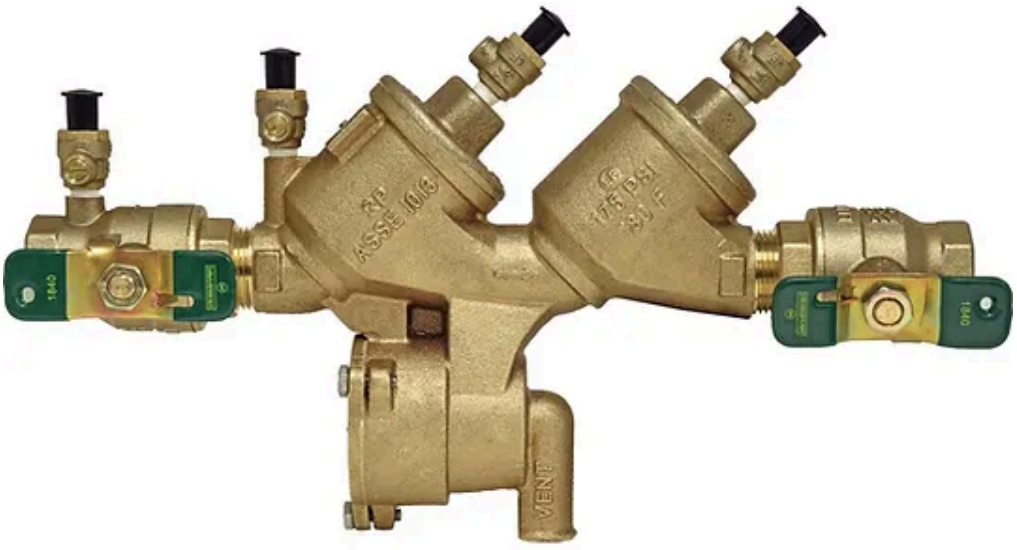
COLORADO

Water Quality Control Division

Department of Public Health & Environment

Backflow Guidance

Regulation 11.39: Backflow Prevention and Cross-Connection Control



April 2024

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1. Introduction

1.1 Overview

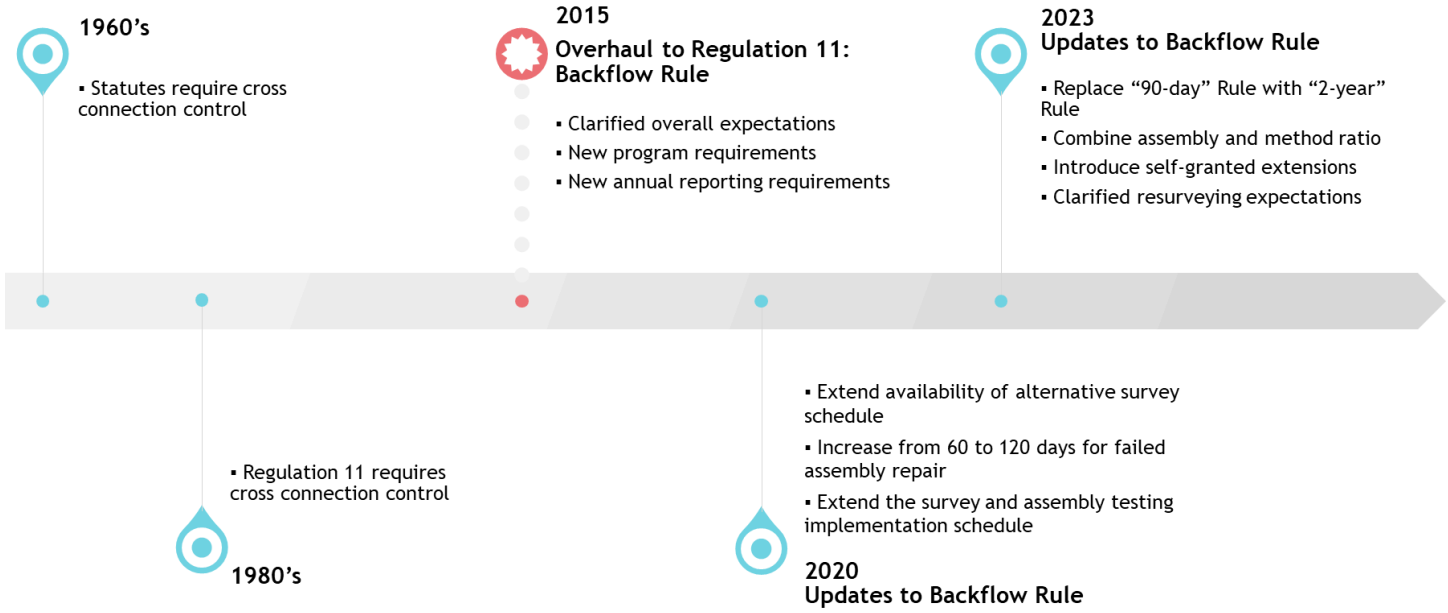
Cross connections are connections to the water supply system that can allow contaminated water to flow backward into otherwise safe drinking water plumbing and fixtures. Contamination of water can lead to disease outbreaks and other adverse health effects. There have been several known outbreaks in Colorado due to cross connections. Colorado Revised Statutes (Statutes) do not allow any cross connections in a drinking water system. Regulation 11, Section 11.39 (Backflow Rule) outlines the requirements that **ALL** public water systems must meet to demonstrate that they do not have cross connections in their system. Generally, the Backflow Rule requires that water suppliers do all of the following:

- Create a written backflow program;
- Identify all cross connections;
- Make sure all cross connections are controlled or removed;
- Make sure all assemblies are tested annually;
- Make sure all methods are inspected annually;
- Maintain records; and
- Notify the department of any suspected or confirmed backflow events.

The Colorado Department of Public Health and Environment's Water Quality Control Division (department) reviews water suppliers records during sanitary surveys or upon request. Failure to meet the requirements of the Backflow Rule may result in significant deficiencies and/or violations.

1.2 Background

Statutes have required that water suppliers provide cross-connection control within their own water supply systems since the mid 1960's. Regulation 11 has required that cross connections be controlled since the mid 1980's. Commercial and residential facilities are required to protect the potable water supply in accordance with the local plumbing code. If there is not a local code the Colorado Plumbing Code applies. In 2015, the Colorado Water Quality Control Commission revised the cross connections section of Regulation 11 which became the Backflow Rule, effective January 1, 2016. The Commission revised the backflow rule in 2020, based on results from stakeholder meetings. Significant changes to the backflow rule were again made at an August 2023 rulemaking hearing, with corresponding updates to Policy 7. The 2023 revisions to the backflow rule became effective October 15, 2023.



1.3 Purpose of this Guidance Document

This guidance is designed to help water suppliers comply with the backflow rule by:

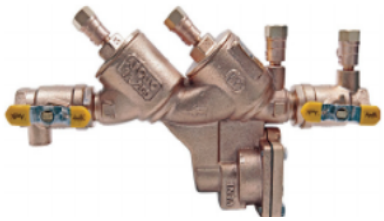
- Assisting water suppliers in creating an adequate backflow program;
- Providing templates for backflow rule requirements; and
- Providing a common reference for water suppliers and department staff.

