



MISSOURI
AMERICAN WATER

Missouri American Water Cross Connection Control Program

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Missouri American Water has the responsibility to implement and conduct a cross connection control program. Legal authority to conduct the program can be found in the Rules of the Department of Natural Resources, Division 60 – Public Drinking Water Program, Chapter 11 – Backflow Prevention, State and Local regulations (provided in Appendix A). This program will apply to all present and future operating locations of Missouri American Water.

SECTION I - PURPOSE

The purpose of these operating policies is to:

- A. Protect the public potable water supply served by Missouri American Water from the possibility of contamination or pollution by containing within the customer's internal distribution system or the customer's private water system, such contaminants or pollutants that could backflow or backsiphon into the public water system.
- B. Promote the elimination or control of cross-connections, actual or potential, between the customer's internal potable water system and non-potable water systems, plumbing fixtures, and industrial piping systems.
- C. Provide a continuing cross-connection control program that will systematically and effectively prevent the contamination or pollution of the potable water distribution system.
- D. Ensure compliance with relevant Federal, State, and local regulations regarding cross connection control.

It is prohibited for any person, firm, or corporation at any time to make or maintain or cause to be made or maintained, temporarily or permanently, for any period of time, any cross-connection between plumbing pipes or water fixtures being served with water by Missouri American Water and any other source of water supply. It is also unlawful to maintain any sanitary fixture or other appurtenances or fixtures, which by reason of their construction may cause or allow backflow of water or other substances into the water supply system and/or the service line(s) of any consumer of Missouri American Water.

Missouri American Water has no responsibility over water systems on private property and takes no legal responsibilities for their safe operation.



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SECTION II - DEFINITIONS

Air-Gap Separation (AG): The term "air-gap separation" means a physical break between a supply pipe and a receiving vessel. The air-gap shall be at least double the diameter of the supply pipe measured vertically above the flood rim of the receiving vessel, in no case less than one inch.

Approved Backflow Prevention Assembly (Device): The term "approved backflow prevention assembly" means any testable assembly that is approved by the Research Foundation for Cross Connection Control of the University of Southern California (USC)

Auxiliary Supply: The term "auxiliary supply" means any water supply on or available to the premises other than the approved public water supply.

AWWA Standard: The term "AWWA Standard" means an official standard developed and approved by the American Water Works Association (AWWA).

Backflow: The term "backflow" shall mean the undesirable reversal of the normal flow of water or mixtures of water and other liquids, gases, or other substances into the distribution system of the public water supply due to backpressure and/or backsiphonage.

Backsiphonage: Backflow resulting from a negative or reduced pressure in the water distribution supply.

Chemigation: Utilizing underground sprinkler systems to apply herbicides and pesticides.

Containment: The term "containment" means that protection of the public water system is maintained by the application of a proper backflow prevention assembly on the line feeding the building so that any contamination is contained within the premises and does not enter the pipelines of a public water system.

Contamination: The term "contamination" means an impairment of the quality of potable water by sewage, industrial fluids, waste liquids, compounds or other materials to a degree which creates an actual or potential hazard to the public health through poisoning or through the spread of disease.

Cross-Connection: The term "cross-connection" means any actual connection between a public water system used to supply water for drinking purposes and any source or system containing unapproved water or a substance that is not or cannot be approved as safe, wholesome, and potable. By-pass arrangements, jumper connections, removable sections, swivel or changeover assemblies, or other assemblies through which backflow could occur, shall be considered to be cross-connections. The term "direct cross-connection" shall mean a cross-connection that is subject to both back-siphonage and backpressure. The term "indirect cross-connection" shall mean a cross-connection that is subject to back-siphonage only.

Designated Backflow Prevention Specialist: The designated Water Company employee(s), trained in backflow prevention, who serve(s) as the district customer contact for technical cross connection/backflow related issues.



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Double Check Valve Assembly (DC): The term "double check valve assembly" means an assembly of two independently operating approved check valves with tightly closing resilient seated shutoff valves at each end of the assembly and properly located test cocks.

