



## **MEADVILLE AREA WATER AUTHORITY**

18160 Rogers Ferry Rd. ♦ Meadville, PA 16335 ♦ (814) 724-6057 ♦ Fax (814) 337-3105

Website: [www.mawa.us](http://www.mawa.us)

# **POLICY FOR THE CONTROL OF CROSS-CONNECTION AND BACKFLOW PREVENTION**

**Effective 1997**

**Amended: June 27, 2011**

**Amended: November 8, 2014**

**Prepared by**



AMERICAN WATER

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# **POLICY FOR THE CONTROL OF CROSS-CONNECTION AND BACKFLOW PREVENTION**

## **01. GENERAL:**

The purposes of the Policy for the Control of Cross-Connection and Backflow Prevention are to:

1. Protect the Meadville Area Water Authority (MAWA) potable water system from contamination or pollution by preventing contaminants and pollutants within the water systems of customers from entering the MAWA water system.
2. Provide for the maintenance of a continuing program of cross-connection control by requiring the installation of approved backflow prevention assemblies and requiring the certification and operational testing of all testable backflow prevention assemblies.
3. Comply with federal regulations related to cross-connections and backflow prevention, including, without limitation, those of the PA Department of Environmental Protection and the Environmental Protection Agency.

## **02. STATUTES:**

The Department of Environmental Protection (DEP) is authorized under the Pennsylvania Safe Drinking Water Act to establish standards for the construction of a water supply to assure compliance with the provisions of the act. Accordingly, Section 109.608 of the department's rules and regulations, requires that "a MAWA system may not be designed or constructed in a manner which creates cross-connection." In addition, Section 109.709(b) further requires that "At the direction of the department, the MAWA supplier shall develop and implement a comprehensive control program for the elimination of existing cross-connections or the effective containment of sources of contaminations and prevention of future cross-connections." The purpose of this part of the Policy for the Control of Cross-Connection and Backflow Prevention is to provide the basic information needed to develop this program.

### ***§ 109.608. Cross-connections.***

A public water system may not be designed or constructed in a manner which creates a cross-connection.

### ***Source***

The provisions of this § 109.608 adopted December 7, 1984, effective December 8, 1984, 14 Pa.B. 4479.

### ***§ 109.709. Cross-connection control program.***

(a) No person may introduce contaminants into a public water supply through a service connection of a public water system.

- (1) It shall be the responsibility of the customer to eliminate cross-connections or provide backflow devices to prevent contamination of the distribution system from both

backsiphonage and backpressure. Individual backflow preventors shall be acceptable to the public water supplier.

- (2) If the customer fails to comply with paragraph (1) within a reasonable period of time, the water supplier shall discontinue service after reasonable notice has been made to the customer.
- (b) At the direction of the Department, the public water supplier shall develop and implement a comprehensive control program for the elimination of existing cross-connections or the effective containment of sources of contaminations and prevention of future cross-connections. A description of the program, including the following information, shall be submitted to the Department for approval:
  - (1). A description of the methods and procedures to be used.
  - (2) An implementation schedule for the program.
  - (3) Legal authority for implementation of the program, such as, by ordinance or rules.
  - (4) A time schedule for inspection of nonresidential customers' premises for cross-connections with appropriate recordkeeping.
  - (5) A public education program for residential customers.
  - (6) A description of the methods and devices which will be used to protect the water system.
  - (7) A program for the review of plans for new users to assure that no new cross-connections are developed.
  - (8) Provisions for discontinuance of water service, after reasonable notice, to premises where cross-connections exist.

**Source**

The provisions of this §109.709 adopted December 7, 1984, effective December 8, 1984, 14 Pa.B. 4479.

**03. BACKFLOW DEVICES:**

In selecting for use of the devices outlined in this section, it is vital that the degree of protection provided be commensurate with the degree of hazard present. It also is important that the limitations of each device be understood since the degree of protection provided will depend on the type of backflow prevention device and the maintenance program employed.