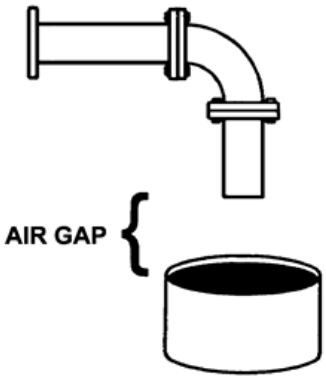
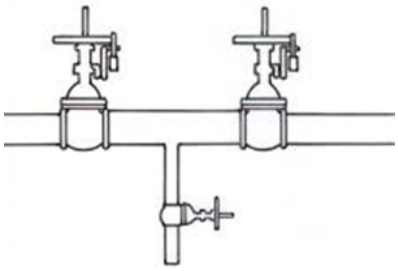
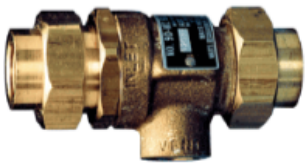
This guidance document is not a regulation, is not a policy, and does not prevent water suppliers from using other means to demonstrate that they comply with the backflow rule and applicable plumbing code. The latest versions of guidance documents, Policy 7 and other backflow resources can be found at: cdphe.colorado.gov/bpccc.

1.4 Common Assembly/Method Descriptions and Examples

There are several types of backflow prevention assemblies and methods. Table 1 below provides information regarding common assemblies and methods and general situations each can be used. Appendix J contains additional information regarding installation standards for assemblies and methods.

Table 1 - Types of Common Assemblies and Methods With Pictures and Their General Appropriate Use

Assembly Name	Illustration	General Appropriate Use
Reduced Pressure (RP)		Appropriate for any identified contaminant **except** direct connections to sewer or installations which may impair the integrity of the assembly to function as designed. RPs specific for fire suppression are also available. RPs cannot be installed in a vault unless adequate drainage is provided.
Double Check (DC)		Appropriate for cross connections to fire suppression systems **except** when upstream of a chemical other than food grade glycerin.
Pressure Vacuum Breaker (PVB)		Appropriate for any identified contaminant except for direct connections to sewer or installations which may impair the integrity of the assembly to function as designed. **Not appropriate for connections subject to backpressure.**
Spill Resistant Vacuum Breaker (SVB)		Appropriate for any identified contaminant except direct connections to sewer or installations which may impair the integrity of the assembly to function as designed. **Not appropriate for connections subject to backpressure.**

Method Name	Illustration	General Appropriate Use
Air Gap (AG)		Appropriate for any identified contaminant. All cross connections can be controlled using an air gap installed in accordance with plumbing code (air gap must equal two times the pipe diameter). For large diameter pipes, a minimum air gap of 2 inches above the flood rim must be present.
Block and Bleed (BB)		Appropriate for membrane clean in place and filter to waste set ups.
Hose Bib Vacuum Breaker (HVB)		Appropriate when installed in accordance with plumbing code.
Atmospheric Vacuum Breaker (AVB)		Appropriate when installed in accordance with plumbing code.
Intermediate Atmospheric Vacuum Breaker (IAVB)		Appropriate when installed per plumbing code such as for boilers or heating systems without chemicals.

Please note, dual check and single check valves are not considered adequate backflow prevention methods. Any deviation from the standard appropriate backflow prevention for a cross connection must be equally protective of the identified cross connection and are subject to department review. Please see Policy 7 for information regarding site specific deviations.

2. Backflow Prevention and Cross-Connection Control Program

Protection of public health from cross connections is best achieved through a properly developed, administered and implemented Backflow Prevention and Cross-connection Control (backflow) program. The development of a written backflow program is required for compliance with Regulation 11. The written backflow program should clearly outline all procedures and duties associated with the implementation of the backflow program.

The backflow program will need to include and specify information regarding how the supplier identifies cross connections, performs surveys, and controls identified cross connections. The backflow program must also address how the supplier requires backflow prevention assemblies and methods to be tested or inspected annually, how the supplier will track the installation, maintenance, and testing of assemblies and methods and how the supplier will ensure that assemblies are tested by a Certified Cross-Connection Control Technician. Many of these program components can be addressed through the establishment of legal authority.

Appendix A contains a link to the latest department template for a written backflow program. Additionally, the department has developed a streamlined written program for suppliers that operate small public water systems. The template for this program can be found at Appendix G. Water suppliers should be prepared to speak to each component of their backflow prevention and cross connection control program during each sanitary survey.

2.1 Legal Authority

The legal authority to implement a public water system's backflow program can vary greatly based on the water supplier's distribution system. Medium to large community public water systems use their legal authority to implement their backflow program utilizing one of the following; local government ordinances, written contracts, or user agreements. The water supplier must rely on local government ordinances or implement a user agreement between the supplier and customers if the supplier serves water via service connections owned by the customer. Implementing a backflow program without legal authority introduces the potential for legal disputes between the water supplier and the served population. An example ordinance can be found in Appendix B.

It is more common for small community systems and non-community public water systems to own the entirety of their water supply system. System's that own all production facilities and the entirety of the distribution system, including non-single family residential connections, are able to utilize a fourth form of legal authority within their backflow program. This is the acknowledgement of full public water system responsibility. The water system adopts complete responsibility for the implementation of each component of their backflow program under this form of legal authority. The water system is able to adopt this responsibility due to their ownership of the entire water system. This acknowledgement of ownership is captured in Appendix G.

The supplier must have a legally-enforceable mechanism that implements its backflow program. The department recommends that the legally enforceable mechanisms include specific provisions identifying customer requirements and the associated actions that the supplier may utilize for failure of customer(s) to comply.

Legal Authority to Perform Surveys:

The first aspect of a supplier's backflow program is the supplier's process for conducting surveys of their system. This process requires the supplier to have a form of a legal authority given the potential need for a water system to gain initial access to properties owned by other entities. As discussed above, a few examples of legal authority a system may have include:

- User agreements,
- City or Town ordinances,
- Written contracts, or
- Demonstration of ownership of a connection or connections.

Legal Authority to Install, Maintain, Test, and Inspect:

The ability for a water system to gain access to a location with an identified cross-connection is fundamental to the implementation of a supplier's backflow prevention and cross connection control program. The supplier's legal authority

must include language indicating the supplier is able to reliably gain access to the backflow prevention assembly or method to ensure each cross-connection is protected. A program would be considered inadequate if it did not allow for the ability to access locations to ensure cross connections remain controlled. The backflow assembly or method used to control the cross-connection is properly installed and to have assemblies tested by a certified cross-connection control specialist.

Example Escalation Measures:

A water system may encounter customers that deny them access to their property. Customer's that deny access to their property can result in the water system being unable to survey the service connection for cross-connections, ensure a backflow control assembly or method is installed and functioning properly, or controlling an identified uncontrolled cross-connection. To achieve control of an identified or potential cross-connection in this scenario, the supplier will need to escalate the situation in accordance with the supplier's backflow program. A couple examples of escalation include:

- Letters and/or phone calls to notify the customer of their non-compliance and potential next actions,
- Issuing fines,
- Suspension of service.

Supplier's must achieve compliance regardless of challenging situations as part of the implementation of their backflow program and the protection of public health.

2.2 Survey Process and Documentation

Suppliers must survey all non-single family residential connections to identify cross connections once the supplier has identified the total number of non-single family residential connections within their distribution system. Suppliers are expected to detail their process for conducting surveys within their backflow program. Surveys can be performed onsite by a delegate of the public water system or by having customers or a third party, such as a certified plumber, complete and return a questionnaire. The supplier's survey process should identify service connection use types known to commonly require cross-connection control upon identification. The survey process should address how the supplier will select individuals to perform surveys, including experience and/or training or certification qualifications required to perform a survey. Additionally, the supplier must survey any waterworks and the water supply systems associated with those facilities for cross connections.

