

SECTION XIV: BACKFLOW PREVENTION AND CROSS-CONNECTION CONTROL

14.1 Backflow Prevention & Cross-Connection Control Program Purpose

The County is obligated to take all measures necessary to protect its water distribution from contamination including the flow of untreated water or other liquids, mixtures, or substances into the County's system from customer's piping, auxiliary water systems, irrigation systems, booster pumps, or fire protection systems. Ohio Administrative Code section 3745-95 contains the Ohio EPA requirements for all backflow prevention and cross-connection control programs. This section provides additional clarification regarding the County's program. If a conflict exists between OAC 3745-95 and the following requirements, the more stringent requirement shall prevail. The purpose of these Rules and Regulations is to:

1. protect the County's public potable water supply from contamination or pollution by isolating within the consumer's water system contaminants or pollutants which could backflow through the service connection into the County's public water system, and
2. promote the elimination or control of existing cross-connections, actual or potential, between the public or consumer's potable water system and non-potable water systems, plumbing fixtures and sources or systems containing process fluids, and
3. provide for the maintenance of a continuing program of backflow prevention and cross-connection control which will systematically and effectively prevent the contamination or pollution of the public and consumer's potable water systems.

The County shall be responsible for the protection of the public water system from contamination due to backflow of contaminants through the water service connection. If, in the judgment of the County, an approved backflow prevention assembly is necessary at the water service connection to any consumer's premises for the safety of the water system, the County shall give notice to the consumer to install such approved backflow prevention assembly at each service connection to their premises. The consumer shall immediately install such approved assembly or assemblies at their own expense, and failure, refusal or inability on the part of the consumer to install such assembly or assemblies immediately shall constitute grounds for discontinuing water service to the premises until such assemblies have been installed.

14.2 Definitions (OAC 3745-95-01)

The following definitions shall apply in the interpretation and enforcement of these rules and regulations as they relate to this section:

- a. "Air gap separation" means the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, or other device and the flood level rim of the receptacle.

- b. “Approved” means that a backflow prevention device or method has been accepted by the County as suitable for the proposed use.
- c. “Auxiliary water system” means any water system on or available to the premises other than the public water system and includes the water supplied by the system. These auxiliary waters may include water from another supplier’s public water system; or water from a source such as wells, lakes, or streams; or process fluids; or used water. They may be polluted or contaminated or objectionable or constitute a water source or system over which the supplier of water does not have control.
- d. “Backflow” means the flow of water or other liquids, mixtures, or substances into the distributing pipes of a potable water supply from any other source other than the intended source of the potable water supply.
- e. "Backflow preventer" means any assembly, device, method, or type of construction intended to prevent backflow into a potable water system.
- f. “Consumer” means the owner or person in control of any premises supplied by or in any manner connected to a public water system.
- g. “Consumer’s water system” means any water system, located on the consumer’s premises, supplied by or in any manner connected to a public water system. A household plumbing system is considered to be a consumer’s water system.
- h. “Containment principle backflow preventer” – A backflow preventer that is installed in a consumer’s water system, that is intended to contain the water within the premises to prevent any polluted or contaminated water from backflowing into the public water system. Typically the containment principle backflow preventer is placed at the service connection, unless alternate placement is approved by the County.
- i. “Contamination” means an impairment of the quality of the water by sewage or process fluid or waste to a degree which could create an actual hazard to the public health through poisoning or through spread of disease by exposure.
- j. “Cross-connection” means any arrangement whereby backflow can occur.
- k. “Degree of hazard” is a term derived from an evaluation of the potential risk to health and the adverse effect upon the potable water system.
- l. “Director” means the director of the Ohio Environmental Protection Agency or his duly authorized representative.

