

Cross Connection Control: Final Amendments to the *Waterworks Regulations*

Robert D. Edelman, PE
Director, Division of Technical Services

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Agenda

- Current outline of *Waterworks Regulations*
- Goals and Objectives for amending the *Regulations*
- 12VAC5-590-55 Relationship of this chapter to the USBC
- 12VAC5-590-580. General requirements for cross-connection control and backflow prevention.
- 12VAC5-590-600. Cross-connection control program responsibilities.
- 12VAC5-590-610. Containment of backflow.
- 12VAC5-590-630. Backflow prevention assemblies, devices, and backflow elimination methods for containment.
- Summary of new requirements

Waterworks Regulations – Currently

- Part I – General Framework
- Part II – Operation Regulations
- Part III – Manual of Practice (Construction/Design)
- ~~Part IV – Exceptions for Noncommunity Waterworks~~
- ~~Appendices~~
- Final Amendments Effective June 23, 2021.
- Issued 1991; last comprehensive amendment in 1993; subsequent amendments limited to federal standards & changes in Virginia law

Amendments: Goals and Objectives

1. Amend out-of-date regulations.
2. Improve readability, increase clarity.
3. Incorporate new technologies.
4. Update/clarify the permitting process.
5. Codify requirements implemented by policy.
6. No changes to federal requirements (NPDWR).
7. Address stakeholder concerns.

12VAC5-590-55. Relationship to the Uniform Statewide Building Code (USBC)

A. This chapter governs waterworks facilities from any source water to all service connections.

B. In accordance with § 36-98 of the Code of Virginia and the USBC, the USBC governs the construction of buildings and structures, including plumbing systems and backflow prevention. The USBC also governs the water service piping from the service connection to a building or structure.

C. Notwithstanding subsections A and B of this section, this chapter shall govern:

1. Water treatment, storage, pumping facilities, and water piping that are part of a waterworks and housed in any building or structure; and
2. Backflow prevention assemblies or elimination methods, or both, installed for containment and located downstream from the service connection, including where located in any building or structure.



Definition



"Service connection" means the point of delivery of finished water from a waterworks to a consumer's water system, fire protection system, irrigation system and to all other points where finished water is delivered through the distribution system to a consumer. Generally, the service connection occurs at the water meter, or at the distribution main if no water meter is installed, or in the case of an owner of both the waterworks and the building supplied, the point of entry into the building. Service connections may be permanent, temporary, or emergency.

Picturing a Service Connection



Source: Communicating About Lead Service Lines: A guide for Water Systems Addressing Service Line Repair and Replacement, AWWA, 2014

Relationship to the Uniform Statewide Building Code (USBC)



NEW

12VAC5-590-55

- Clarifies and codifies the relationship between of the Waterworks Regulations and the USBC, which governs building plumbing systems.
- Waterworks Regulations apply up the **Service Connection**
- USBC governs the premise plumbing and service line after the **Service Connection**
- Exceptions:
 - Waterworks Regulations cover treatment, storage, pumping facilities, and water piping that are part of a waterworks
 - Waterworks Regulations cover backflow prevention assemblies or elimination methods, or both, installed for containment and located downstream from the service connection

12VAC5-590-580. General requirements for cross-connection control and backflow prevention.

A. Every owner shall establish and enforce a cross-connection control program (CCCP) in accordance with 12VAC5-590-360. The goal of the CCCP is to prevent the intrusion of contamination into the distribution system via cross-connections and backflow. The owner shall document the CCCP activities in a cross-connection control plan and submit the written document to the department for review and approval.



12VAC5-590-580. General requirements for cross-connection control and backflow prevention.

B. No owner shall install, maintain, or allow a service connection to any premises where cross-connections to a waterworks or a consumer's water system exist, unless the owner and department ensure the cross-connections are adequately safeguarded.



12VAC5-590-580. General requirements for cross-connection control and backflow prevention.

C. No owner shall install, maintain, or allow any connection whereby water from an auxiliary water system may enter a waterworks or consumer's water system, unless the owner and department approve the auxiliary water system, the method of connection, and use of such system.



12VAC5-590-580. General requirements for cross-connection control and backflow prevention.