Various methods may be used to distribute the questionnaires if the supplier uses questionnaires. The department has provided several example survey questionnaires to be considered by public water systems in Appendix E. For the convenience of small public water systems, Appendix H can be used for this purpose. A few methods of providing questionnaires to customers include: email surveys, web-based surveys, written surveys, or telephone surveys. Questionnaires should provide examples of common cross connections to the customer who completes the survey. Questionnaires should ask that the property-owner indicate the information provided is accurate to the best of their knowledge. If the supplier does not receive a response to a questionnaire or the results are inconclusive, the supplier is required to perform an onsite survey for cross connections or control the connection with the most protective backflow prevention assembly or method.

Community water systems must maintain survey documentation and results for three years. Non-community water systems must maintain survey documentation and results for five years. All survey documentation should be maintained in a manner that allows the supplier to demonstrate compliance with the survey ratio requirements . Survey documentation should demonstrate that surveys have been performed within the supplier's waterworks and at all non-single family residential connections, as well as, if any action was required based on the result of the survey.

It is important that newly constructed and renovated buildings are constructed in accordance with the local plumbing code. The code is intended to protect the internal potable water system and its occupants from contamination that can be introduced via restrooms, kitchens, boilers, irrigation, HVAC systems, etc. It is equally important that the water supplier protects their distribution system from contamination that can be introduced via car washes, auxiliary water sources, fire suppression systems, irrigation and many other sources. Water suppliers need to perform cross connection identification surveys to identify potential cross connections within their distribution system.

Suppliers may choose not to perform surveys of non-single-family-residential connections if the supplier controls the service connection with the most protective backflow prevention assembly or backflow prevention method. The following are acceptable “most protective backflow prevention assemblies or methods”:

- Method - air gap installed in accordance with standard ASME A112.1.2.
- Assembly - reduced pressure zone backflow prevention assembly.

Identification of Cross-Connections:

Suppliers must survey all non-single-family-residential connections to the public water system to determine if the connection is a cross connection. The supplier must also survey all connections within the supplier’s waterworks to determine if there are any cross connections present which could contaminate the public water systems or the facilities water supply system. Acceptable survey process documentation should include how the supplier will select service connections that need a survey; For example:

- Usage type - commercial, industrial, or multi-family;
- New or newly acquired connections; and/or
- Questionnaire results.

The supplier must identify the total number of non-single-family-residential connections to the public water system and connections within the supplier’s waterworks. This number is the total number of service connections to the public water distribution system that are not considered single–family connections.

Single-family means:

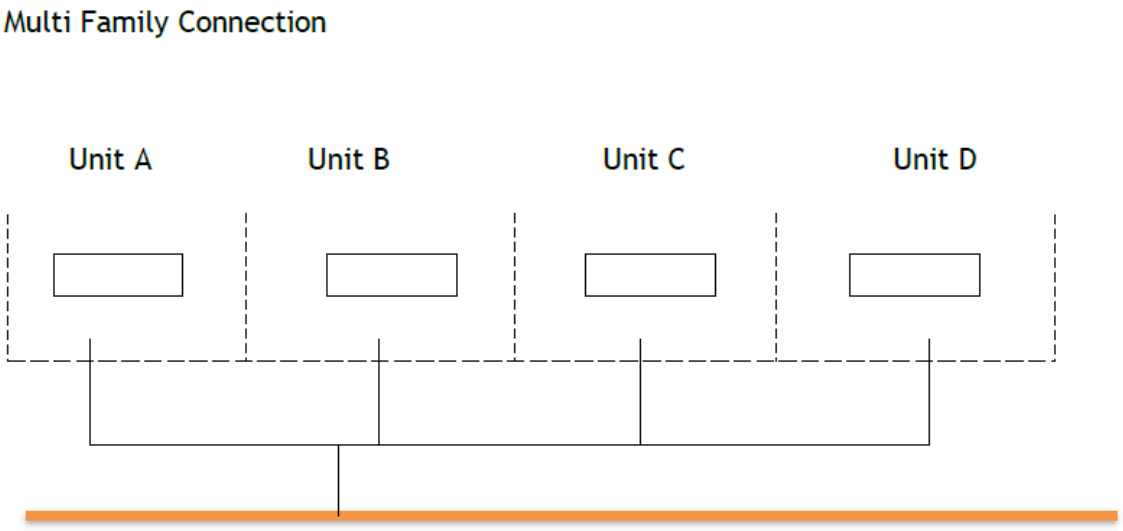
- A single dwelling which is occupied by a single family and is supplied by a separate service line;
- A single dwelling comprised of multiple living units where each living unit is supplied by a separate service line.
- If a water supplier has ownership and maintenance responsibilities of a service line up to a point of single-connections such connections may be considered a single-family- residential-connection even if this connection is to a multi-family dwelling unit. It is important to be aware that all other applicable parts of Regulation 11 will also apply to those new acquired waterworks (i.e. distribution system) and that any irrigation or other cross connections that are directly connected to the newly acquired service line would have to be controlled in accordance with Regulation 11.39.

Single-Family-Residential-Connections:

Single family residential service connections are a single living unit that is supplied by its own separate service line, multiple living units where each individual living unit is supplied by a separate service line or two separate single living units supplied by a common service line. Suppliers are not required to perform surveys for cross-connections at single family residential service connections in order to maintain compliance with Regulation 11. However, suppliers are required to control all identified cross-connections within the distribution system or waterworks. This requirement includes single family residential service connections in the event that the supplier becomes aware of a cross-connection or cross-connections present at a single family residential service connection.

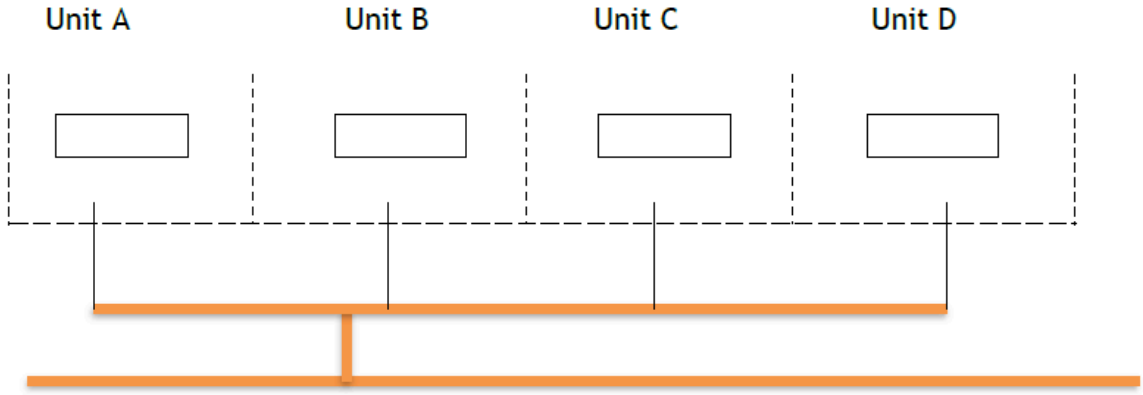
The supplier’s public water system may consist exclusively of single family residential service connections in certain circumstances. Public water systems that consist exclusively of single family residential service connections are not required to perform surveys for cross-connections at those service connections. The identification of single family residential connections and non-single family residential connections may be ambiguous at times. Below are a couple diagrams that illustrate the difference between a multifamily connection categorized as a non-single family residential connection and one categorized as a single family residential connection. The difference between the two diagrams is where each customer’s service connection to the distribution system is located.