Acceptable backflow prevention devices used for cross connection control are as follows:

1. Air Gap
2. Double Check Valve Assembly (DCVA)\*
3. Reduced Pressure Zone Devices (RPZD)\*
4. Residential Dual Check Valve (RDCV)
5. Atmospheric Vacuum Breaker (AVB)
6. Hose-Bibb Vacuum Breaker (HBVB)
7. Pressure Vacuum Breaker (PVB)

\*RPZDs and DCVAs should conform to AWWA's Standard C506

**Air Gap**

An air gap separation provides a complete physical separation between the free flowing discharge end of a potable water supply line, faucet, plumbing fixture, or other device and the

flood level rim of an open or non-pressure receiving vessel. An acceptable air gap separation shall be at least double the diameter of the supply line. In no case shall the air gap be less than one inch.

*Advantages:*

By preventing backflow caused by both backsiphonage and backpressure, air gap installations provide the maximum degree of protection against backflow. Air gaps are recommended for health hazard risks.

*Limitations:*

Air gap separations can be defeated by the thoughtless addition of a hose that in effect extends the discharge end of the pipe to a point below the highest possible water level of the fixture. Fixture outlet devices should be installed when there is any possibility of hose installation.

Under some conditions the cost of an air gap separation may be high when compared to a mechanical backflow prevention device.

Air gaps cause a loss of line pressure. Therefore, certain commercial processes will need to reestablish pressure through pumps or elevation.

**Double Check Valve Assembly (DCVA)**

The DCVA consists of two independently acting, soft-seated, spring-loaded, check valves mounted in series with two tightly closing shutoff valves and four test cocks.

*Advantages:*

The primary advantage of a DCVA is that when its two check valves are in the wide open position, there is relatively little resistance to flow. The head loss through the device ranges between 3 and 11 psi, depending on the rate of flow and diameter of pipe.

Double check valve assemblies prevent backflow caused by both backsiphonage and backpressure.

*Limitations:*

Because DCVAs lack the differential pressure relief valve that RPZDs have, they are recommended only for non-health hazard risks.

DCVAs have the inherent weakness of possible failure without giving exterior indication that a failure has occurred.

DCVAs are mechanical devices that require periodic inspection and maintenance.

**Reduced Pressure Zone Device**

This device consists of two soft-seated, spring-loaded check valves operating in series, and a soft-seated, spring-loaded, diaphragm-activated, pressure differential relief valve located in the zone between the check valves. Two tightly closing shutoff valves and four test cocks complete the assembly. These devices 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.

*Advantages:*

The RPZD, when periodically tested and properly maintained, may be used for backflow protection in situations where it would be extremely difficult, or impractical, to provide an air gap separation.

Malfunctioning of RPZD is indicated by discharge of water from the relief port. The RPZD provides protection from backflow caused by both backsiphonage and backpressure, and is recommended for health hazard risks.

*Limitations:*

RPZDs are mechanical devices that require periodic testing and maintenance.

Pressure loss through RPZDs may be expected to average between 10 and 30 psi, depending upon the size and flow rate of the device.

RPZDs should not be installed below ground level, must be protected from freezing, and must be provided with adequate space to facilitate maintenance and testing.

**Residential Dual Check Valve, Non-Testable:**

The RDCV is a practical, non-testable device that can be installed for containment protection at residential homes. The RDCV is installed in-line and downstream of the service meter, and contains no shutoff valves. The RDCV prevents backflow caused by both backsiphonage and backpressure, but is recommended only for residential homes which are considered to be a non-health hazard.

**Atmospheric Vacuum Breaker:**

The AVB is a non-testable device that is installed at fixture outlets. The AVB prevents backflow caused by backsiphonage, but not backpressure. The AVB must not be kept under continuous pressure for more than 12 hours in any 24-hour period. Because of this requirement, no shutoff valve should ever be installed downstream of the AVB. A shutoff valve upstream of the AVB is recommended. The AVB should be installed at least six inches above the fixture outlet.

**Hose-Bibb Vacuum Breaker:**

The HBVB is a non-testable device that is installed at fixture outlets. The HBVB prevents backflow caused by backsiphonage, but not backpressure.

**Pressure Vacuum Breaker:**

The PVB is a testable device that is equipped with test cocks and shutoff valves, and is installed at fixture outlets. The PVB prevents backflow caused by backsiphonage, but not backpressure.

