

**CITY OF POMPANO BEACH**

**UTILITIES DEPARTMENT**



Florida's Warmest Welcome

**POTABLE WATER SYSTEM,  
BACKFLOW PREVENTION AND  
CROSS-CONNECTION CONTROL  
PROCEDURES MANUAL**

JUNE 2017

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## **INTRODUCTION**

The purpose of this manual is to describe the City of Pompano Beach backflow prevention and cross-connection control program. The primary goal of this program is to preserve the integrity of the potable water system and protect the public health through the prevention of backflow. The American Water Works Association (AWWA) M14 *Recommended Practice for Backflow Prevention and Cross-Connection Control*, defines a cross-connection as “an actual or potential connection between any part of a potable water system and any other environment that contains other substances that, under any circumstances, would allow such substances to enter the potable water system. Other substances include gases, liquids, or solids, such as chemicals, water products, steam, water from other sources (potable or nonpotable), and any matter that may change the color or taste of water or add odor to water.”

This manual also serves to provide guidance in the daily application of City Ordinance Chapter 50, Water and City Ordinance Chapter 54, Reuse Water and Cross-Connection Control. The backflow prevention program is outlined in the City Ordinance and has been developed based on regulatory requirements, good engineering practices and water industry standards. Whenever this manual references sections of the City of Pompano Beach Code of Ordinances, Florida Administrative Code (FAC), American Water Works Association (AWWA) M14 *Recommended Practice for Backflow Prevention and Cross-Connection Control*, or any other authoritative document and said referenced document is updated, unless a specific exemption is contained herein, this manual shall be considered updated to reflect those changes.

## **LEGAL AUTHORITY**

As directed by FAC 62-555.360, the City of Pompano Beach herein creates procedures for a backflow prevention and cross-connection control program. As the purveyor of potable water, the City of Pompano Beach Utilities Department

shall be the sole arbitrator as to the level of protection needed to protect the water system. The City may elect to require more stringent controls than required by state regulations in order to protect Pompano Beach citizens.

City Ordinance, Chapter 50 (See Appendix A) grants the Utilities Director or his designee the authority to require a customer to install an approved<sup>1</sup> backflow preventer on their potable water service. The ordinance sets forth the requirements for acceptable units as well as installation standards. Ordinance Chapter 54 (See Appendix B) specifies that all commercial and multifamily residential reuse customers must have an approved<sup>1</sup>, testable, backflow prevention assembly installed on their potable system before reuse service is connected. Single family residential reuse customers must have at least a city owned dual check device installed on their potable system, as well as an additional protective measure (i.e. customer agreement or Automated Metering Infrastructure (AMI)) before reuse service is connected. Both ordinances require submittal of annual inspection results for assemblies, conducted by a certified technician. Both ordinances also provide the Utilities Department the authority to disconnect potable water services upon failure to meet backflow prevention or cross-connection control requirements. The City will not allow any cross- connections to the potable water supply.

## **BACKFLOW PREVENTION POLICY**

Per Ordinance, the Utilities Department determines the level of hazard, or likelihood of cross-connection or backflow, for a given site, and determines the backflow prevention requirements for that site. At a minimum, the AWWA M14 and the Florida Department of Environmental Protection rules and policies are followed. The City may require more stringent backflow prevention in order to protect the public water supply. The following policy is currently in place:

<sup>1</sup> Device must be nationally approved testable, in full conformance with the current standards established by the AWWA, the Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California (FCC HR USC), or the American Society of Sanitary Engineering (ASSE), as well as meeting local building codes.

- All commercial services must install a reduced pressure backflow preventer.
- All buildings or mastered metered connections, with four or more units must install a reduced pressure backflow preventer.
- All single family residential reuse customers must have at least a dual check device on the potable system with an additional layer of protection (i.e. customer agreement or AMI).
- A pressure vacuum breaker may be installed at a potable irrigation only meter depending on pressure conditions.
- Fire only systems require a double check detector assembly or reduced pressure detector assembly.
- Metered potable water use from a fire hydrant or other water system fixture for filling tank type vehicles (i.e. lawn maintenance or pest control) shall protect the water system by an approved air gap separation or reduced pressure principle backflow preventer.
- All other determinations will be made on a case by case basis depending on the level of hazard.