D. The owner, in accordance with 12VAC5-590-510 C, shall maintain acceptable working pressures in the distribution system to reduce the potential for backflow to occur.



510 C. All waterworks shall provide a minimum working pressure of 20 psi gauge (psig) at all service connections.

Cross Connection Control



Substantial revisions to sections 12VAC5-590-580

Summary of Owner responsibilities:

- Establish and enforce a CCCP
- Document CCCP activities in a cross-connection control plan and submit the written document to the department for review and approval.
- Ensure that cross connections are adequately safeguarded
- Maintain acceptable working pressure in the distribution system

12VAC5-590-590. ~~Cross connections~~

- Repealed
- Content moved to 580

12VAC5-590-600. Cross-connection control program responsibilities

NEW

Reworded

A. The owner shall establish and implement a CCCP consistent with the extent of the distribution system and the consumers served by the waterworks. The owner shall review the CCCP and written cross-connection control plan not less than every five years and update it as necessary to satisfy the requirements of this chapter. The owner shall submit updates to the department to obtain approval. The department may review the plan upon request. This program shall include at least one designated individual assigned by the owner. Requirements for this position shall include training and experience in cross-connection control programs.

12VAC5-590-600. Cross-connection control program responsibilities.

B. The CCCP shall not be in conflict with the USBC and applicable building code regulations, including 13VAC5-63 or subsequent regulations promulgated by the Board of Housing and Community Development.



C. The CCCP shall ensure complete assessments of every consumer's water system and shall determine both the degree of hazard and the appropriateness of existing safeguards to prevent contamination from cross-connections and backflow.



12VAC5-590-600. Cross-connection control program responsibilities.

D. The CCCP shall ensure testing, maintenance, and repairs of all backflow prevention assemblies, backflow elimination methods, and backflow prevention devices required and installed pursuant to 12VAC5-590-610.



610 refers to the containment of backflow

12VAC5-590-600. Cross-connection control program responsibilities.



NEW

E. 13VAC5-63-530, which incorporates the International Property Maintenance Code into the USBC, requires testing of RPZ assemblies, double check valve assemblies, double check detector backflow assemblies, and pressure vacuum breaker assemblies after initial installation, immediately after repairs or relocation, and annually thereafter. The CCCP shall establish procedures for completing and monitoring operational tests, or other evaluation procedures as appropriate, at least annually, and after installation, relocation, or repairs, for testable backflow prevention assemblies, devices, and methods that provide containment.

12VAC5-590-600. Cross-connection control program responsibilities.



The CCCP may include a public education program to:

1. Prompt consumer self-assessments, increase the awareness of cross-connections, and inform the consumer of the public health hazards of backflow.
2. The public education program, if provided as part of the CCCP, shall include, at a minimum, the following:
 - a. Causes of backflow;
 - b. Hazards and health effects of cross-connections and backflow;
 - c. Resources available to identify actual or potential cross-connections;
 - d. Safeguards to use to eliminate or control the hazards at the point of use; and
 - e. Sources for additional information.

12VAC5-590-600. Cross-connection control program responsibilities.

F. The CCCP shall provide a method to discontinue or refuse water service to the consumer to ensure that the waterworks is adequately protected from cross-connections and backflow if any of the following conditions occur:



1. The consumer does not install, test and maintain a required backflow prevention assembly or backflow elimination method in accordance with the applicable sections of this chapter;
2. The consumer allows a required backflow prevention assembly or backflow elimination method to become inoperable or the consumer removes or bypasses it; or
3. The owner knows an unprotected or inadequately protected cross-connection exists on the premises and determines that there is inadequate backflow prevention at the service connection.

12VAC5-590-600. Cross-connection control program responsibilities.

G. In the event of backflow of contaminants into the waterworks, the owner shall promptly take or cause corrective action to confine and eliminate the contamination. The owner shall report the event to the department within one business day in the most expeditious manner. The owner shall submit a written report by the 10th day of the month following the month during which backflow occurred addressing the incident, its causes and effects, and safeguards required or other action taken.



12VAC5-590-600. Cross-connection control program responsibilities.