- m. “Double check valve assembly” means an assembly composed of two single, independently acting, check valves including tightly closing shutoff valves located at each end of the assembly and suitable connections for testing the water-tightness of each check valve.
- n. “Health hazard” means any condition, device, or practice in a water system or its operation that creates, or may create, a danger to health and well-being of users. The word “severe” as used to qualify “health hazard” means a hazard to the health of the user that could reasonably be expected to result in significant morbidity or death.
- o. “Interchangeable connection” means an arrangement or device that will allow alternate but not simultaneous use of two sources of water.
- p. “Non-potable water” means water not safe for drinking, personal, or culinary use.
- q. “Person” means the state, any political subdivision, public or private corporation, individual, partnership, or other legal entity.
- r. “Pollution” means the presence in water of any foreign substance that tends to degrade its quality so as to constitute a hazard or impair the usefulness or quality of the water to a degree which does not create an actual hazard to the public health but which does adversely and unreasonably affect such waters for domestic use.
- s. “Potable water” means water which is satisfactory for drinking, culinary, and domestic purposes and meets the requirements of the Ohio Environmental Protection Agency.
- t. "Premises" means any building, structure, dwelling or area containing plumbing or piping supplied from a public water system.
- u. “Process fluids” means any fluid or solution which may be chemically, biologically or otherwise contaminated or polluted in a form or concentration such as would constitute a health, pollution, or system hazard if introduced into the public or a potable consumer’s water system. This includes, but is not limited to:
 - i. polluted or contaminated waters;
 - ii. process waters;
 - iii. used waters originated from the public water system which may have deteriorated in sanitary quality;
 - iv. cooling waters;
 - v. contaminated natural waters taken from wells, lakes, streams, or irrigation systems;
 - vi. chemicals in solution or suspension; and

- vii. oils, gases, acids, alkalis, and other liquid and gaseous fluids used in industrial or other processes, or for fire fighting purposes.
- v. “Public water system” consists of the treatment plants, distribution system and water mains of the water system under the control of the County up to the point of the consumer’s water meter.
- w. “Reduced pressure principle backflow prevention assembly” means an assembly containing a minimum of two independently acting check valves together with an automatically operated pressure differential relief valve located between two check valves. During normal flow and the cessation of normal flow, the pressure between these two checks shall be less than the supply pressure. In case of leakage of either check valve, the differential relief valve, by discharging to the atmosphere, shall operate to maintain the pressure between the check valves at less than the supply pressure. The unit must include tightly closing shutoff valves located at each end of the device, and each device shall be fitted with properly located test cocks.
- x. “Service connection” means the terminal end of a service line from the public water system, where the County’s service and responsibility ceases. This location is the water meter is installed at the end of the service.
- y. “Supplier of water” means the Warren County Water and Sewer Department which is the owner and operator of a public water system.
- z. “System hazard” means a condition posing an actual or potential threat of damage to the physical properties of the public water system or a potable consumer’s water system.
- aa. “Pollutional hazard” means a condition through which an aesthetically objectionable or degrading material not dangerous to health may enter the public water system or a potable consumer’s water system.
- bb. “Used water” means any water supplied by the County to a consumer’s water system after it has passed through the water meter service connection and is no longer under the control of the supplier.

14.3 Cross-Connections Prohibited (OAC 3745-95-02)

- a. No water service connection shall be installed or maintained to any premises where actual or potential backflow cross-connections to the County’s water system or consumer’s water system may exist unless such actual or potential cross-connections are abated or controlled to the satisfaction of the County.
- b. No person shall install or maintain a connection between the County’s water system or consumer’s water system and an auxiliary water system unless the

auxiliary water system, the method of connection, and the use of such system is approved by the County and by the director of Ohio EPA as required by ORC Section 6019.13.

14.4 Survey and Investigations (OAC 3745-95-03)

- a. The consumer's premises shall be accessible at all reasonable times to the County, for the purpose of performing surveys and investigations of water use practices within the consumer's premises 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 County's water system.
- b. On request by the County, the consumer shall furnish information on water use practices within their premises.
- c. It shall be the responsibility of the water consumer to conduct periodic surveys of water use practices on their premises to determine whether there are actual or potential cross-connections in their water system through which contaminants or pollutants could backflow into their or the public potable water system.

