM BREAKER ASSEMBLY
 ASSE 1056
 WATTS MODEL NO: 008QT
 CONBRACO MODEL NO: N/A



5700 Crooks Rd. Suite 100
 Troy, Michigan 48068
 PH: 248.250.0000
 FAX: 248.786.1789

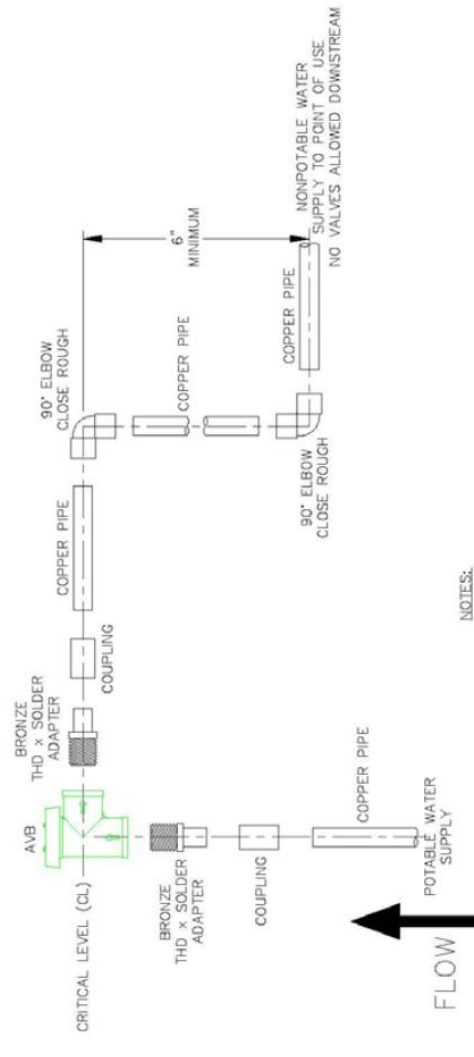
dwg. name: PM4.dwg effective: 2/27/02



HYDRACORP

THE SAFE WATER AUTHORITY
5700 Crooks Rd, Suite 100
Troy, Michigan 48098
ph: 248.250.5000
fax: 248.786.1789

dwg. name: PW6.dwg effective: 2/27/02



- NOTES:
1. THE DEVICE MUST BE INSTALLED SO THAT THE CRITICAL LEVEL IS 6" ABOVE THE HIGHEST POINT IN DOWNSTREAM PIPING.
 2. NO VALVES ARE ALLOWED DOWNSTREAM OF THE AVB.
 3. ALL PIPING DOWNSTREAM OF THE AVB MUST BE IDENTIFIED (I.E. LABELED) AS EITHER "NONPOTABLE WATER" OR "PROCESS WATER".
 4. THE DEVICE CAN ONLY BE INSTALLED IN THE ORIENTATION SHOWN (VERTICAL). REFER TO MANUFACTURER INSTALLATION & MAINTENANCE INSTRUCTIONS FOR ADDITIONAL DETAILS.
 5. WHEN ORDERING SPECIFY: SIZE AND INLET/OUTLET CONNECTION.