Scenario 1 - Multi Family Connection Categorized as a Non-single Family Residential Connection



Scenario 1 - Example Multi-Family Connection to a Public Water System (distribution system is red thick line) considered a ***Non-Single-Family-Residential Connection***

Scenario 2 - Multi Family Connection Categorized as a Single Family Residential Connection



Scenario 2 - Example Multi Family Connection with Four Separate Connection (Supplier assumes ownership and maintenance of the service line (distribution system is red thick line) up to the distribution system. This type of connection would be considered a single-family-residential connection.

Identified Cross-Connections:

Suppliers will discover cross-connections during the implementation of their backflow program. A system's first step is to assess whether or not the discovered cross-connection is controlled. Supplier's must ensure the cross-connection is controlled within 120 days of discovery if the cross-connection is not properly controlled.

A system may become aware of an uncontrolled cross-connection due to learning of a backflow contamination event. For these situations, suppliers must notify and consult with the department on any appropriate corrective measures no later than 24 hours after learning of a suspected or confirmed backflow contamination event. To report an event, please call the 24-hr reporting line at 1-877-518-5608.

A system may discover and determine a cross-connection to have the potential for an acute public health risk based on the site's hydraulic conditions and the toxicity of the identified risk. The department requests notification for further evaluation to determine if alternative actions are necessary based on the cross-connection's potential threat to public health. Such actions could be an expedited schedule to remove or control the cross-connection or issuing a bottle water advisory for the impacted area.

Supplier's may also become aware of uncontrolled cross-connections where, to their knowledge, a backflow contamination event has not occurred. The supplier must conduct the following if a backflow contamination event has not occurred:

- Determine the type of backflow prevention assembly or backflow prevention method appropriate for control of the discovered cross-connection and have the appropriate assembly or method is installed and maintained, or
- suspend service to the customer, or
- remove the cross connection

The actions indicated above must be completed no later than 120 days after the discovery of the uncontrolled cross-connection. Additionally, the supplier must ensure all actions are implemented in accordance with their backflow program. As a reminder, uncontrolled cross-connections discovered at single family residential connections must be controlled in the same manner as uncontrolled cross-connections discovered at non-single family residential connections or within the supplier's waterworks.

Supplier's may encounter unexpected difficulties when attempting to achieve compliance within the 120-day deadline for controlling uncontrolled cross-connections. The supplier may issue a self approved extension or consult with the department regarding the approval of an extension if the supplier is unable to meet the 120-day deadline. Please see Appendix C.1 - Cross-Connection Control Extension Application. Please note that submission of an application does not constitute approval. Once the department has reviewed the application the department will notify the supplier of its decision. Please refer to Section 9 below for additional information regarding extensions.

Documentation:

Supplier's must record and maintain information supporting the implementation of their backflow program. This documentation includes:

- Dates, addresses, and results of the supplier's surveys for cross-connections;
- Dates and results of the supplier's method inspections and assembly tests for each calendar year; and
- Date of discovery, addresses, date of control for all identified uncontrolled cross-connections for each calendar year.

Suppliers are required to develop and implement a written backflow program and to document survey results even if no cross-connections are identified. The written backflow program should make mention of how the supplier will continue to evaluate new service connections and changes in use within the distribution system for cross-connections.

Resurveying Connections:

Distribution systems and waterworks are subject to change throughout time. These changes can result in the introduction of new and unknown cross-connections at previously surveyed service connections or waterworks. Supplier's **must** develop a mechanism within their backflow program for resurveying service connections and develop procedures to be notified when a triggering event has occurred. The supplier may need to coordinate notification procedures with personnel outside of the backflow department to ensure all triggering events are captured (ex. The billing department may receive information regarding a change in ownership or the local building authority may issue a permit for upgrades that include the internal water lines at a connection). Resurveying is required when the supplier becomes aware that the water use at a connection within the water supply system has changed AND the most protective assembly or method is not already being utilized.

> **Example:** a small business closes and a new tenant moves into the building. The previous small business did not have any identified cross-connections or backflow prevention in place. The supplier can no longer guarantee the information collected in their previous survey is representative of the building's current use. This change would trigger a resurvey of the building. The building's original survey would be overwritten by the new survey and would not count twice towards the annual survey compliance

When a connection is identified for a resurvey, that connection is considered unsurveyed in the survey ratio. Suppliers are expected to document updates to their survey numbers in the annual report. If a connection is identified for resurvey after October 31 of the calendar year it is not required to be included in the total number of connections in the survey ratio. The supplier is expected to resurvey the connection within a reasonable amount of time after notification of a triggering event. If a connection remains unsurveyed for multiple years, it may result in a significant deficiency.

Original and updated survey documentation must be kept for each connection that requires a resurvey.

2.3 Assembly and Method Selection

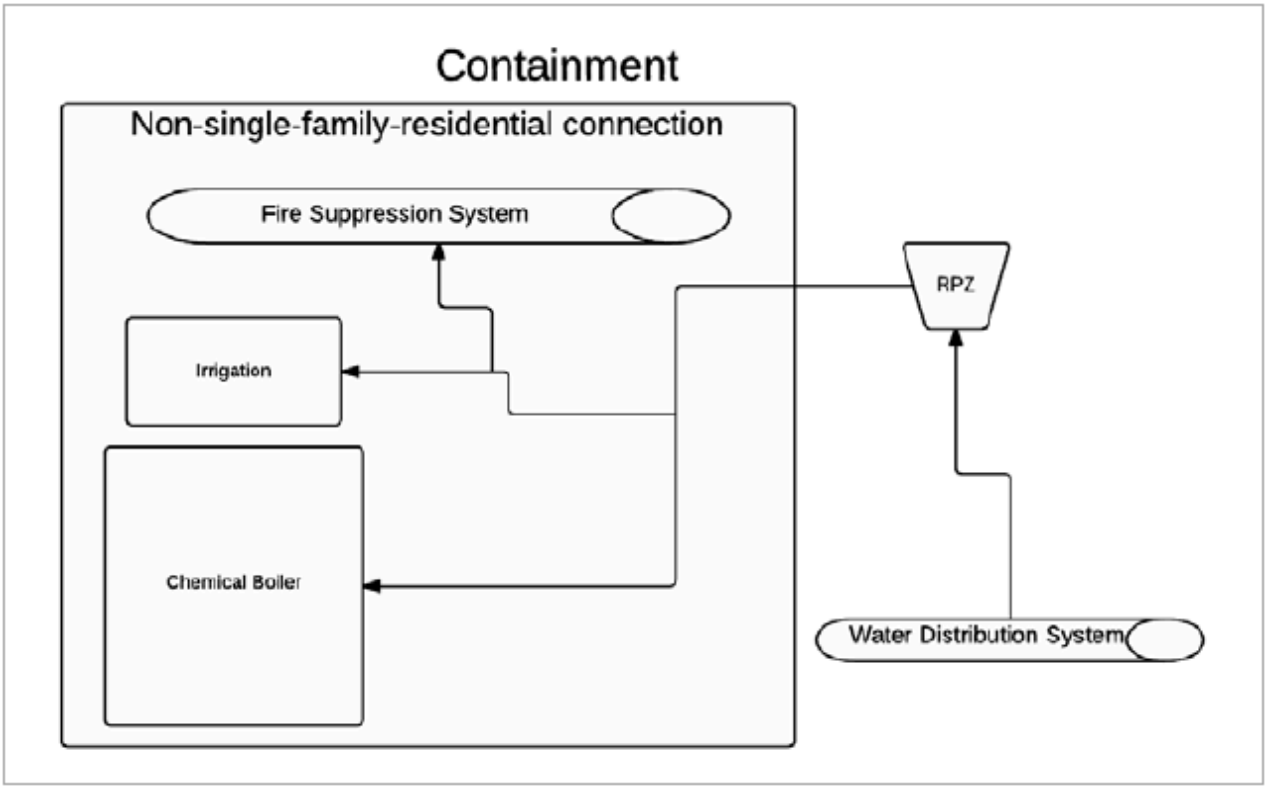
Suppliers are required to describe the process used to select a backflow prevention assembly or backflow prevention method to control a cross connection in the written backflow program. Suppliers should include their guidelines and criteria used to select the type of backflow prevention assembly or method used to control identified cross connection in their written backflow program. Guidelines and criteria should address examples of cross connections throughout the water systems distribution system along with the corresponding appropriate backflow prevention assembly and or backflow prevention method required to control the identified cross connection. Part 4.4 of Policy 7 provides examples for the appropriate use of backflow prevention assemblies.