Double Check Detector Valve Assembly (DCDA): The term "double detector check valve assembly" means an assembly of two independently operating approved check valves with tightly closing resilient seated shutoff valves at each end of the assembly and properly located test cocks. In addition, the device has a by-pass line with a water meter and two (2) independent check valves located within that line.

Hazard, Degree of: The term "degree of hazard" can be categorized as either a pollutant (non-health) hazard or a contaminant (health) hazard and is derived from the evaluation of conditions within a system.

Hazardous substance: The term "hazardous substance" shall mean a contaminant to the public water supply.

Internal Protection: The term "internal protection" means the appropriate type or method of backflow prevention within the consumer's potable water system at the point of use, commensurate with the degree of hazard.

Non-residential customers: Refers to all customers except for residential customers.

Pollution: The term "pollution" means an impairment of the quality of the water to a degree that does not create a hazard to the public health but does adversely and unreasonably affect the aesthetic qualities of such waters for domestic use.

Premises: The term "premises" means any and all areas on a water user's property which are served or have the potential to be served by the public water system.

Pressure Vacuum Breaker: The term "Pressure Vacuum Breaker" means an assembly consisting of a spring loaded check valve which closes tightly when the pressure in the assembly drops below one (1) PSI or when zero flow occurs, plus an air relief valve that opens to break a siphon when the pressure in the assembly drops to one (1) PSI.

Primacy Agency: The term "Primacy Agency" shall mean the State Agency(ies) having authority or jurisdiction over cross connection control.

Public Water Supply or System: The term "public water supply or system" shall mean any publicly or privately owned water system operated as a public utility under applicable local authority to supply water for domestic purposes.

Qualified Backflow Assembly Installer: The installer must be a plumber who meets all applicable local and State requirements to install backflow prevention assemblies.

Qualified Backflow Assembly Tester: The tester must have the backflow prevention assembly tester certification required by the State in accordance with the requirements and procedures in 10 CSR 60-11.030, and must follow all municipal, county, and state testing requirements.



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Residential Customer: Refers to an individual single family home used solely for residential purposes.

Reduced Pressure Detector Check Backflow Prevention Assembly (RPDA): The term "reduced pressure detector check backflow prevention assembly" means an assembly consisting of two independently operating approved check valves together with a hydraulically operating, mechanically independent, pressure differential relief valve located between the check valves and at the same time below the first check valve. The assembly shall include properly located test cocks for the testing of the check and relief valves and tightly closing resilient seated shut-off valves at each end of the assembly. In addition, the device has a by-pass line with a water meter and two (2) independent check valves together with a hydraulically operating, mechanically independent, pressure differential relief valve located between the check valves and at the same time below the first check valve located within that line. It shall be installed with no plug or additional piping attached to the discharge of the pressure relief valve port (except for the air gap supplied by the manufacturer).

Reduced Pressure Principle Backflow Prevention Assembly (RP): The term "reduced pressure principle backflow prevention assembly" means an assembly consisting of two independently operating approved check valves together with a hydraulically operating, mechanically independent, pressure differential relief valve located between the check valves and at the same time below the first check valve. The assembly shall include properly located test cocks for the testing of the check and relief valves and tightly closing resilient seated shut-off valves at each end of the assembly. It shall be installed with no plug or additional piping attached to the discharge of the pressure relief valve port (except for the air gap supplied by the manufacturer).

Residential Dual Check Valve (RDC): A backflow prevention device consisting of two check valves in series within one housing. This is not a testable device.

Service Connection: The term "service connection" refers to the point of connection of a user's piping to the public water supplier's facilities.

Water Company: The term "Water Company", in the context of this document, means "Missouri American Water" and its subsidiaries, which own or operate the approved water supply systems.

Water Customer: The term "water customer", or "customer", means any person obtaining water from a public water supply system owned or operated by the Water Company.