Types of backflow preventers include:

Air Gap (AG) – An approved AG is a piping system that provides an unobstructed vertical distance through free atmosphere between the lowest point of a water supply outlet and the overflow rim of an open, non-pressurized receiving vessel into which the outlet discharges. For AGs that are constructed on site, these vertical physical separations must be at least twice the effective opening (inside diameter) of the water supply outlet but never less than 1 inch (25mm). In locations where the outlet discharges within three times the inside diameter of the pipe when measured from a single wall or other obstruction, the AG must be increased to three times the effective opening but never less than 1.5 inches (38mm). In locations where the outlet discharges within four times the inside diameter of the pipe when measured from two intersecting walls, the AG must be

increased to four times the effective opening but never less than 2 inches (51mm). Air gaps should not be approved for locations where there is the potential for the atmosphere around the AG to be contaminated, nor should the inlet pipe be in contact with a contaminated surface or material.

Dual Check Device (DuC) – A non-testable device containing two internally loaded, independently operating check valves. Application includes low hazard protection without excessive pressure conditions. Dual checks may be used to protect the potable water supply at Single Family Residential locations if supplemented with AMI.

Double check valve prevention assembly (DC) – An assembly composed of two single, independently acting, check valves, including tightly closing shutoff valves located at each end of the assembly and suitable connections for testing the water tightness of each check valve. Application includes low hazard backsiphonage and backpressure only.

Double check detector assembly (DCDA) – This assembly is a double check valve prevention assembly with a flow meter to detect flow on a fire system. Application includes low hazard backsiphonage and backpressure only.

Pressure vacuum breaker assembly (PVB) – A pressure vacuum breaker has a spring activated poppet valve with a single check valve, including tightly closing shutoff valves located at each end of the assembly and suitable connections for testing the water tightness of each check valve. Application includes high and low hazard backsiphonage only.

Reduced pressure zone backflow preventer assembly (RP) – A device containing tightly closing shutoff valves located at each end of the assembly and suitable connections for testing the water tightness of each check valve. It has within its structure a minimum of two independently acting approved check valves, together with an automatically operating pressure differential relief valve located between the two check valves. Application includes high and low hazard backsiphonage and backpressure.

## **MATERIAL AND INSTALLATION STANDARDS**

Both City Ordinance Chapters 50 and 54 address the material and installation standards for backflow prevention at service connections. The Community Water System owned RP's and DC's must conform to AWWA Standards C510 and C511. Customer-owned backflow preventers must conform to the Florida Building Code and AWWA standards, as well as be approved by the FCC HR USC.

All assemblies will be installed at the water meter, at the property line, or for retrofits to existing systems, at a location approved by the Utilities Department. A written request must be submitted to the Utilities department for installations at any other location citing extenuating circumstances. All assemblies must have factory approved shut-off valves and are to be shipped from the factory completely assembled. Fire systems require Outside Stem and Yoke (OS&Y) rising stem shut-off valves. Backflow prevention assembly (2" and below) installations must be equipped with matching ball valves. Larger domestic installations must have resilient seat gate valves. In addition, all double checks and reduced pressure backflow preventers must be equipped with all four test cocks.

The relief port on all RP backflow preventers must be installed at a minimum of 12", but not more than 30" above the flood plain of the surrounding area. DC valve assemblies must be installed 12" above the flood plain level from the bottom of the device. PVB assemblies must be installed 12" above the highest downstream outlet. Reduced pressure containment backflow prevention assemblies may not be installed in a pit, vault, or inside a building.

The Utilities Department recommends that all customers consider installing a strainer on all installations with the exception of fire services.