Water systems may choose to control all cross connections with the most protective backflow prevention assembly or method. Water systems that implement this approach to controlling cross-connections within their backflow prevention cross connection control program will not have to develop guidelines or criteria. Water systems that implement any other practices within their backflow prevention and cross connection control program must identify the selected industry standards used to ensure cross connections are adequately controlled.

Suppliers are able to protect their public water system from cross connections through containment or containment by isolation. These terms are explained and defined as follows;

“CONTAINMENT” means the installation of a backflow prevention assembly or a backflow prevention method at any connection to the public water system that supplies an auxiliary water system, location, facility, or area such that backflow from a cross connection into the public water system is prevented.

Scenario 1 - Containment

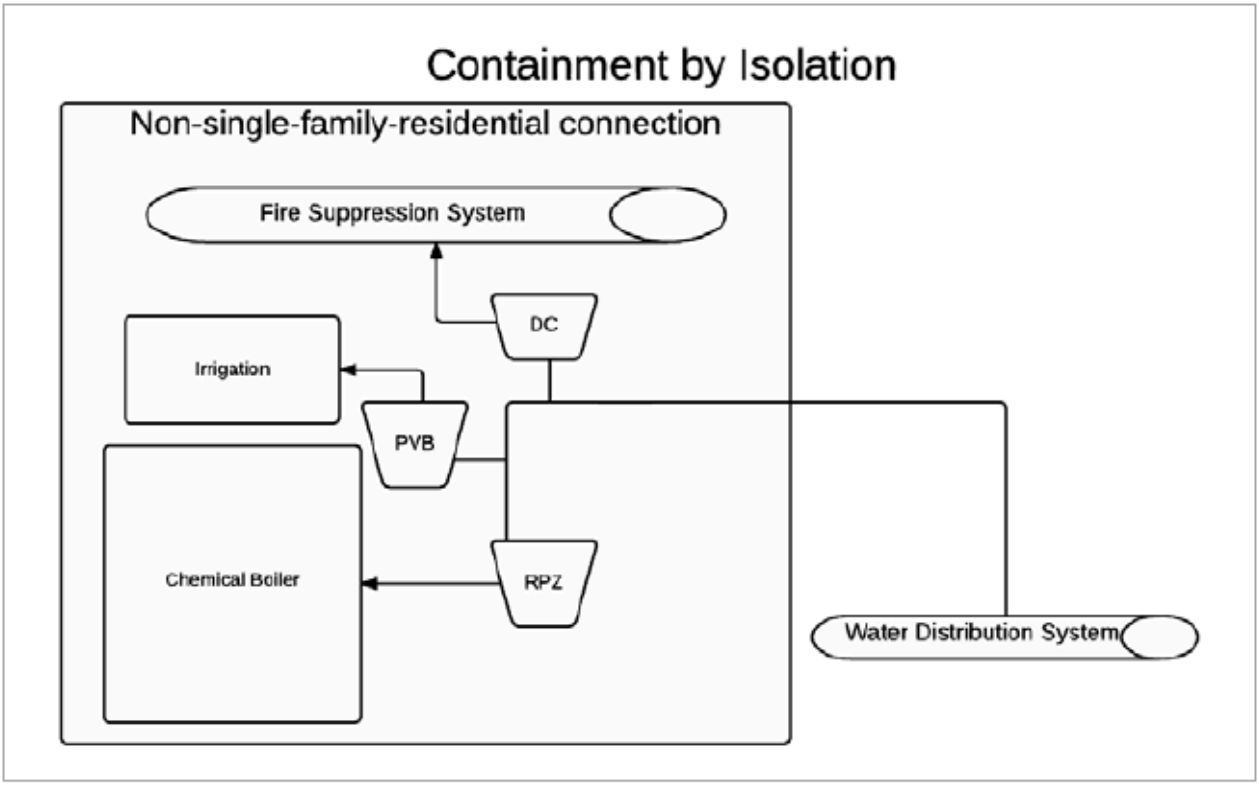


When utilizing a properly installed containment assembly or method that is installed on the service line prior to any cross connections, the supplier would count this as a single identified cross connection, even if multiple cross connections exist after the assembly or method.

> **Example**: The connection above has a fire suppression system, an irrigation system and a chemical boiler that utilize water from the supplier’s distribution system. There is a reduced pressure zone assembly (RPZ) installed on the water service line before it enters the building or splits. Since RPZs are considered the most protective backflow assembly, the supplier is protected from all cross connections in the building and would count the entire building as one cross connection.
>
> Please note: it is best practice for customers to still protect each cross connection individually to not cause contamination inside of the building; however, the RPZ on the service line protects the supplier's distribution system and is considered the compliance assembly for the backflow rule.

“CONTAINMENT BY ISOLATION” means the installation of backflow prevention assemblies or backflow prevention methods at all cross connections identified within a customer’s water system such that backflow from a cross connection into the public water system is prevented.

Scenario 2 - Containment by Isolation



When utilizing containment by isolation, the supplier must count each cross connection inside a building as an individual cross connection. This means there may be multiple identified cross connections for a single customer connection.

> **Example:** The connection above has a fire suppression system, an irrigation system and a chemical boiler that utilize water from the supplier’s distribution system. A backflow prevention assembly has been installed at each internal water supply line inside the building. Since each cross connection is controlled by an individual backflow prevention assembly, the supplier would count this as three identified cross connections and must ensure the assemblies are tested annually.

2.4 Tracking Installation, Maintenance, Testing, and Inspections

Suppliers must specify the tracking mechanism they will use to verify the installation, maintenance, testing, and inspection of all backflow prevention assemblies and backflow prevention methods used to control cross connections within the distribution system and their own waterworks. In the state of Colorado, public water systems vary significantly in size and the population served; ranging from a small restaurant that serves 25 people per day, to the largest water system which provides service to over one million people per day. The number of cross connections within a water system often increases with the size of the population served water. Tracking mechanisms will vary from water system to water system depending on the number of identified cross connections.

If a water system performs a survey and no cross-connections are identified, then the supplier must document within their tracking mechanism the date of the survey and indicate that no cross-connections were identified. There are no further tracking requirements for locations determined to have no cross-connections unless there is a triggering event that requires a resurvey.

