



Florida Department of Environmental Protection  
Drinking Water and Aquifer Protection Program

## Cross-Connection Control and Backflow Prevention for Public Water Systems

28<sup>th</sup> Annual Cross-Connection Control Conference



## Overview

- History
- Need To Know
- Rules and Regulations
- Backflow
- Enforcement
- Reports
- Education
- Cases
- Summary

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## History

- For more than 100 years cross-connection has been discussed by water and health officials.
- One of the first papers on record concerning cross-connections was presented initially in 1894.
- Soon after, a committee was appointed to investigate cross-connection issues.
- After filing the report in 1928 regarding the investigation, the committee defined the word 'cross-connection'.

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## History

- The final report detailed the overall issues caused by cross-connections, auxiliary intakes and bypasses.
- The tabulation included a total of more than 11,000 cases of dysentery and 226 deaths.

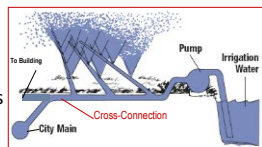
• *AWWA Journal, Backflow Prevention and Cross Connection Control, June 1970*

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## Need To Know

- Cross-Connection is the point where a non-drinking water source can be connected to a drinking water source within a distribution system
- Rules and regulations have been developed to reduce or eliminate the possibility of health risks
- City and County ordinances follow the rules and regulations



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## Rules and Regulations

- Department of Environmental Protection (DEP) first developed a Cross-Connection Control (CCC) Rule for Public Water Systems (PWS) in 1977
- DEP CCC Rule references *Recommended Practice for Backflow Prevention and Cross-Connection Control: AWWA Manual M14*
- DEP amended the CCC Rule in 1991 to allow Dual Check Devices (DuC) to be used as backflow protection at residential service connections to premises with a reclaimed water system
- DEP Rule 62-555.360 of the Florida Administrative Code (F.A.C.) was revised in 2014 for clarification and additional information

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## CCC Program

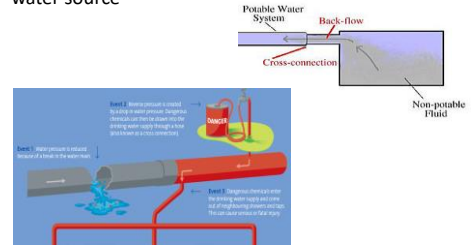
- Systems are required to establish guidelines for controlling cross-connections to protect the public drinking water supply
- They must ensure compliance with those guidelines
- These guidelines should include methods to reduce or eliminate possible cross-connections

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## Backflow

- Backflow is defined as an undesirable reverse flow of water that returns contaminated water to the potable water source



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## Backflow

- Backflow can occur for two reasons, **back pressure** or **back siphonage**.
- Back pressure occurs when there is a higher pressure in one area of the system than in another
- Back siphonage occurs when one part of the water system is at a lower pressure than another

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## Public Health Risks

- Compromised water quality can lead to public health effects
- Cross-connection can be defined as either low risk or high risk
- The level of risk will determine the corresponding cross-connection control device or assembly

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## Public Health Risks

- **Low Risks** are hazards involving a substance that if introduced into the water supply would not cause considerable threat to public health
  - Beverage bottling plants
- **High Risks** are hazards involving substances that if introduced into the water supply could potentially cause illness or death
  - Hospital
  - Car wash
  - Mortuary

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## Backflow Device Installation

- Consideration should be given to temperature (freeze protection)
- Cannot be installed in an area prone to flooding
- Ground clearance must be considered before installation

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## Backflow Devices

- Double Check Device (DC) 
- Reduced Pressure Device (RP) 
- Dual Check Device (DuC) 
- Pressure Vacuum Breaker (PVB) 
- Air gap (AG) 

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## Backflow Devices

- Approved Reduced Pressure Principle Assemblies (RP) and Double Check Assemblies (DC) may be used *depending on the level of risk for the drinking water system*
- RP incorporates two independently-acting spring-loaded check valves separated by a spring-loaded differential pressure relief valve, two seated shutoff valves, and four test cocks
- DC devices incorporate two single-check valves assembled within one body with four test cocks and two shut-off valves
  - Devices must be installed at facilities that handle substances under constant pressure that may cause a health risk

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## Backflow Devices

- AG required at or for service connections conveying water to a tank or waste discharges; provides maximum protection if not altered and must be available for inspections
- Dual Check Devices (DuC) may only be used if there is no known cross-connection between the plumbing of a customer's property, and a secondary water source