H. The owner shall maintain an inventory and records of testing, repairs, and maintenance of all backflow prevention assemblies, backflow elimination methods, and backflow prevention devices required and installed under 12VAC5-590-610 C. In the case of single-family residences subject to 12VAC5-590-610 C 5, the owner may determine whether or not to maintain an inventory or records. The department recommends the owner follow best practices identified in the AWWA Manual of Water Supply Practices M14 and the EPA Cross-Connection Control Manual.



12VAC5-590-600. Cross-connection control program responsibilities.

I. The owner shall maintain an inventory and records of testing, repairs, and maintenance of all backflow prevention assemblies, backflow elimination methods, and backflow prevention devices required and installed under 12VAC5-590-610 E.

J. The owner shall maintain records related to the CCCP implementation, and any other records the department requires in accordance with 12VAC5-590-550.



12VAC5-590-610. Containment of backflow.

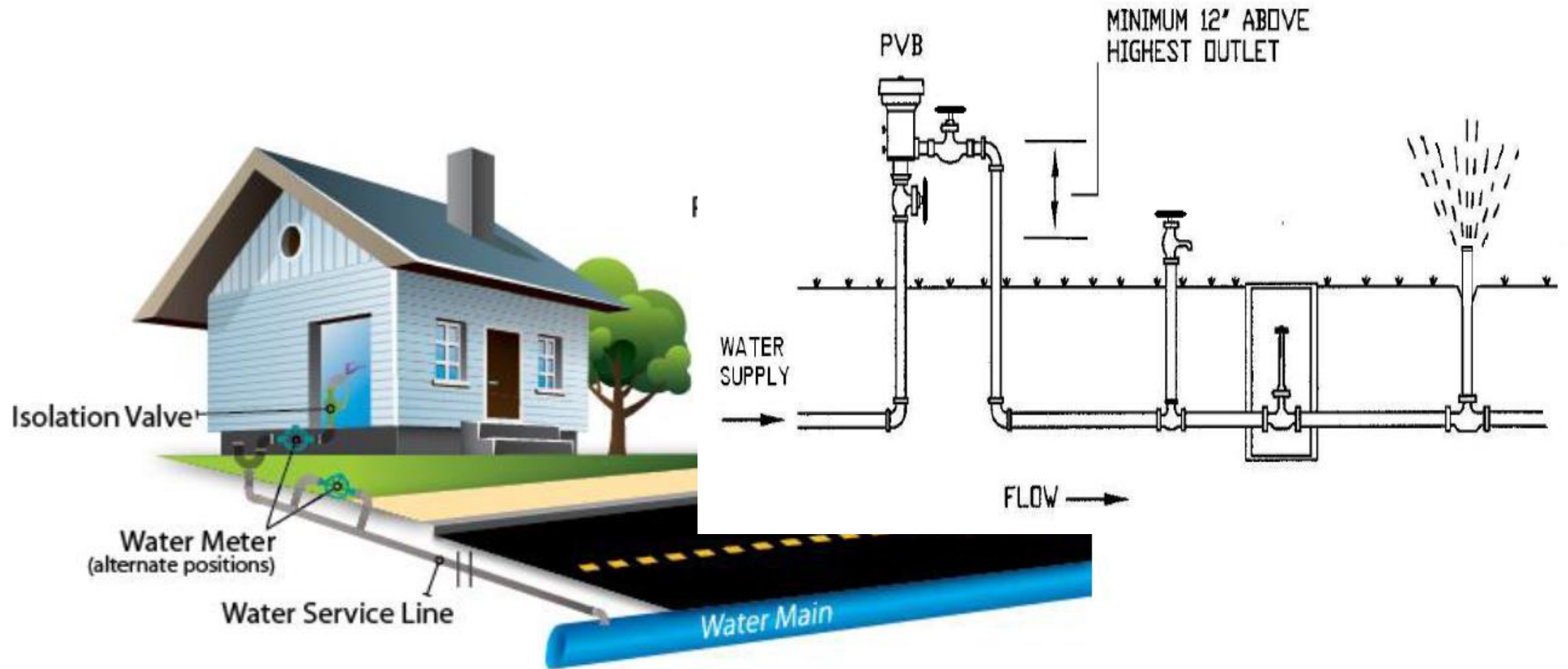
A. The owner shall ensure installation of backflow prevention assemblies or backflow elimination (i) at the service connection or (ii) downstream of the service connection but before any unprotected takeoffs.