New customers may introduce cross connections. The supplier's tracking mechanism must account for the installation, testing and maintenance of assemblies and methods for any newly identified cross connections. Their tracking mechanism should demonstrate the following:

- Date of discovery or survey;
- Cross-connections are controlled within 120 days of discovery or an approved extension;
- Date of annual assembly testing or method inspection; and
- Result of annual assembly testing or method inspection.

Tracking mechanisms may vary from a simple list, spreadsheet, or a tracking software specifically dedicated to documenting the control of cross-connections. The department has developed a tracking template that is part of the annual report template titled Appendix D - Backflow Annual Report and Tracking Template.

Adequate tracking mechanisms must be able to track the following information;

- Type of cross connection,
- Address and location of each cross connection,
- Type of assembly or method installed,
- Assembly or method model and serial number,
- Facility contact information,
- Initial discovered date,
- Date assembly tested or method inspected with result (pass/fail), and
- Other notes or comments that may be useful to the supplier such as installation issues or pass/fail history.

Please note that for assemblies that fail a test, the supplier should track the date they were notified of the failed test. Suppliers must also track the initial failed test date and the passing retest date.

2.5 Certified Tester

The supplier's program must document how they will verify that certified cross-connection control technicians are performing the tests for assemblies in the system. The department will determine the adequacy of a supplier's process to ensure that testing has been completed by a certified professional during sanitary surveys. The supplier may demonstrate through the following:

- The supplier has a documented process in place where the supplier receives a test report directly from the Certified Cross-Connection Control Technician or their associated company.
- To be considered adequate, test reports used must include all of the following:

  Assembly or method information:

  - Assembly or method type;
  - Assembly or method location;
  - Assembly make, model and serial number;
  - Assembly size;
  - Test date; and,
  - Test result (pass/fail).

  Certified Cross-Connection Control Technician information:

  - Certified Cross-Connection Control Technician certification agency;
  - Certification number;
  - Certification expiration date; and,
  - As an alternative to the information above, suppliers may provide documentation of an alternative validation process such as electronic login to reporting software where only current, certified cross-connection control technicians (or their companies) are given a login.

- Appendix I provides examples of acceptable test reports.

3. Backflow Annual Report

The annual backflow report summarizes the status of a public water system's backflow program. ALL public water systems must complete a backflow report every year. The backflow report for each calendar year must be completed no later than May 1 of the following year. The backflow reports and associated tracking processes will be reviewed during sanitary surveys to verify compliance. A copy of the backflow report and tracking processes must be available upon request.

The information below follows the reporting lines in the department's backflow annual report template (Appendix D). Please refer to the annual report template as you review this section. You will find the section titles on the far left hand side and the report line numbers next to the section titles.

Please note that in order for the department's backflow annual report template (Appendix D) to work properly and for the automated calculations to work, the worksheet needs to be downloaded in Excel format.

3.1 Survey Section

This section of the report summarizes the supplier's survey process. Surveys involve evaluating water connections to determine if a cross connection exists. A survey needs to be performed at a connection once, it does not need to be performed each year. There are some instances when a resurvey is required; please see Policy 7 for additional information on resurvey requirements.

Report Line 1

This number is the total number of "customer owned" water connections that must be evaluated for cross connections. This includes all businesses, multifamily complexes (triplex and larger), restaurants, industrial facilities, etc.

- This number should only increase if new service connections are added to the distribution system.
- This number should only decrease if service connections are removed from the distribution system.

Report Line 2

This number is the total number of "supplier owned" water connections that must be evaluated to determine if a cross connection exists. This number includes all treatment plants, pump stations, storage tanks, well houses, etc.

- This number should only increase if the supplier adds new connections to the water system (such as a new treatment plant, new storage tank, new pump station, etc.).
- This number should only decrease if the supplier removes connections from the water system (such as a treatment plant, storage tank, etc.).

Report Line 3

This number is the total number of **ALL** water connections that must be evaluated for cross connections. This is the sum of Line 1 and Line 2. This number is used to determine compliance with the survey ratio.

- If you are completing the annual report within Excel on your computer, this number will automatically be calculated for you.

Report Line 4

This number is the total number of water connections that the supplier has completed an evaluation (survey) to determine if a cross connection exists. This number is used to determine compliance with the survey ratio.

- This can include evaluations by third parties, adequate questionnaire results or documentation that the most protective assembly is already in place.

Report Line 5

This number is a comparison between the surveys that have been completed and the total number of surveys that need to be completed.

- If you are completing the annual report in Excel on your computer, this number will automatically be calculated for you.
- This number must equal 1.0. The supplier may round to the nearest tenth (first number after decimal). **If this number is less than 1.0, a violation has occurred**.

  Example: A ratio of 0.951 rounds to 1.0. A ratio of 0.947 rounds to 0.9.
- If the supplier has an alternative survey ratio schedule, this number must be equal or greater than the required value for the calendar year.

3.2 Cross-Connection Section

This section of the report summarizes all controlled cross connections and all uncontrolled cross connections identified during the calendar year. Uncontrolled cross connections include cross connections that do not have an assembly or method; cross connections that have an inadequate or incorrectly installed assembly or method; and cross connections with an assembly that failed its test. Tracking uncontrolled cross connections is important to ensure that they are all controlled within the required regulatory deadlines (120 days of discovery or an approved deadline extension).

Report Line 6

This number is the total number of ALL cross connections. Cross connections are first identified during the survey process.

- This includes both existing and new cross connections.
- This includes cross connections that are controlled and cross connections that are not controlled.
- This number does NOT have to equal the number in Report Line 4. There may be additional or fewer cross connections identified than the number of water connections that must be surveyed.
- Service connections that have not been surveyed yet are NOT included in the total number of cross connections. A survey will determine if there is a cross connection present.
- IF the supplier has identified a cross connection at a single family home, that cross connection must be included in this number.
    - Common cross connections at single family homes that must be included are: fire suppression systems, homes with a second water source (such as a private well), homes with cisterns and homes with a separate connection from the water main for irrigation.

Report Line 7.A

This number is the total number of uncontrolled cross connections that **WERE controlled** within the required timeline.

- Timeline for control is 120 days from discovery OR an approved extension.
- This number includes failed assemblies that were repaired and have received a passing test.
- This number includes only uncontrolled connections identified during the calendar year.
- IF an assembly fails a test but is repaired and receives a passing test on the SAME day, it is NOT required to be included in this number.

Example: An assembly fails testing on June 5; the same assembly is repaired and receives a passing test on July 1 (26 days). This assembly would be included in report line 7.A

Report Line 7.B

This number includes the total number of uncontrolled cross connections that **WERE NOT controlled** within the required timeline.

- Timeline for control is 120 days from discovery OR an approved extension.
- This number includes failed assemblies that were NOT repaired or controlled through suspension of service.
- This number includes only uncontrolled connections identified during the calendar year.
- **Any number other than 0 is a violation.**

Example: A new cross connection is identified on July 3. An alternative extension is not created for this connection. The cross connection is controlled on December 30. This connection would be included in report line 7.B because it was not controlled within 120 days from discovery or an approved extension.

Report Line 7.C

This number includes the total number of uncontrolled cross connections that **are NOT controlled yet, but ARE still within the timeline** to be controlled.

- Timeline for control is 120 days from discovery OR an approved extension.
- This number includes failed assemblies that are not repaired but are still within the timeline.
- This number includes only uncontrolled connections identified during the calendar year.

Example: A cross connection is identified on August 30. An extension is developed for June 15 of the following year. This connection is included in report line 7.C because it has not been controlled but is still within the extension deadline.