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SECTION III – BACKFLOW PROTECTION REQUIREMENTS

A. General Provisions

1. Unprotected cross-connections with the public water supply are prohibited. The Water Company will refuse to give service to any premise having such connections until any and all such existing conditions are terminated, or are protected by an approved backflow prevention assembly. Should a customer fail to have an approved backflow prevention assembly properly inspected, tested and maintained, the Water Company will refuse to continue service to the premises until such time as the customer complies.
2. This program is designed for containment protection of the distribution system and requires the water customer to install, at the customer's expense, an approved backflow prevention assembly as close as possible to the meter, on the customer's side, as practicable and before any branching occurs, with the exception of underground sprinkler systems and boilers where the assembly may be installed on the branch of the service line that specifically serves these systems. The installation of the backflow assembly will be required as a condition for continued service for existing customers and before a new service will be granted. The installation of all backflow prevention assemblies required by this program must be performed by a Qualified Backflow Assembly Installer.
3. This program applies to all commercial, industrial, and public authority facilities. Establishments that have only drinking fountains, and restrooms, having non-commercial type water using appliances may not be required to install a backflow prevention assembly at the discretion of the Water Company.
4. The Water Company will require backflow protection on residential customers when the following conditions exist:
 - The premises has an auxiliary supply.
 - The premises has an underground sprinkler system.
 - The premises has a private fire protection system.

- The premises has a reported history of cross connections being established or re-established.
 - The premises has permanently installed means of internally pressurizing the water supply (e.g. pressure booster, power shower, etc.)
5. Wherever backflow protection is determined to be required on a water supply line entering a water customer's premises, all such water supply lines from the Water Company's mains entering such premises, shall be protected by an approved backflow prevention assembly.
6. Temporary connections to the public water supply are prohibited unless authorized by the Water Company in writing. This includes the use of fire hydrants. If a temporary connection is permitted the proper metering and backflow prevention assembly, as approved by the Water Company, will be required. The backflow device shall be an RP, and it shall be tested each time it is placed into service.
7. Underground Sprinkler Systems
- a. All new and existing underground sprinkler systems connected to the Water Company's water supply shall be protected from back pressure and back siphonage by one of the following testable devices:
 - Double Check Valve Assembly (DC).
 - Reduced Pressure Principle Backflow Prevention Assembly (RP).
 - b. In some areas local ordinances may require RPs to be installed. In these areas the ordinance requirements shall be followed.
 - c. Irrigation systems with facilities for the injection of pesticides, herbicides, or other chemicals or with provisions for creating back pressure shall be protected with a RP.
8. Fire Protection Systems
- a. All new fire protection systems connected to the Water Company's water supply shall be protected from back pressure and back siphonage by one of the following testable devices:
 - Double Check Detector assembly (DCDA).
 - Reduced Pressure Detector Assembly (RPDA).
 - b. Fire protection systems that contain antifreeze, fire retardant, or other chemicals must be equipped with an RPDA.



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- c. A RP may be used to isolate a branch line(s) of the fire service that contains chemicals, at the discretion of the Water Company. In this case, a DCDA may be installed as the containment assembly.
- d. Existing fire protection systems scheduled for modifications must be equipped with a DCDA unless the system contains chemicals. In this case, the system must be equipped with an RPDA.
- e. When an existing fire protection system equipped with a DC is extended or renovated, the system's backflow prevention device must be upgraded to a DCDA.

B. Type of Protection Required

The type of protection that shall be required to prevent backflow into the public potable water supply shall be commensurate with the degree of hazard that exists on the customer's premises. The degree of hazard will be determined through the Water System Survey (discussed in Section V. B) process, or the new customer review (discussed in Section V. A). The types of backflow prevention assemblies that may be required (listed in increasing level of protection) are as follows: Double Check Valve Assembly (DC), Double Check Detector Assembly, (DCDA) Reduced Pressure Principle Backflow Prevention Assembly (RP), Reduced Pressure Detector Assembly (RPDA), and Air-gap separation (AG). The water customer may choose a higher level of protection than required by the Water Company. Situations will be considered on a case by case basis and the appropriate backflow protection shall be determined by the Water Company. For examples of the type of backflow protection required for common backflow hazards please see Section VII, "Type of Backflow Protection Required - Examples".



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C. Dispute Resolution:

If a customer disagrees with the company's requirements to install a backflow prevention device, the customer has the option, at their expense, to have their plumbing system inspected by a licensed, certified plumber. The plumber can provide the company a letter stating the customer's plumbing system is in compliance with Missouri Department of Natural Resources (DNR) requirements and does not possess an actual or potential cross-connection that may allow or cause contamination to the public water supply. The Water Company will review this additional information, but reserves the right to make the final decision to protect the public potable water supply.