**04. APPLICATION OF SERVICE:**

MAWA and the consumer have the joint responsibility for protection of the MAWA from contamination or pollution due to backflow. If the MAWA requires an approved backflow

prevention device, the supplier shall give notice to the consumer to install such an approved backflow prevention device at each service connection to his premises. The consumer should immediately install such an approved device or devices at his own expense. Failure, refusal or inability on the part of the consumer to install such a device or devices shall constitute grounds for discontinuing water service to the premises until such a device or devices have been installed.

## 05. DEFINITIONS:

For the purpose of this part of the Policy for the Control of Cross-Connection and Backflow Prevention Manual, the following words shall have the meaning indicated unless clearly indicated otherwise in the text:

**Air Gap Separation** - The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying potable water to a tank, plumbing fixture or other device and the flood level rim of the receptacle. The differential distance shall be at least double the diameter (2 x D) of the supply pipe, measured vertically above the top of the rim of the vessel. In no case shall the air gap be less than one inch.

**Approved** - A backflow prevention device or method that has been accepted by the MAWA supplier as suitable for the proposed use.

**Atmospheric Vacuum Breaker (AVB)** - A fixture outlet device containing an optional shutoff valve followed by a valve body containing a soft-seated float-check, a check seat and an air inlet port. If the shutoff valve is open, the flow of water causes the float to close the air inlet port. If the shutoff valve is closed, the float falls and forms a check valve against backsiphonage and at the same time opens the air inlet port. If no shutoff valve is provided, the flow of water will determine the opening and closing of the air inlet port.

**Auxiliary Water System** - Any water source or system on the premises of, or available to the customer, except connections to other approved community water supply systems.

**Backflow** - A flow condition, induced by a differential in pressure, that causes the flow of water or mixtures of water and other substances into the distribution pipes of a potable water supply system from a source other than its intended source. Backflow can result from either backsiphonage or backpressure.

**Backflow Preventer** - A device of other means which will prevent the backflow of water or any other substance into the public water supply system.

**Backpressure** - The backflow of water or a mixture of water and other substances from a plumbing fixture or other customer source, into a MAWA supply system, due to an increase of pressure in the fixture or customer source to a value that exceeds the system pressure.

**Backsiphonage** - The backflow of water or a mixture of water and other substances from a plumbing fixture or other customer source, into a MAWA supply system, due to a temporary negative or sub-atmospheric pressure within the MAWA supply system.



**Consumer** - The owner or person in control of any premises supplied by or in any manner connected to a MAWA supply system.

**Consumer's Water System** - Any water system, located on the consumer's premises, supplied by or in any manner connected to a MAWA supply system. A household plumbing system is considered to be a consumer's water system.

**Containment** - Cross-connection control which isolates the customer's entire facility from the MAWA supply system so as to provide the protection necessary to prevent contamination of the MAWA supply in the event of backflow from the customer's facility. Though containment control prevents contamination of the MAWA supply, it offers no protection to the water distribution system within the facility. Reduced pressure zone devices are used for containment control.

**Contamination** - The degradation of the quality of the drinking water by wastewater, processed fluids or any water of a quality less than accepted drinking water quality to a degree which would create an actual hazard to the public health through poisoning or through the spread of disease.

**Cross-connection** - An arrangement allowing either a direct or indirect connection through which backflow, including backsiphonage, can occur between the drinking water in a MAWA system and a system containing a source or potential source of contamination, or allowing treated water to be removed from any MAWA system, used for any purpose or routed through any device or pipes outside the MAWA system, and returned to the MAWA system. The term does not include connections to devices totally within the control of one or more MAWA systems and connections between water mains.

**Degree of Hazard** - An evaluation of the potential risk to health and the adverse effect upon the MAWA supply system.

**Double Check Valve Assembly (DCVA)** - An assembly composed of two single, independently acting, soft-seated, spring-loaded 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.

**Fixture Outlet Protection** - Cross-connection control which isolates all free-flowing fixture outlets (i.e., faucets) from the water distribution system within a facility. Fixture outlet protection prevents backflow contamination of both the facility water system and the MAWA supply. Examples of fixture outlet protection devices include atmospheric vacuum breakers, hose-bib vacuum breakers and pressure vacuum breakers.