Report Line 7.Total

This number is the total number of ALL uncontrolled cross connections.

- This number includes only uncontrolled connections identified during the calendar year.
- This number is the sum of 7.A, 7.B and 7.C.
- If you are completing the annual report in Excel on your computer, this number will automatically be calculated for you.

3.3 Combined Compliance Ratio

This section of the report summarizes the backflow assemblies and methods. Assemblies and methods are installed at cross connections to prevent contamination. Assemblies are testable backflow prevention that require a certified technician to perform testing. Methods are non-testable backflow prevention that require visual inspection to confirm they are in place and appropriately installed.

Report Line 8

This number is the total number of assemblies and methods in the system. This number is used to determine compliance with the combined compliance ratio.

- This number relates to the total number of cross connections in Report Line 6.
- If ALL cross connections have an assembly or method installed, then Report Line 8 will equal Report Line 6.
- If an assembly or method is used during the calendar year and is later suspended during the same calendar year, it must still be included in Report Line 8. When service is suspended during the previous calendar year and remains suspended for the ENTIRE following year, then that assembly or method is NOT included in this line.

Example: Service is suspended at a connection in 2022. For the calendar year 2022 annual report, this assembly must be included in Report Line 8. If that assembly remains suspended for ALL of calendar year 2023, it is not included in Report Line 8 for the 2023 annual report.

Report Line 9

This number includes ALL assemblies that have received a test report and ALL methods that have been inspected. This number is used to determine compliance with the combined compliance ratio.

- To be included, an assembly MUST have a test report from a certified tester for the calendar year.
- To be included, a method MUST have a documented inspection for the calendar year.

Report Line 10

This number is a comparison between the number of assemblies & methods that **HAVE BEEN tested & inspected** to the number of assemblies & methods that **MUST be tested & inspected**.

- If you are completing the annual report within Excel on your computer, this number will automatically be calculated for you.
- This number must be greater than or equal to 0.90. The supplier may round to the nearest hundredth (second number after decimal). **If this number is less than 0.90, a violation has occurred**.

Example: A ratio of 0.893 rounds to 0.89. A ratio of 0.896 rounds to 0.90.

3.4 Untested Assembly Tracking

This section of the report summarizes the connections where the backflow prevention assembly was NOT tested or the backflow prevention method was NOT inspected during the year. Every assembly must be tested and every method must be inspected within a two year timeframe.

Report Line 11

This number includes all assemblies that were **NOT tested** and methods that were **NOT inspected** during the year.

- Any connections included in this number **must be tested or inspected during the next calendar year**.
- This number relates to Report Line 10. If Report Line 10 is less than 1.00, Report Line 11 must include numbers other than zero (0).
- The location of these connections must be recorded. The supplier must make sure that these locations are available for review and that they do not get lost or overwritten when the next test report is received.

Example: A supplier has 100 cross connections and 91 were tested during the year. The 9 connections that were not tested must be reported here. The locations of those 9 cross connections must be documented at the bottom of the report or in another location the supplier has chosen.

Report Line 12

This number includes all assemblies that were NOT tested and methods that were NOT inspected during **the last two (2) calendar years**.

- This number relates to Report Line 10.
- Any number included here would have been included in Report Line 11 for the previous year's report.
- **Any number other than 0 is a violation and must be reported to the department.**

Example: A supplier has 4 assemblies that were not tested during 2023 and were also not tested during 2022. The assemblies have gone 2 calendar years without being tested. These assemblies must be included in report line 12 for the 2023 annual report due May 1, 2024. This is automatically a violation.

The following are situations that should and should **NOT** be included in Report Line 12:

Table 2 - Examples of Situations That Should and Should Not Be Reported in Line 12:

Included	Not Included
Assemblies **NOT TESTED** for two (2) consecutive calendar years	Connections where service was suspended for backflow testing non-compliance **before the end of the second calendar year** (still included in report lines 8, 9 and 10)
Null	Failed assemblies (included in report lines 7.A, 7.B or 7.C)
Null	Newly identified cross connections (included in report lines 7.A, 7.B or 7.C)

4. Department Notification (Coming Soon)

5. Permitting a Cross-Connection (Coming Soon)

6. Suspension of Service (Coming Soon)

7. Failed assemblies (Coming Soon)

8. Extensions

When suppliers discover an uncontrolled cross-connection, the supplier must control it within 120-days or within a timeline specified in an alternative schedule. These alternative schedules are often called “Extensions.” There are two different ways that a supplier can get an extension; 1) The supplier can submit a Cross-Connection Control Extension Application to the drinking water portal for department review, or 2) The supplier can develop and implement a self extension for situations meeting the criteria specified in Section 4.11 of Policy 7. This must be done for each individually discovered uncontrolled cross-connection that is given an extension. If the supplier does not correctly develop and implement an extension, a violation may occur.

8.1 Supplier Extensions

Providing Justification:

For a supplier extension, the supplier must provide justification for why they cannot comply with the original 120-day timeline. The justification must be reasonable for why the extension should be issued. The department developed categories of supplier extensions to assist suppliers in providing justification. For a list and details about these categories, please refer to Policy 7.

Limitations:

Limits have been set for supplier extensions to ensure the risk of an uncontrolled cross-connection is considered. If any situation goes beyond these limits, suppliers must consult with the department. The following limitations apply to all supplier extensions;

1. All supplier extensions must be developed, implemented and documented within 120 days from the date the supplier became aware of the uncontrolled cross-connection.
2. The extension date must be as soon as practical and cannot exceed 12 months from the date the supplier became aware of the uncontrolled cross-connection.
3. Supplier extensions cannot be used for the testing or inspection requirements for backflow assemblies or methods
4. Supplier extensions cannot be categorical extensions. Suppliers must consult with the department for any proposed categorical extensions.
5. For any discovered direct connections to sewer, the supplier must notify the department as soon as possible and no later than 48 hours.

6. If the supplier learns of a suspected or confirmed backflow contamination event, the supplier must notify the department as soon as possible and no later than 24 hours. (24-hr Incident report line: 1-877-518-5608)

For additional information on limitations for supplier extensions, please refer to Policy 7.

Guidelines for developing and implementing:

To help guide suppliers in complying with the self extension process and to ensure alignment with a culture of health, the department prepared the following guidelines;

1. Suppliers shall make a reasonable effort to control any uncontrolled cross-connection as soon as practical and within the original 120-day timeline.
2. Suppliers shall create a tracking process to ensure all required information is adequately tracked and documented. This is required for each individual cross-connection that gets a supplier extension.
3. The owner or person responsible for controlling the discovered uncontrolled cross-connection should be cooperative and give reasonable assurances that work will be completed by the proposed timelines.
4. Suppliers shall develop an escalation and enforcement process. This process needs to have internal deadlines before the extension deadline and a plan for what to do if the cross-connection is not controlled (i.e. suspension of service). The escalation and enforcement process should be adequately documented and incorporated into the supplier's backflow program. For information on common escalation techniques, please refer to Policy 7.

For additional information on limitations for supplier extensions, please refer to Policy 7.