TYPICAL AVB INSTALLATION
 ATMOSPHERIC VACUUM BREAKER
 ASSE 1001
 WATTS MODEL NO: 288A-C
 CONBRACO MODEL NO: 38-100

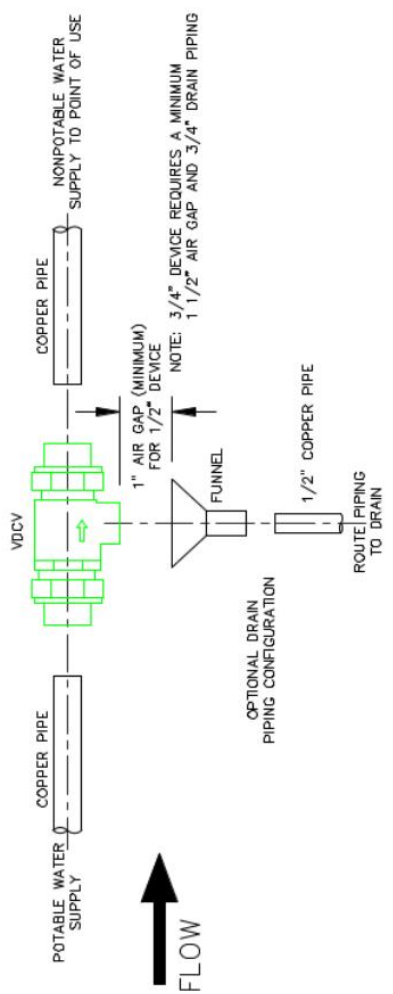


HYDRACORP

THE SAFE WATER AUTHORITY

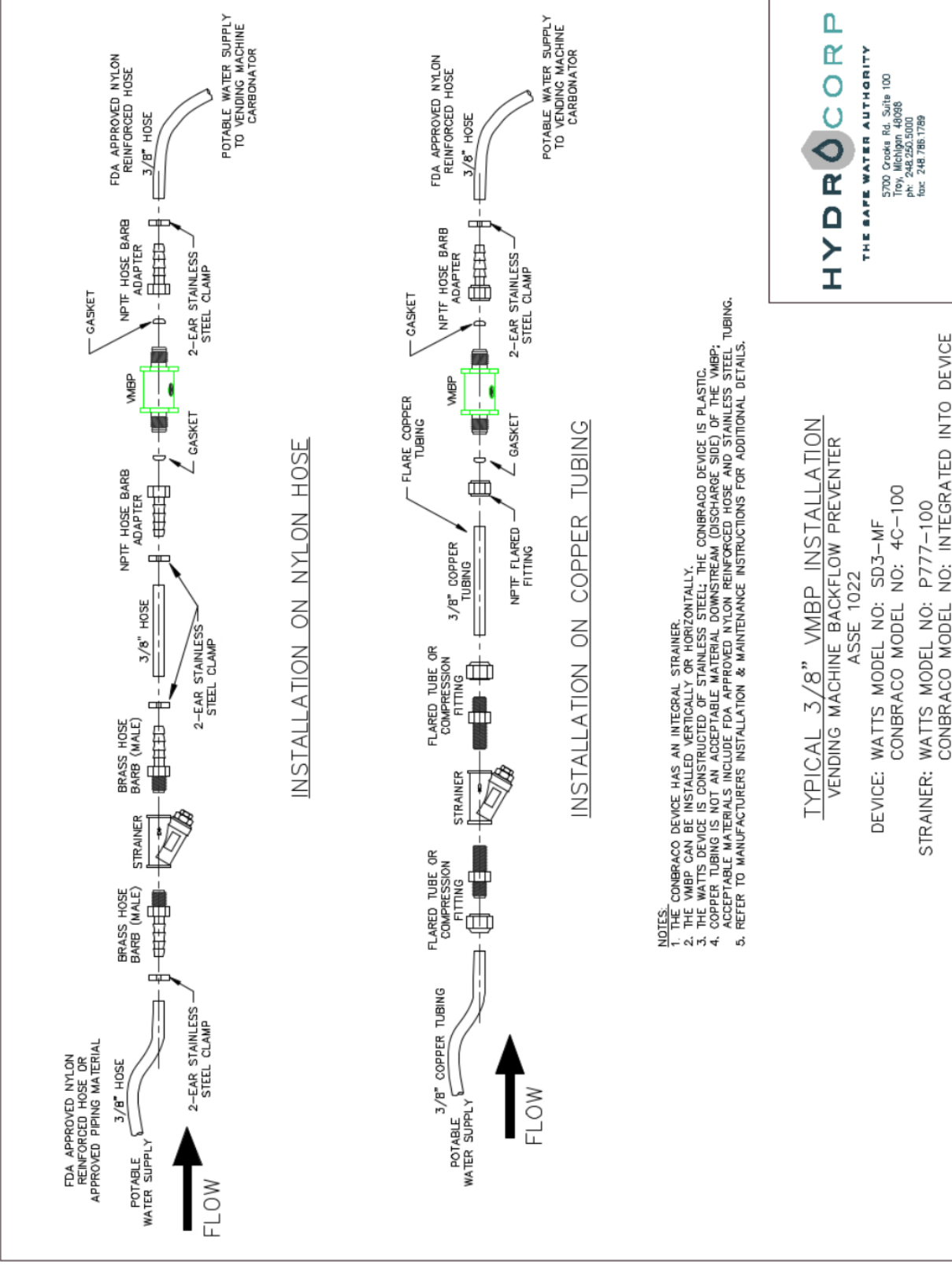
5700 Crooks Rd, Suite 100
Troy, Michigan 48068
ph: 248.250.5000
fax: 248.786.1789

dwg. name: PWS.dwg effective: 2/27/02



- NOTES:
1. THE VDCV CAN BE INSTALLED VERTICALLY OR HORIZONTALLY.
 2. ENSURE VENT FROM THE DEVICE IS ORIENTED IN THE DOWN POSITION.
 3. REFER TO MANUFACTURERS' INSTALLATION & MAINTENANCE INSTRUCTIONS FOR ADDITIONAL DETAILS.
 4. WHEN ORDERING SPECIFY: SIZE & INLET/OUTLET CONNECTION.

TYPICAL VDCV INSTALLATION
 VENTED DUAL CHECK VALVE
 ASSE 1012
 WATTS MODEL NO: 9D
 CONBRACO MODEL NO: 40-400



INSTALLATION ON NYLON HOSE

INSTALLATION ON COPPER TUBING

- NOTES:
1. THE CONBRACO DEVICE HAS AN INTEGRAL STRAINER.
 2. THE VMBP CAN BE INSTALLED VERTICALLY OR HORIZONTALLY.
 3. THE WATTS DEVICE IS CONSTRUCTED OF STAINLESS STEEL; THE CONBRACO DEVICE IS PLASTIC.
 4. COPPER TUBING IS NOT AN ACCEPTABLE MATERIAL DOWNSTREAM (DISCHARGE SIDE) OF THE VMBP.
 5. ACCEPTABLE MATERIALS INCLUDE FDA APPROVED NYLON REINFORCED HOSE AND STAINLESS STEEL TUBING.

TYPICAL 3/8" VMBP INSTALLATION
VENDING MACHINE BACKFLOW PREVENTER
 ASSE 1022

DEVICE: WATTS MODEL NO: SD3-MF
 CONBRACO MODEL NO: 4C-100

STRAINER: WATTS MODEL NO: P777-100
 CONBRACO MODEL NO: INTEGRATED INTO DEVICE

HYDROCORP
 THE SAFE WATER AUTHORITY
 5700 Crooke Rd, Suite 100
 Troy, MI 48066
 PH: 248.262.5000
 FAX: 248.786.1789