Dual Check devices will be installed at the water meter and contain two internally loaded, independently operating check valves. The Utilities Department has approved the use of dual check valves in order to protect the potable system from auxiliary irrigation sources such as reuse, ponds, wells and canals. These devices will be used with an additional protective measure (i.e. customer agreement or AMI).

Assemblies 3" or larger require a formed reinforced concrete pad for support. The pad must be no less than 4" thick, 2' wide and span the length of the unit. Additionally, the unit shall be braced by pipe supports. The customer supplies the pad and supports.

## **BACKFLOW TESTING AND MAINTENANCE**

City Ordinance, Chapter 50 specifies that backflow preventers shall be subject to approval, inspection and discretionary testing (as applicable) by the Utilities Department personnel. All backflow assemblies must be tested and inspected upon installation and annually thereafter. Additional testing shall be performed by the backflow preventer owner as directed by the Utilities Director. It shall be the owner's responsibility to maintain the backflow preventer in proper working condition. Testing may only be performed by certified backflow technicians and must meet Florida Building Code standards (American Society of Sanitary Engineering Series (ASSE) 5000 Standard or Canadian Standards Association (CAS) Standard B64.10.1-01). Repairs and maintenance costs and testing fees shall be the responsibility of the backflow preventer owner regardless of the installation location of the assembly. Permits for all installations and replacements shall be obtained from the City Building Inspections Division. The test results for all installations and replacements shall be entered on a Backflow Prevention Assembly Test Report (see Figure 6) and provided to the Building Inspections Division. Failure by a customer/owner to install, test or repair a backflow prevention assembly within fifteen calendar days, after being directed to do so by the City, shall be a violation and may result in termination of the customer's water service. Protection of the potable water supply is our highest priority. As an alternative to termination of service, the City will include with the final notice to install or test the backflow assembly, a Backflow Preventer Installation, Repair, Replacement or Testing Waiver and Hold Harmless Agreement (Agreement). The Agreement will allow the City to contract with an outside plumbing contractor to install, repair, replace or test the backflow assembly. The owner may either complete and submit the Agreement or be subject to termination of service. Per Florida Statutes 633.021 and 633.541, combined plumbing/fire connections may only be tested by certified plumbing contractors who hold a backflow tester certification. Only Certified fire protection

contractors who hold a backflow tester certification may test backflow preventers at service connections for fire only protection systems.

As a courtesy, the City, or its designee, sends letters to customers with testable backflow preventers to remind them of the upcoming annual backflow testing anniversary. The licensed contractor and certified backflow technician must enter all test information into an online data base. The online program performs automated checks, including verification of testing results compared to acceptability limits, and verification of certified technician and licensed contractor status. A successful test must be submitted within 30 days after notification. If the annual testing, or re-certification or repair is not conducted within the notified time limit, the water service may be discontinued. The Utilities Department is not authorized to repair the customer's private assemblies unless it is done so under the termination of service provisions.

City owned units must also be maintained, inspected and repaired as above. The City uses only certified backflow prevention technicians as required by the policy. Technicians are currently required to complete recertification every three years and to abide by all City and Utilities Department safety regulations. The City also replaces all city-owned dual check devices according to state requirements (currently every ten years).

The differential gauges used to conduct backflow preventer checks, must be calibrated and certified annually by an accredited gauge calibration facility. Certified backflow technicians must submit proof of the annual equipment calibration to the City or its designee.

## **HAZARD ASSESSMENT**

The Utilities Director or his designee determines the need for a backflow preventer depending on the level of hazard determined for a particular site. This determination meets or exceeds the standards of the AWWA M14, the Florida Building Code, as well as FDEP rules and policies. Utilities staff make hazard assessments based on the type of service connection as indicated in the Backflow Prevention Policy section of this manual. The City assesses new connections upon application for a potable water, irrigation, fire or reuse account. Brand new facilities or sites are assessed via the Utility Connection and Capital Recovery Fee Application.