B. Where the consumer's water system is not intricate or complex and where actual or potential cross-connection hazards can be eliminated or controlled, instead of containment, the owner may allow consumers to use point-of-use isolation protection by application of appropriate backflow prevention assemblies, backflow prevention devices, or backflow elimination methods complying with the USBC.



Picturing a Service Connection



Source: Communicating About Lead Service Lines: A guide for Water Systems Addressing Service Line Repair and Replacement, AWWA, 2014

12VAC5-590-610. Containment of backflow.

C. A backflow prevention **assembly or backflow elimination method** shall be installed where the following conditions exist:

1. A substance is handled in such a manner as to create an actual or potential hazard to a waterworks (this shall include premises having sources or systems containing process fluids or waters originating from a waterworks which are no longer under the control of the **owner**);
2. **There exists** internal **cross-connections** that, in the judgment of the **owner** or the **department**, may not be easily correctable or have intricate **or complex** plumbing arrangements **that** make it impracticable to determine whether or not **cross-connections** exist;

12VAC5-590-610. Containment of backflow.

3. **There are** security requirements or other prohibitions or restrictions **that prevent the assessment of all potential cross-connections that may impair the quality of the water delivered;**
4. **There is** a repeated history of **cross-connections** being established or reestablished;
5. **There are** fire protection systems, **lawn sprinkler systems, or irrigation systems;**
6. **The owner or department can show that a potential cross-connection hazard exists.**



12VAC5-590-610. Containment of backflow.

D. The owner shall ensure that consumers equip premises having booster pumps or fire pumps connected to the waterworks with control devices to prevent a reduction of pump suction line pressure to less than 20 psig.

E. A backflow prevention assembly or backflow elimination method shall be installed at consumer water systems serving the following types of facilities, including:

1. Hospitals, mortuaries, clinics, veterinary establishments, nursing homes, and medical buildings;
2. Laboratories;
3. Piers, docks, and waterfront facilities;



12VAC5-590-610. Containment of backflow.

4. Sewage treatment plants, sewage pumping stations, or storm water pumping stations;
5. Food and beverage processing plants;
6. Chemical plants, dyeing plants, and pharmaceutical plants;
7. Metal plating industries;
8. Petroleum or **natural-gas** processing or storage plants;
9. Radioactive materials processing plants or nuclear reactors;
10. Car washes and laundries;

12VAC5-590-610. Containment of backflow.

11. Buildings with commercial, industrial, or institutional occupants served through a master meter;
12. Water loading facilities;
13. Slaughter houses and poultry processing plants;
14. Farms where the water is used for other than household purposes;
15. Commercial greenhouses and nurseries;
16. Health clubs with swimming pools, therapeutic baths, hot tubs, or saunas;
17. Paper and **paper-product** plants and printing plants;
18. Pesticide or exterminating companies and their vehicles with storage or mixing tanks;
19. **Facilities that blend, store, package, transport, or treat chemicals, and their related vehicles;**



12VAC5-590-610. Containment of backflow.

20. Schools or colleges with laboratory facilities;

21. Highrise buildings (four or more stories);

22. Multiuse commercial, office or warehouse facilities; and

23. Others specified by the owner or the department when reasonable cause can be shown for a potential backflow or cross-connection hazard.



12VAC5-590-610. Containment of backflow.

F. All temporary or emergency service connections shall be protected where reasonable cause can be shown for a potential backflow or cross-connection hazard. Backflow prevention assemblies or backflow elimination methods used shall be appropriately certified or approved to match the requirements of this section



12VAC5-590-620.

~~Type of protection required.~~

- Repealed
- Some text moved 630 and reworded
- Harmonizing the *Regulations* with the USBC
- Harmonizing the degree of hazard (previously: high, moderate, or low) with the USBC
- Removed moderate hazards
- Refer to USBC
- Repealed Table 2.10

12VAC5-590-630. Backflow prevention assemblies, devices, and backflow elimination methods for containment.

A. Any backflow prevention **assembly or backflow elimination method or backflow prevention device** shall be of the approved type and shall comply with the **USBC**.