14.5 Where Protection Is Required (OAC 3745-95-04)

- a. An approved backflow prevention assembly shall be installed on each service line to a consumer's private water system, where in judgment of the County, actual or potential hazards to the public potable water system exist.
- b. An approved backflow prevention assembly shall be installed on each service line to a consumer's water system serving premises where the following conditions exist:
 - i. Landscape Irrigation Systems - Premises that have and maintain a landscaping irrigation system that is connected to the County water system;
 - ii. Fire Protection Systems - Premises that have and maintain a fire protection system that is connected to the County water system;
 - iii. Nonresidential Services - Premises that are not single or two family residential homes but that operate a commercial, industrial, retail, or multifamily business.
 - iv. Residential Service – Single or two family residential dwellings.
 - v. Auxiliary Water Systems - Premises having an auxiliary water system, unless such auxiliary system is accepted as an additional source by the

County and the source is approved by the Director of the Ohio Environmental Protection Agency;

- iv. Potentially Hazardous Systems - Premises on which any substance is handled in such a fashion as to create an actual or potential hazard to the County water system. This shall include premises having sources or systems containing process fluids or waters originating from the public potable water system which are no longer under the sanitary control of the County;
 - vii. Internal Cross-Connections - Premises having internal cross-connections that, in the judgment of the County, are not correctable or intricate plumbing arrangements which make it impractical to determine whether or not cross-connections exist;
 - viii. Secured Facilities - Premises, where, because of security requirements or other prohibitions or restrictions, it is impossible or impractical to make a complete cross-connection survey;
 - ix. Systems with Prior Issues - Premises having a repeated history of cross-connections being established or re-established;
 - x. Others - As specified by the County or Director of Ohio EPA.
- c. An approved backflow prevention assembly shall be installed on each service line to a consumer's water system serving, but not necessarily limited to, the following types of facilities unless the County or the Director of Ohio EPA determines that no actual or potential hazard to the public water system exists:
- 1. Hospitals, mortuaries, clinics, nursing homes;
 - 2. Laboratories;
 - 3. Piers, docks, waterfront facilities;
 - 4. Sewage treatment plants, sewage pumping stations or storm water pumping stations;
 - 5. Food or beverage processing plants;
 - 6. Industrial customers including chemical plants, metal plating industries, petroleum processing or storage plants, Radioactive material processing plants, or nuclear reactors;
 - 7. Multifamily residential plants.
 - 8. Commercial facilities including restaurants, hotels, and office complexes.
 - 9. Car washes;
 - 10. Others specified by the County or Ohio EPA.
- d. An approved backflow prevention assembly shall be installed at any point of connection between the County or consumer's water system and an auxiliary water system, unless such auxiliary system is accepted as an additional source by

the County and the source is approved by the Director of the Ohio Environmental Protection Agency.

14.6 Type of Protection Required (OAC 3745-95-05 and 3745-95-06)

A. The type of protection required under Sections 14.5 of these regulations shall depend on the degree of hazard which exists, and the requirements as follows:

1. Landscape Irrigation Systems – Service connections with landscape irrigation systems shall be equipped with a Reduced Pressure Principle Backflow Prevention Assembly. The assembly shall be lead free, conform to **ASSE 1013** and NSF/ANSI 61, and shall be by the following:

- i. Zurn Wilkins, Model 975XL2
- ii. Watts, Series LF909, Series LF009, or Series LF919.

Pressure Vacuum Breaker Assemblies conforming to ASSE 1020 and NSF/ANSI 61 may be acceptable on existing irrigation systems provided all the following conditions apply:

1. The assembly is equipped with test ports and is annually tested and certified as operating property by a qualified technician.
2. The assembly is installed in an upright position and at least 12-inches above the highest irrigation nozzle.
3. The irrigation system is a water-only system with no chemical additives that is not subjected to backpressure and is not equipped with pumps, tanks, or other equipment which can create backpressure to the public or the consumer's water system. ,

Existing Pressure Vacuum Breaker assemblies that fail to pass the annual test shall be replaced with a Reduced Pressure Principle Backflow Prevention Assembly (ASSE 1013).