**Health Hazard** - Any condition, device or practice in a water system or its operation that creates, or may create, a danger to the health and well-being of its 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.

**Hose-Bibb Vacuum Breaker (HBVB)** - A fixture outlet device which contains a soft-seated, spring-loaded, air inlet valve and is designed to be attached to an outlet having a hose connection thread.

**Interchangeable Connection** - An arrangement or device that will allow alternate, but not simultaneous, use of two sources of water.

**Internal Protection** - Cross-connection which isolates all non-outlet, water-use appliances within a facility (e.g., kitchen appliances, air conditioners, boilers, process tanks, photo developing equipment) from the water distribution system within the facility. Internal protection prevents backflow contamination of both the facility water system and the MAWA supply. Reduced pressure zone devices and double check valve assemblies are used for internal protection.

**Non-Health Hazard** - Any condition, device or practice in a water system or its operation that creates, or may create, an impairment of the quality of the water to a degree which does not create a hazard to the public health, but which does adversely and unreasonably affect the aesthetic qualities of such water for domestic use.

**Non-Potable Water** - Water not safe for drinking, personal, culinary or any other type of domestic use.

**Person** - Any individual, partnership, association, company, corporation, municipality, municipal authority, political subdivision or any agency of federal or state government. The term includes the officers, employees and agents of any partnership, association, company, corporation, municipality, municipal authority, political subdivision or any agency of federal or state government.

**Pollution** - The presence in water of any foreign substance that tends to degrade its quality so as to constitute a hazard, or to 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.

**Potable Water** - Water which is satisfactory for drinking, personal, culinary and domestic purposes and meets the requirements of the Department of Environmental Protection.

**Pressure Vacuum Breaker (PVB)** - A fixture outlet device containing an independently operating, soft-seated, spring-loaded check valve and an independently operating, soft-seated, spring-loaded, air inlet valve on the discharge side of the check valve.

**Process Fluids** - 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, pollutional, or system hazard if introduced into the public or a consumer's water system. This includes, but is not limited to:

- a) Polluted or contaminated waters;
- b) Process waters;

- c) Used waters originating from the MAWA system which may have deteriorated in sanitary quality;
- d) Cooling waters;
- e) Contaminated natural waters taken from wells, lakes, streams or irrigation systems;
- f) Chemicals in solution or suspension;
- g) Oils, gases, acids, alkalis, and other liquid or gaseous fluids used in industrial or other processes, or for fire fighting purposes;
- h) Heating system waters from boilers or heat pumps.

**MAWA Supply System** - A community water system which provides water to the public for human consumption, which has at least 15 service connections, or regularly serves an average of at least 25 individuals daily at least 60 days out of the year. The term includes any collection, treatment, storage and distribution facilities under control of the operator of the system and used in connection with the system. The term includes collection or pretreatment storage facilities not under such control which are used in connection with the system. The term also includes a system which provides water for human consumption via bottling, vending machines, retail sale or bulk hauling methods.

**Reduced Pressure Zone Device (RPZD)** - A device which contains two independently acting, soft-seated, spring-loaded check valves, together with a soft-seated, spring-loaded, diaphragm-activated, pressure differential relief valve located between the two check valves. During normal flow and at 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 shall maintain the pressure between the checks at less than the supply pressure by opening to the atmosphere. The device must include tightly closing shutoff valves located at each end, and each device shall be fitted with properly located test cocks.

**Residential Dual Check Valve (RDCV)** - A non-testable backflow prevention device that is used for containment control of residential homes and consists of two independently operating, soft-seated, spring-loaded, consecutive check valves.

**Service Connection** - The terminal end of a service line from the MAWA supply system. If a meter is installed at the end of the service line, then the service connection means the downstream end of the meter.

**System Hazard** - A condition posing an actual or potential threat of damage to the physical properties of the MAWA system or to the consumer's potable water system.

## **06. WATER SYSTEM:**

1. The water system shall be considered as made up of two parts: the MAWA supply system and the consumer's water system.
2. The MAWA supply system shall consist of the source facilities and the distribution system, and shall include all those facilities of the MAWA supply system under the control of the MAWA supplier up to the point where the consumer's water system begins.