B. General safeguards

1. The **backflow prevention assembly or backflow elimination method or backflow elimination device** used shall depend on the degree of hazard that exists or may exist. The safeguard shall ensure maintenance of the distribution system water quality and its usefulness.



12VAC5-590-630. Backflow prevention assemblies, devices, and backflow elimination methods for containment.

2. The degree of hazard, either high or low, is based on (i) the nature of the contaminant; (ii) the potential of the health hazard; (iii) the potential method of backflow (either by backpressure or by backsiphonage); and (iv) the potential effect on waterworks structures, equipment, and appurtenances used in the storage, collection, purification, treatment, and distribution of potable water. Table 630.1 shall be used as a guide to determine the degree of hazard for any situation.

3. The USBC and the manufacturer's specifications shall be used to determine the appropriateness of the backflow prevention assembly or backflow prevention device application for containment.



12VAC5-590-630. Backflow prevention assemblies, devices, and backflow elimination methods for containment.



Table 630.1

Determination of Degree of Hazard

Cross-connections that meet or may meet the following conditions shall be rated at the corresponding degree of hazard.

High Hazard	Low Hazard
The contaminant would be toxic, poisonous, noxious, unhealthy, or of unknown quality.	The contaminant would only degrade the quality of the water aesthetically or impair the usefulness of the water.
A health hazard would exist.	A health hazard would not exist.
The contaminant would disrupt the service of piped water for human consumption.	The contaminant would not disrupt service of piped water for human consumption.
Backflow would be by either backpressure or backsiphonage.	Backflow would occur by backsiphonage.
Examples: lawn irrigation systems, fire sprinkler systems with chemical additives or antifreeze, sewage, used water, nonpotable water, auxiliary water systems, and mixtures of water and other liquids, gases, or other chemicals.	Examples: food residuals, coffee machines, non-carbonated beverage dispensers, and residential fire sprinkler systems constructed of materials designed for potable water flow.

12VAC5-590-630. Backflow prevention assemblies, devices, and backflow elimination methods for containment.

C. Owners shall not allow the installation of backflow prevention devices or backflow prevention assemblies with openings, outlets, or vents that are designed to operate or open during backflow prevention:

1. In areas subject to flooding or in pits;
2. In areas with atmospheric conditions that represent a contamination threat to the potable water supply; and
3. In such a manner as to be able to be bypassed.



12VAC5-590-630. Backflow prevention assemblies, devices, and backflow elimination methods for containment.

D. Starting January 1, 2023, persons testing and repairing backflow prevention assemblies and backflow prevention devices shall be certified by a Commonwealth of Virginia tradesman certification program (identified by DPOR as backflow prevention device workers). Until January 1, 2023, persons testing and repairing backflow prevention assemblies and backflow prevention devices shall be qualified to perform such work as demonstrated by possessing a certification or license from a local or state agency having legal authority or shall possess a certificate of completion of applicable vocational training acceptable to the owner.



Cross Connection Control

Substantial revisions to sections 12VAC5-590-580 through 630

What's new:

- Document CCCP activities in a cross-connection control plan and submit the written document to the department for review and approval.
- Owner to review CCCP every 5 years
- Performance standard for cross-connection control.



Cross Connection Control



What's new:

- Clarify relationship with the USBC.
- Eliminate conflicts between regulations and the USBC.
- Require methods and assemblies to comply with the USBC
- References property maintenance code of the USBC
- Clarify requirements for testing and recordkeeping.
- Eliminated “moderate hazard”
- Added three types of activities/facilities to list requiring c
- Installation standards (prohibited in areas subject to flooding, etc.)
- Testing and repairs by a certified backflow prevention device worker (effective January 2023)

Cross Connection Control

What's removed:

- Conflicts with the USBC
- Table 2.19 – Determination of Degree of Hazard
- Moderate hazard
- Suggested program elements (Appendix I)

Cross Connection Control

Why a CCCP might need updates:

- Can't locate the plan document
- Requirement for review every 5 years
- Conflicts with the USBC
 - Mentions moderate hazard or specific devices
- Does not address DPOR Certification requirement for backflow device prevention workers
- Uses ODW model CCCP template (pre-2021)