2. Fire Protection Systems

- i. *Additives* - Systems containing additives shall be equipped with an air-gap separation that conforms to ANSI Standard A112.1.2 "Air-Gaps in Plumbing Systems". Systems that are not equipped with Air-Gaps must be reviewed and receive written approval from the Sanitary Engineer.
- ii. *Auxiliary Source* - Systems containing connections to stored water, or an auxiliary water source shall be equipped with a Reduced Pressure Principle Detector Check assembly that is lead free, conforms to **ASSE 1047** and NSF/ANSI 61, and shall be by the

following:

- a. Zurn Wilkins, Model 375DA, 375ADA, 374ASTDA, 475DA, or 475DAV
 - b. Watts, Series 909RPDA, 994RPDA, or LF957RPDA
- ii. *Simple Fire Protection Systems or Simple Systems with Pumps*
Simple fire protection systems contain no additives, auxiliary water system connections, or stored water. These systems with or without booster pumps shall be equipped with a Double Check Valve assembly that conforms to **ASSE 1015** and NSF/ANSI 61, or a Double Check Detector Check assembly that is lead free, conforms to **ASSE 1048** and NSF/ANSI 61, and shall be by the following
- a. Zurn Wilkins, Model 350, 350A, 350AST, 350DA, 350ADA, 350ASTDA, 450 or 450DA
 - b. Watts, Series 757, 757N, LF709, 774, LF757DCDA, LF757NDCDA, or 774DCDA
- iii. *Auxiliary Sources* – Fire Protection Systems that use an auxiliary water system for fire protection must be equipped with an approved air-gap separation or an approved interchangeable connection. An interchangeable connection, to be approved, shall be either a swing type connector or a four-way valve mechanism which unseats the plug, turns it ninety degrees and reseats the plug. Four-way valves shall stop valves on each pipe connected to the valve. The telltale port on the four-way valve shall have no piping connected and the threads or flange on this port shall be destroyed so that a connection cannot be made.
3. Nonresidential Services – Service connections to commercial, industrial, retail, governmental, or multifamily business shall be equipped with a Reduced Pressure Principle Backflow Prevention Assembly. These services have the potential to contaminate the public water system resulting in a system or health hazard. The assembly shall be lead free, conform to **ASSE 1013** and NSF/ANSI 61, and shall be by the following:
- i. Zurn Wilkins, Model 975XL2
 - ii. Watts, Series LF909, Series LF009, or Series LF919.

Upon determining that a low hazard exists, the Sanitary Engineer or their designee may approve the installation of a double check backflow

prevention assembly equipped with two independently-acting check valves, tightly closing inlet & outlet valves, and four test cocks (ASSE 1015) at multifamily developments where installation of a ASSE 1013 device is not practical.

4. Residential Services – Residential services are considered low hazard and therefore, as a minimum, shall be equipped with a device comprising of two independently acting check valves to be installed where the service line enters the structure. The assembly shall be lead free, conform to **ASSE 1024** and NSF/ANSI 61.
5. Severe Health Hazards - An approved air gap separation shall be installed where the public water system may be contaminated with substances that could cause severe health hazard that could reasonably be expected to result in significant morbidity or death. The air gap separation shall conform to ANSI Standard A112.1.2.

14.7 Backflow Prevention Devices (OAC 3745-95-06)

A. Installation

1. Any containment principle backflow preventer required by the County shall be installed at a location and in a manner approved by the County and shall be installed at the expense of the water consumer.
2. Backflow prevention assemblies installed on the service line to a consumer's water system shall be located on the consumer's side of the water meter, as close to the meter as is reasonably practical, and prior to any other connection.
3. Pits or vaults shall be of water-tight construction, be so located and constructed as to prevent flooding and shall be maintained free from standing water by means of either a sump and pump or a suitable drain. Such sump pump or drain shall not connect to a sanitary sewer nor permit flooding of the pit or vault by reverse flow from its point of discharge. An access ladder and adequate natural or artificial lighting shall be provided to permit maintenance, inspection and testing of the backflow prevention device.
4. Reduced pressure principle backflow prevention assembly must be installed above ground level or floor level, whichever is higher and shall have a minimum 12-inch gap between grade and the bottom of the unit to allow for visual inspection of the relief port.
5. It shall be the duty of the water consumer to maintain any containment principle backflow preventer in proper working order and in continuous operation.