3. The source shall include all components of the facilities utilized in the production, treatment, storage and delivery of water to the public distribution system.
4. The public distribution system shall include the network of conduits used for delivery of water from the source to the consumer's water system.
5. The consumer's water system shall include all facilities beyond the service connection which are utilized in conveying water from the public distribution system to points of use.

**07. CROSS-CONNECTIONS PROHIBITED:**

1. No water service connection shall be installed or maintained to any premises where actual or potential cross-connections to the MAWA supply system or consumer's water system may exist, unless such cross-connections are abated or controlled to the satisfaction of the MAWA supplier.
2. No connection shall be installed or maintained whereby water from an auxiliary water supply may enter a MAWA or consumer's water system unless such auxiliary water supply, as well as the method of connection and use of such supply, has been approved.

**08. SURVEYS AND INVESTIFATIONS:**

1. The consumer's premises shall be open at all times to the MAWA supplier, or its authorized representative, for the purposes of surveying for, or investigating, actual or potential cross-connections.
2. On request by the MAWA supplier, the consumer shall furnish information on water use practices within his premises.
3. It shall be the responsibility of the water consumer to conduct periodic surveys of water use practices on his/her premises to determine whether there are actual or potential cross-connections to his/her water system.

**09. WHERE BACKFLOW PTROTECTION IS REQUIRED:**

An approved backflow prevention device shall be installed after the meter for all customers.

**10. TYPE OF PROTECTION REQUIRED:**

1. The type of protection required under Section 08, No's. 1, 2 and 3 shall depend on the degree of hazard which exists as follows:
  - a. An approved air gap separation shall be installed where the MAWA supply system may be contaminated with substances that are dangerous to public health and could cause a severe health hazard, and where such a device would be technically feasible and/or practical.
  - b. An approved air gap separation or an approved reduced pressure zone device shall be installed where the MAWA supply system may be contaminated with a substance that could cause a system or health hazard.

- c. An approved air gap separation, an approved reduced pressure zone device, or an approved double check valve assembly shall be installed where the MAWA supply system may be polluted with substances that would be objectionable but not dangerous to health.

## **11. BACKFLOW PREVENTION DEVICES:**

1. Any backflow prevention device required by this ordinance shall be of a model or construction approved by the MAWA supplier and shall comply with the following:
  - a. Air gap separation to be approved shall be at least twice the diameter of the supply pipe, measured vertically above the top rim of the receiving vessel, but in no case less than one inch.
  - b. A double check valve assembly or a reduced pressure zone device shall be approved by the MAWA supplier and shall mean a device that has been manufactured in full conformance with standards established by the American Water Works Association entitled:

AWWA C506 Standards  
Reduced Pressure Principal and Double Check  
Valve Backflow Prevention Devices.

- c. Existing backflow prevention devices approved by the MAWA supplier at the time of installation and properly maintained shall, except for inspection and maintenance requirements, be excluded from the requirement of Section VIII, No. 1 above, provided the MAWA supplier is assured that they will satisfactorily protect the MAWA supply system. Whenever the existing device is moved from the present location, or requires more than minimum maintenance, or when the MAWA supplier finds that the maintenance of the device constitutes a hazard to health, the device shall be replaced by a backflow prevention device meeting the requirements of this policy.

## **12. INSTALLATION:**

1. Backflow prevention devices required by this policy shall be installed at a location, and in a manner, approved by the MAWA supplier. The device(s) shall be installed by a person properly qualified. Installation of the devices shall be at the expense of the water consumer.
2. Backflow prevention devices 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 water-tight, flood-free and maintained free from standing water by means of either a sump and pump or a suitable drain. Such a 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 lighting, natural or artificial, shall be provided to permit maintenance, inspection and testing of the backflow prevention device.