Documentation Requirements:

For each individual uncontrolled cross-connection that receives a supplier extension, the supplier must track and document all necessary information including but not limited to the following information;

- Type of extension (no assembly/method, inadequate assembly/method, or an assembly that failed a test)
- Date of discovery
- Location/address
- Owner/Property Manager/Site Contact
- Service connection type and/or identified contaminant
- Reasonable justification for why the supplier and/or the customer are unable to comply with the 120-day deadline
- Proposed and achieved action for compliance (Installed assembly/method, repair/replace and testing of assembly/method, removal of cross-connection, suspension of service)
- Proposed control date
- Date controlled (ie passing test date, date removed, or date service was suspended)

For assistance in documenting information, suppliers can utilize APPENDIX C.2 - Supplier Extension Documentation Template. If a supplier fails to document all necessary information for supplier extensions, a violation may occur.

8.2 Department Approved Extensions

For situations not specified in Policy 7, suppliers must consult with the department for approval of an extension. This requires the supplier to submit all necessary information for review. To assist suppliers in submitting all necessary information for a department-approved extension request, suppliers can utilize APPENDIX C.1 - Cross-Connection Control Extension Application.

8.3 Categorical Extensions

For qualified scenarios where a supplier requests a general extension for cross-connections of a specific category that have yet to be identified, suppliers can consult with the department for a categorical extension. The department will review all available information and issue either an approval letter or a compliance advisory requesting additional information.

9. Small System Guidance (Coming Soon)

APPENDIX A - Written Backflow Program Template

A template backflow program can be downloaded on the department's website at https://cdphe.colorado.gov/bpccc.

Written Backflow Program Template

APPENDIX B - Example Backflow Ordinance

An example backflow ordinance can be downloaded on the department's website at https://cdphe.colorado.gov/bpccc.

Example Backflow Ordinance

APPENDIX C.1 - Cross-Connection Control Extension Application

An application for the extension request of the 120-Day deadline for controlling cross-connections can be downloaded on the department's website at https://cdphe.colorado.gov/bpccc.

Cross-Connection Control Extension Application

This application is for submitting a request to the department and should be submitted to the department electronically through the drinking water portal at https://wqcdcompliance.com/login under the category "Sanitary Survey Inspection."

APPENDIX C.2 - Supplier Extension Documentation Template **(Coming Soon)**

APPENDIX D - Backflow Annual Report and Tracking Template

An example backflow annual report and tracking template can be downloaded on the department's website at https://cdphe.colorado.gov/bpccc. The department has provided an Excel version of the required report.

Backflow Annual Report and Tracking Template

APPENDIX E - Example Backflow Survey and Questionnaires

Example backflow survey and questionnaires can be downloaded on the department's website at https://cdphe.colorado.gov/bpccc.

Example Backflow Survey and Questionnaires

APPENDIX F - Alternative Survey Compliance Ratio Application

An application for an alternative survey compliance ratio can be downloaded on the department's website at https://cdphe.colorado.gov/bpccc.

Alternative Survey Compliance Ratio Application

APPENDIX G - Small System Backflow Program Template

A template backflow program for small systems (non-community, small HOAs, etc.) can be downloaded on the department's website at https://cdphe.colorado.gov/bpccc.

Small System Backflow Program Template

APPENDIX H - Small System Cross Connection Survey

A template small system backflow survey can be downloaded on the department's website at https://cdphe.colorado.gov/bpccc.

Small System Cross Connection Survey

APPENDIX I - Example Assembly and Method Test Reports

Sample Backflow Assembly Test Report

Public water system:	this cell intentionally left blank
Customer name & number:	this cell intentionally left blank
Customer account number:	this cell intentionally left blank
Onsite contact person name, number & address	this cell intentionally left blank
Assembly type and size:	this cell intentionally left blank
Assembly location:	this cell intentionally left blank
Assembly make, model and serial number:	this cell intentionally left blank
Test result:	this cell intentionally left blank
Observations, repairs or comments	this cell intentionally left blank
Certified Cross-Connection Control Technician Certification Agency:	this cell intentionally left blank
Certification number:	this cell intentionally left blank
Certification expiration date:	this cell intentionally left blank
Signature of Owner or onsite contact:	this cell intentionally left blank
Date:	this cell intentionally left blank
Signature of tester:	this cell intentionally left blank
Date:	this cell intentionally left blank

Directions: The tester or customer must submit and include all of the following information to the appropriate public water system. Records must be kept for 3 years for community systems and for 5 years for non-community systems.

Sample Backflow Method Inspection Report

Public water system:	this cell intentionally left blank
Customer name & number:	this cell intentionally left blank
Customer account number:	this cell intentionally left blank
Onsite contact person name, number & address	this cell intentionally left blank
Method type and size:	this cell intentionally left blank
Method location:	this cell intentionally left blank
Method make, model and serial number:	this cell intentionally left blank
Inspection result:	this cell intentionally left blank
Observations, repairs or comments	this cell intentionally left blank
Certified Cross-Connection Control Technician Certification Agency (NA if performed by supplier):	this cell intentionally left blank
Certification number (NA if performed by supplier):	this cell intentionally left blank
Certification expiration date (NA if performed by supplier):	this cell intentionally left blank
Test kit information & last calibration date:	this cell intentionally left blank
Signature of Owner or onsite contact:	this cell intentionally left blank
Date:	this cell intentionally left blank
Signature of tester:	this cell intentionally left blank
Date:	this cell intentionally left blank

Directions: The tester or customer must submit and include all of the following information to the appropriate public water system. Records must be kept for 3 years for community systems and for 5 years for non-community systems.

APPENDIX J - Example Standards for Assemblies and Methods

(1) Only the models of backflow prevention assemblies that are approved by the Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California (USC- FCCC&HR) or The American Society of Sanitary Engineering (ASSE) are acceptable for use when installing assemblies and methods used to control cross connections in accordance with Regulation 11.

(2) Air gaps must be installed in accordance with standard AMSE A112.1.2.

(3) Backflow prevention assemblies and air gaps used for containment shall be installed on the user's water service line as close as possible to the point of connection to the public water system and prior to any other connection or branch line. If it is not possible or practical to install backflow prevention assemblies or air gaps as described, the installation shall be at the approval of the water supplier; such backflow prevention assemblies or air gaps used for containment by isolation shall be installed in the user's plumbing system as close as possible to the cross-connections and shall be installed in accordance with the applicable plumbing code.

(4) No bypass piping shall be allowed around the backflow prevention assembly unless the bypass is equipped with the same degree of backflow prevention protection.

(5) Reduced pressure principle backflow prevention assemblies and reduced pressure principle detector backflow prevention assemblies shall be installed with no plug or additional piping affixed to the pressure differential relief valve port (except for specifically-designed funnel apparatus available from the manufacturer) and with the pressure differential relief valve port a minimum of twelve inches (12") above floor level or finished grade. Additionally, the assembly shall be installed at a location where any leakage from the pressure differential relief valve port will be noticed, that allows easy access to the assembly for maintenance and testing, and that will not subject the assembly to flooding.

(6) All double check valve assemblies and double check detector backflow prevention assemblies shall be installed at a location that allows easy access to the assembly for maintenance and testing and that will not subject the assembly to excessive heat or freezing.

(7) All pressure vacuum breaker assemblies and spill resistant pressure vacuum breaker assemblies shall be installed at a location that allows easy access to the assembly for maintenance and testing and that will not subject the assembly to backpressure or flooding. Said assembly shall be installed at least twelve inches (12") above the highest downstream plumbing.

(8) All backflow prevention assemblies installed on fire suppression systems shall be installed upstream of the fire department connection (FDC).

(9) All backflow prevention methods should be installed in accordance with the local jurisdictional plumbing code if applicable. If there is not a local jurisdiction having authority the method must be installed in accordance with the most current Colorado Plumbing Code.