B. Inspection and Maintenance

1. It shall be the duty of the consumer at any premises on which backflow preventers required by these regulations are installed to have inspections, tests, and overhauls made in accordance with the following schedule, or more often where inspections indicate a need. Residential services that are not equipped with irrigation systems are considered low hazard and there are not required to perform annual inspections unless directed by the County.
 - i. Double check valve assemblies shall be inspected and tested for tightness at the time of installation and at least every twelve months thereafter. They shall be dismantled, inspected internally, cleaned and repaired whenever needed.
 - ii. Air gap separations shall be inspected at the time of installation and at least every twelve months thereafter;
 - iii. Reduced pressure principle backflow prevention assemblies shall be inspected and tested for tightness at the time of installation and at least every twelve months thereafter.
 - iv. Interchangeable connections shall be inspected at the time of installation and at least every twelve months thereafter.
2. Inspections, tests, and overhauls of backflow prevention assemblies shall be made at the expense of the water consumer and shall be performed by a person that is registered with the Ohio Department of Commerce, Division of Industrial Compliance or the Operator Training Committee of Ohio. The person shall be specifically certified to inspect, test and overhaul backflow prevention assemblies. Inspections and work performed on each backflow prevention containment device shall be documented on the County's Annual Test & Maintenance Report form and kept by the consumer.
3. The water consumer shall submit to the County a completed Annual Test & Maintenance Report form for each containment device along with an administrative processing fee.
4. Whenever backflow prevention assemblies required by these regulations are found to be defective, they shall be repaired, overhauled or replaced at the expense of the consumer without delay.
5. Backflow preventers shall not be bypassed, made inoperative, removed or otherwise made ineffective without specific authorization by the County.

14.8 Booster Pumps (OAC 3745-95-07)

- A. Domestic Service - For booster pumps not intended to be used for fire suppression, such booster pump shall be equipped with a low pressure cut-off designed to shut-off the booster pump when the pressure in the service line on the suction side of the pump drops to ten pounds per square inch gauge or less.
- B. Fire Protection - For booster pumps, or fire pumps, used for fire suppression installed after August 8, 2008, such booster pump, or fire pump, shall be equipped with one of the following:
 - 1. A low suction throttling valve on the booster pump discharge, which throttles the discharge of the pump when necessary so that suction pressure will not be reduced below ten pounds per square inch gauge while the pump is operating; or,
 - 2. The fire pump is equipped with a variable speed suction limiting control on the booster, or fire, pump. The speed control system must be used to maintain a minimum suction pressure of ten pounds per square inch gauge at the pump inlet by reducing the pump driver speed while monitoring pressure in the suction piping through a sensing line.
- C. It shall be the duty of the water consumer to maintain the low pressure cut-off device, low suction throttling valve, or variable speed suction limiting control, in proper working order and to certify to the County, at least once every twelve months that the minimum pressure sustaining method in place is operating properly.

14.9 Violations (OAC 3745-95-08)

- A. The County shall deny or discontinue, after reasonable notice to the occupants thereof, the water service to any premises wherein any backflow prevention device required by these regulations is not installed, tested and maintained in a manner acceptable to the County, or if it is found that the backflow preventer has been removed or by-passed, or if an unprotected cross-connection exists on the premises, or if the minimum pressure sustaining method required by these regulations is not installed and maintained in working order.
- B. Water service to such premises shall not be restored until the consumer has corrected or eliminated such conditions or defects in conformance with these regulations and to the satisfaction of the County.

14.10 Requirements for Yard Hydrants (OAC 3745-95-09)

- A. Yard Hydrants with weep holes.
 - 1. Yard hydrants with weep holes used for human consumption shall not be permitted.

2. Yard hydrants with weep holes not used for human consumption installed on a public water system, and those installed on a consumer's water system, shall be equipped with a device comprising of two independently acting check valves , shall be lead free, conform to ASSE 1024 and NSF/ANSI 61 to protect the public water system. Yard hydrants with weep holes installed on public water systems shall be clearly labeled as "non-potable, do not drink" or "not for human consumption.

B. Sanitary yard hydrants that do not have weep holes, are allowed to be used for human consumption provided the following conditions:

1. Sanitary yard hydrants shall conform to the "American Society of Sanitary Engineers (ASSE) Standard 1057.
2. Sanitary Yard Hydrants shall be Woodford Mfg Co. Model S3 or S4H, Hoepfner Perfected Products Model 213, or equivalent by Murdock-SuperSecur.
3. All hose connections shall be equipped with a hose connection backflow preventer ASSE 1052 assembly.