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SECTION IV - BACKFLOW PREVENTION ASSEMBLIES

A. Approved Backflow Prevention Assemblies

1. Only backflow prevention assemblies which are approved by the DNR and the Water Company shall be used.

B. Backflow Prevention Assembly Installation

1. Installation will be in accordance with all applicable plumbing codes. The assembly should be located as close to the meter as practicable, on the customer's side, and before any branching occurs, with the exception of underground sprinkler systems and boilers where the assembly may be installed on the branch line serving the sprinkler system. The customer must not remove the meter. The assembly must be installed by a Qualified Backflow Assembly Installer.
2. Backflow prevention assemblies shall be located in an area that provides a safe environment for testing and maintenance. The area should be easily accessible, dry, and free from dirt/debris, extreme cold, heat, and electrical hazards. **RP assemblies should not be installed in a pit, below ground, or where they may be subject to freezing and/or flooding conditions, subject to the discretion of the Water Company.** Also, if water which may be discharged from these assemblies could cause damage, it should be piped via an air gap to a drain or other suitable location.
3. If an uninterrupted supply of water is required to a facility, backflow assemblies must be installed in parallel to allow for testing and maintenance.
4. A pressure loss through the backflow prevention assembly will be experienced by the customer. The pressure reduction varies with the size and type of assembly installed. The customer will be responsible for providing any increase in pressure required as a result of the pressure loss through the backflow prevention assembly.



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5. Installation of a backflow prevention assembly will create a closed system. Therefore, pressure buildups as a result of heating or other means will not be alleviated through this assembly. Water customers should be advised of this and the need for a temperature/pressure relief valve, within their system.
6. The need for replacement of existing backflow prevention assemblies that do not meet all of the above installation requirements will be determined by the Water Company on a case by case basis.

C. Backflow Prevention Assembly Testing and Maintenance

1. The owner(s) of any premises on which, or on account of which, a backflow prevention assembly is installed, shall be responsible for having the assemblies tested by a Certified Backflow Assembly Tester. A backflow prevention assembly shall be tested after installation, relocation or repair, and annually thereafter. The Water Company may require a more frequent testing schedule if determined to be necessary. No assembly shall be placed in service unless it is functioning as required and an assembly shall be serviced, overhauled, or replaced whenever it is defective.
2. The Water Company will notify affected customers by mail when annual testing of an assembly is needed and also supply the affected customer with the necessary form that shall be completed each time an assembly is tested, relocated, or repaired.

D. Backflow Prevention Assembly Relocation, Repair, or Replacement

1. Approval must be obtained from the Water Company before a backflow prevention assembly is relocated or replaced.
 - a. Relocation: An assembly may be relocated following confirmation by the Water Company that the relocation will continue to provide the required protection and satisfy installation requirements. Removal and reinstallation of the assembly must



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be done by a Qualified Backflow Assembly Installer. A test is required following the relocation of the assembly.

- b. Repair/Replacement: An assembly may be removed for repair or replacement, provided the service line is shut off and water use is discontinued until the repair/replacement is completed and the assembly is tested and found to be operating correctly. Alternatively, the service connection may be equipped with other temporary backflow protection, approved by the Water Company, if continuous service is required. Repair or replacement of the assembly must be done by a Qualified Backflow Assembly Installer. All replacement assemblies must be approved by the Water Company and must be commensurate with the degree of hazard present. A test is required following the repair or replacement of the assembly.

SECTION V - ADMINISTRATIVE PROCEDURES

A. New Customers

All new customers applying for service taps, including residential, will be evaluated at the time of service application for the type of backflow assembly required to be installed. The Company reserves the right to inspect the customer's plumbing before service is rendered. Compliance will be a condition of service. Customers determined to need a backflow prevention assembly will be informed by letter of the type of assembly to install. Installation of backflow prevention assemblies shall be in accordance with all State and local plumbing codes.