### **13. INSPECTION AND MAINTENANCE**

1. It shall be the duty of the consumer at any premises on which backflow prevention devices are required by this ordinance to have inspections, tests and overhaul made in accordance with the following schedule, or more often where inspections indicate a need.
  - a. Air separation shall be inspected at the time of installation, and at least every 12 months thereafter.
  - b. Double check valve assemblies shall be inspected and tested for tightness at the time of installation, and at least every 12 months thereafter. These devices shall be dismantled, inspected internally, cleaned and repaired whenever needed.
  - c. Reduced pressure zone devices shall be inspected and tested for tightness at the time of installation, and at least every 12 months thereafter. These devices shall be dismantled, inspected internally, cleaned and repaired whenever needed.
  - d. Interchangeable connections shall be inspected at the time of installation, and at least every 12 months thereafter.
2. Inspections, tests and overhaul of backflow prevention devices shall be made at the expense of the water consumer by a person certified to inspect, test and overhaul backflow prevention devices.
3. Whenever backflow prevention devices required by this ordinance are found to be defective, they shall be repaired or replaced at the expense of the consumer without delay.
4. The water consumer must maintain a complete record of each backflow prevention device from purchase to retirement. This shall include a comprehensive listing that includes a record of all tests, inspections and repairs. Records of inspections, tests, repairs and overhaul shall be submitted to the MAWA supplier upon request.
5. Backflow prevention devices shall not be bypassed, made inoperative, removed or otherwise made ineffective without specific authorization by the water supplier.

### **14. BOOSTER PUMPS:**

1. Where a booster pump has been installed on the service line to, or within, any premises, such a pump shall be equipped with a low pressure cut-off device designed to shutoff the booster pump when the pressure in the service line on the suction side of the pump drops to 10 pounds per square inch gauge or less for a period of 30 seconds or longer.
2. It shall be the duty of the water consumer to maintain the low pressure cut-off device in proper working order and to certify to the MAWA supplier, at least once a year, that the device is operating properly.

### **15. VIOLATIONS:**

1. The MAWA supplier may deny or discontinue, after issuing reasonable notice, the water service to any premises wherein any backflow prevention device required by this policy is not installed, tested and maintained in a manner acceptable to the MAWA supplier, or if it

is found that the backflow prevention device has been removed or pressure cut-off device required by this policy is not installed and maintained in working order.

2. Water service to such premises shall not be restored until the consumer has corrected or eliminated such conditions or defects in conformance with this ordinance and to the satisfaction of the MAWA supplier.

## **APPENDIX A: RECOMMENDED BACKFLOW DEVICES FOR FACILITIES**

The following table outlines the applicability of the air gap, RPZD and DCVA for the protection of a community water supply. This is a partial list and is not intended to supplant any ordinances or standards developed by a water company.

<b>PLANT or FACILITY</b>	<b>TYPE OF DEVICE TO BE USED</b>		
	<b>Air Gap</b>	<b>RPZD</b>	<b>DCVA</b>
Aircraft and Missile Plants	X	X	
Automated Manufacturing Plants	X	X	
Automatic Car Wash	X	X	
Auxiliary Water Systems	X	X	
Beverage Bottling Plants			X
Breweries/Distillers	X	X	
Chemical Plants (Manufacturing, Processing, Compounding or Treatment)	X	X	
Dairies and Cold Storage Plants		X	X
Dye Works	X	X	
Film Processing	X	X	
Irrigation systems (Green House, Park, Golf Course, Playgrounds, Estates, Cemeteries, etc.)	X	X	
Laboratories	X	X	
Laundries		X	X
Manufacturing, Processing and Fabrication Plants Using Nontoxic Materials			X
Manufacturing, Processing and Fabrication Plants Using Toxic Materials	X	X	
Meat Packing and Rendering Plants	X	X	
Metal Plating Plants	X	X	
Paper and Paper Products (Wet Process)	X	X	
Petroleum or Gas Processing or Storage Plants	X	X	
Plating Plants	X	X	
Power Plants (Heating, Ventilation, Refrigeration or Commercial Power)	X	X	
Radioactive Materials or Substances, Processing Plants or Facilities Handling	X		
Rubber Plants (Natural or Synthetic, Mfg. Rubber Goods or Tires)	X	X	
Sand and Gravel Plant	X	X	
Sewage or Stormwater Treatment/Processing Facility; Ejector or Pumping Station	X	X	
Swimming Pools			X
Water Front Facilities and Industries	X	X	
Where a Cross-Connection is to be Maintained	X	X	