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## Backflow Devices


### Atmospheric Vacuum Breaker (AVB) vs. Pressure Vacuum Breaker (PVB)

- AVB devices prevent backflow of non-potable liquids into the drinking water system; however, the device does not allow for testing after it has been installed, nor does it allow the ability to locate any back pressure sources
- PVB devices prevent the reversal flow of fluid into the drinking water system as well, evolving beyond the AVB device in order to allow the device to be operational under constant pressure, and with the ability to be tested


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## Backflow Devices


- Cross-connections and backflow protection within the distribution system between facilities are described on pages 80-84 in the *AWWA Manual M14 and Subsection 62-555.360(1), F.A.C.*
- Images below show BP devices needed between drinking water systems.




CWS — NTNCWS



CWS — Residential



CWS — TNCWS



CWS — Irrigation System

NTNCWS = Non-Transient Non-Community Water System      TNCWS = Transient, Non-Community Water System

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## Backflow Device Maintenance

To make sure backflow devices are working properly, the devices require testing and maintenance on a regular basis by certified or licensed inspector, or plumber

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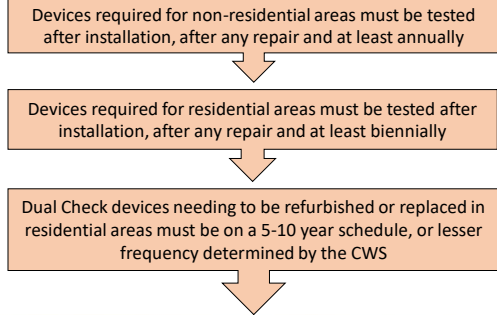
Testing and maintenance are referenced in the rules and regulations of the state (62-555.360, F.A.C.), city or county ordinances, or the manufacturer's procedures of the device

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## Backflow Device Maintenance



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## Enforcement

- City or County governments can determine, according to their ordinances, what type of actions to enforce
- If for any reason a water system cannot comply with the requirements for eliminating or reducing a backflow hazard or cross-connection, a request for an extension may be considered depending on the City or County ordinance
  - The request must be accompanied by appropriate documentation identifying the steps to be taken by the water system in order to make the necessary corrections

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## Enforcement

- If an unprotected cross-connection is discovered, water systems should ensure that the cross-connection is eliminated and appropriate backflow protection is provided at the service connections, or water service must be discontinued
- In a case where there has not been any backflow prevention devices installed, the system / customer must install an approved device depending on the type of facility and hazard

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## Cross-Connection Reports

- Each Community Water System serving more than 10,000 persons must prepare and submit a CCC program annual report
- The first report must be for the current calendar year; subsequent reports must cover each calendar year thereafter
- The reports must be prepared using Form 62-555.360(13) in Rule 62-555.360, F.A.C., and submitted to the appropriate District or Approved County Health Department (ACHD) within 3 months after the end of the calendar year

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## Education

- Education is important when it comes to cross-connection
- The city or county may require operators or technicians to complete training for certification
- Trained and certified operators can contribute effectively to CCC and backflow prevention
- Many CCC Programs have a public education component and involve customers, to gain a better understanding of the dangers of backflow and effective actions to prevent cross-connections

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## Cross-Connection Cases

"A CCC Program is like an insurance policy: You hope you never have to use it, but you're glad it's there when something out of your control happens" ...AWWA, *In the Field: Cross-Connection Control is Everyone's Responsibility*, November 2014.

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## Cross-Connection Cases

### Cases involving Cross-Connection:

- Garden hose connected to residence and open end placed in bucket of unknown fluid
- Employees at an office building complained of health issues. It was determined that a cross connection existed between the drinking water and a 10,000 gallon hot water tank
- City in Florida: A single-family residence connected to a water system and reuse water system without a backflow device went unnoticed for three months

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## Presentation Summary

- CCC and Backflow Prevention is a necessity to maintain water quality
- Establish CCC Programs according to risks that may contribute to backflow within plumbing system
- Education is key to control the risks of cross-connection
- Know your City or County ordinances
- View or download current FAC Rule 62-555.360, including Form 62-555.900(13), at following Florida Department of State webpage:

<https://www.flrules.org/gateway/ChapterHome.asp?Chapter=62-555>

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## Questions and Comments

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## Contact Information

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