B. Water System Surveys

1. Surveys of non-residential customers' water systems will be conducted on a periodic basis, not to exceed five (5) years, or each time there is a change in the water customer occupying the premises. The survey of non-residential customers will be repeated every five years except for those customers who have devices installed that are tested annually as required by law and test reports on those devices are received by Missouri American Water and kept current.
2. The survey method will be determined by Missouri American Water and will be designed to assess each facility for potential backflow hazards, recent changes to the facility that may impact the backflow hazards, as well as any existing backflow prevention assemblies currently installed at the facility.
3. The survey will be used to determine the following:
 - If the customer meets the requirements for the installation of a backflow prevention assembly as described under Section 3 "Backflow Protection Requirements".
 - The need for an upgrade in the level of backflow prevention at the facility.
 - The need for follow-up inspection of the facility.

- The need for the existing backflow prevention assembly to be entered into the data management system.
4. Based upon the results of the survey one or more of the Customer Notification Letters may be sent to the facility.

SECTION VI - WATER SERVICE TERMINATION

A. General

When the Water Company encounters a water customer connection that represents a clear and immediate hazard to the public water supply, and the hazard cannot be immediately abated, the Water Company shall immediately institute the procedures for discontinuing the water service. The Water Company will notify the Department of Natural Resources and the water customer of the reasons for discontinuing the water service and the corrective action to be taken by the water customer before the service can be restored. This will be done in accordance with all applicable customer service rules and regulations.

B. Basis for Termination

Conditions for water use that create a basis for water service termination shall include, but are not limited to, the following items:

1. Refusal to install a required backflow prevention assembly.
2. Refusal to test a backflow prevention assembly.
3. Refusal to repair a faulty backflow prevention assembly.
4. Refusal to replace a faulty backflow prevention assembly.
5. Direct or indirect connection between the public water system and a sewer line.
6. Unprotected direct or indirect connection between the public water system, and a system or equipment containing contaminants.
7. Unprotected direct or indirect connection between the public water system and an auxiliary water system.
8. A situation that presents an immediate health hazard to the public water system.



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C. Water Service Termination Procedures

Termination procedures will be conducted in accordance with all the applicable customer service rules and regulations for such actions.

Section VII Table 1 TYPE OF BACKFLOW PROTECTION REQUIRED - EXAMPLES

Degree of Hazard	Minimum Type of Backflow Prevention
1) Sewage and Hazardous Substances	
a) Premise where the public water system is used to supplement the reclaimed water supply.	AG
b) Premise where there is a wastewater pumping and/or treatment plant and there is no inter-connection with the potable water system. This does not include a single-family residence that has a sewage lift pump.	RP
c) Premise where reclaimed water is used and there is no interconnection with the potable water system.	RP
d) Premise where hazardous substances are handled in any manner in which the substances may enter a potable water system. This does not include a single-family residence that has a sewage lift pump.	RP
e) Premise where there is a irrigation systems into which fertilizers, herbicides, or pesticides are, or can be, introduced.	RP
2) Auxiliary Water Supplies	
a) Premise where there is an auxiliary water supply which is interconnected with the public water system.	RP



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Table 1 (continued)
TYPE OF BACKFLOW PROTECTION REQUIRED

Degree of Hazard	Minimum Type of Backflow Prevention
<ul style="list-style-type: none"> b) Premise where there is an auxiliary water supply, or gray-water system, and there is no interconnection with the public water system. 	RP
<ul style="list-style-type: none"> 3) Fire Protection Systems <ul style="list-style-type: none"> a) Class II - Where the system is constructed of piping material not approved as potable water system material per the 1994 Uniform Plumbing Code and the system has a Fire Department Connection or is a looped system. b) Class I - Premises where there is an auxiliary water supply on or available to the premise and/or there are chemicals added to the system, such as but not limited to: anti-freeze. 	DC
<ul style="list-style-type: none"> 4) Premises where entry is restricted so that inspections for cross-connections cannot be made with sufficient frequency or at sufficiently short notice to ensure that cross-connections do not exist. 	RP
<ul style="list-style-type: none"> 5) Premises where there is a repeated history of cross connections occurring. 	RP
<ul style="list-style-type: none"> 6) Sale for Resale Customers (water sold to other municipalities/districts for resale to the municipalities'/districts' customers). 	RP