## APPENDIX B: RECOMMENDED BACKFLOW PER BUILDINGS

BUILDINGS	Air Gap	RPZD	DCVA
Apartment and/or Hotel (Over three stories)			X
Apartment (3 or more units) and/or Hotel with House Pump and/or Water Storage Tank			X
Apartment (3 or more units) and/or Hotel with Restaurant			X
Convalescent Home			X
Elementary, High Schools, Trade Schools and Colleges			X
Home for the Aged			X
Hospitals	X	X	
Medical Clinic	X	X	
Medical/Dental Building	X	X	
Morgue	X	X	
Mortuary	X	X	
Multipurpose Commercial Buildings (Over three stories)			X
Nursing Home			X
Office Building (Over three stories)			X
Public Building (Federal/State/City)			
Potential Health Threat	X	X	
Potential Pollution			X
Restricted/Classified or Closed Facilities	X	X	
Restaurant (Any Food Handling Establishment)			X
Schools with Laboratories	X	X	
Supermarket			X
*Building with House Pump and/or Water Storage Tank			X
*Building with Sewage Ejectors	X	X	
*Apply to any building regardless of building purpose			
<b>FIRE PROTECTION SYSTEMS</b>			
a.. Double Check Valve Assembly			
1. Any system (wet or dry) with a pumper connection.			
2. Wet system only within line booster pump on building over three stories			
3. Any system with private hydrants.			
b. Reduced Pressure Zone Device			
1. Any system where anti-freeze or inhibitors are used.			
2. Any system where an auxiliary water source is available and connected to the fire system.			

## APPENDIX C: RESIDENTIAL BACKFLOW REQUIREMENTS

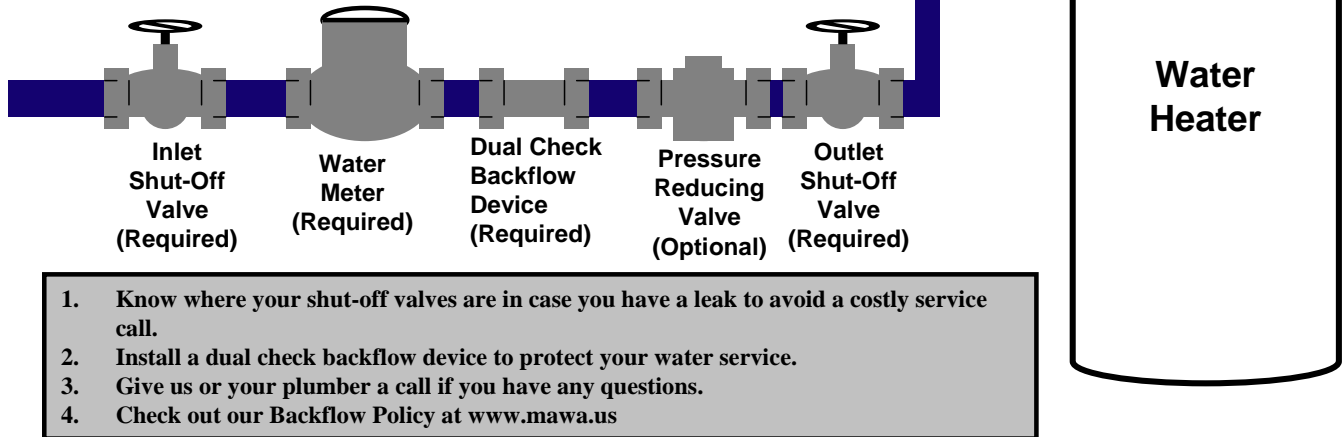
### Protecting Our Water System and A Regulatory Requirement for Water Service

#### *Typical Residential Customer's Water Line Components*

The illustration is typical of the plumbing system required by MAWA. If you have any questions about the required components, we suggest that you contact your plumber or MAWA.

#### *Residential Meter Replacement*

MAWA replaces your water meter every 15 years. Before MAWA can install your meter, we require a working shut-off valve before and after the meter and a dual check backflow device. If your water system does not meet our requirements, you will be given 30 days to bring your water service up to code or your water service will be terminated.



Title 25. Environmental Protection, Department of Environmental Protection, Chapter 109. Safe Drinking Water, Subchapter G, System Management Responsibilities, Section 109.709.

**APPENDIX D: COMMERCIAL, INDUSTRIAL, MUNICIPAL BACKFLOW REQUIREMENTS**