## **FIRE SYSTEMS**

All fire systems require a backflow preventer. A licensed professional engineer must pre-approve the installation. A signed and sealed Hydraulic Calculation must be submitted to the Building Inspections Division along with a completed Plumbing Permit Application and a Fire Plan Review Application.

## **DOCUMENTATION AND RECORD KEEPING**

The Utilities Department uses a web based system and database to track the backflow prevention program. This system maintains a record of all backflow preventers, inspection dates, customer information, certified inspectors, and inspection results. Daily data backups are performed to ensure the safety of the data. The online program tracks backflow preventer inspection due dates and automatically generates letters for customer notification. The program also tracks customer non-compliance and notifies the City for enforcement action. Copies of inspection test reports and non-compliance letters are maintained for at least ten years.

A Cross-Connection Control Program Annual Report will be prepared and submitted to the Broward County Department of Health by the third month after the end of the calendar year covered in the report.

## **ENHANCED PUBLIC EDUCATION AND INSPECTIONS**

This City provides all reuse customers with written information pertaining to reuse water, cross-connection control, backflow prevention requirements and other important information at the time of service application. In addition the City has a reuse website at <http://pompanobeachfl.gov/> with frequently asked questions, general reuse information, backflow prevention information and customer connection procedures. Information is also available through the City cable network and through local workshops and presentations. The reuse program named, **OASIS**, (**O**ur **A**lternative **S**upply **I**rrigation **S**ystem) was created to provide the public with a way to identify the reuse system and promote future interaction with the City of Pompano Beach residents. The additional backflow prevention and cross-connection control requirements particular to a reuse system are included in the City's Reuse Water System Program Manual. This manual not only includes the backflow prevention requirements, but also additional periodic residential site inspections to reduce the likelihood of cross-connections or backflows incidents (See Appendix C).

## **EMERGENCY RESPONSE**

In the event that a backflow preventer fails, and biological contamination, chemical contamination or physical contamination enters the potable water system, the City is prepared to handle the event through the City of Pompano Beach Utilities Department Emergency Response Plan. The Emergency Response Plan includes the procedures to be followed in the event of contamination in order to minimize the effect of the event. The procedures include isolation of the contaminant, public notification, and contaminant, inactivation or removal.

## **APPENDIX A**

The current version of Appendix A. Ordinance Chapter 50 – Water, is available at

[http://www.amlegal.com/codes/client/pompano-beach\\_fl/](http://www.amlegal.com/codes/client/pompano-beach_fl/)

## **APPENDIX B**

The current version of Appendix B. Ordinance Chapter 54 – Reuse Water and  
Cross Connection Control, is available at

[http://www.amlegal.com/codes/client/pompano-beach\\_fl/](http://www.amlegal.com/codes/client/pompano-beach_fl/)



## REUSE INSPECTION FORM

Customer Address: \_\_\_\_\_ Permit # \_\_\_\_\_

Plumber Name/Company: \_\_\_\_\_ Date: \_\_\_\_\_

Plumbing License # \_\_\_\_\_

The following items must be inspected as required by City Standards or Florida Regulations.

Item #	Description	YES	NO	N/A
1	All plastic reuse water piping, valves, outlets, manifolds and other appurtenances are continuously/consistently color-coded Pantone Purple 522C, or otherwise marked (i.e., meter box) to differentiate reuse water from other water per Rule 62-610.469(7)(f).			
2	New purple piping was installed from the meter to the irrigation control valve using Pantone 522C SCH 40 irrigation pipe.			
3	Hose bibbs or hand-operated systems attached to the reuse water system are visible from the street, locked and clearly labeled.			
4	An approved backflow preventer is installed on the potable water service per Rule 62-555.360.			
5	Hose bibb vacuum breakers are installed on all potable hose bibbs.			
6	Sprinklers are supplied only by reuse water, with no connections to the potable water system, ground water, or canal water per Rule 62-610.476(2)(b).			
7	The top of the reuse water line is installed at least 12-inches below the bottom of the potable water line per Rule 62-610.469(7)(c).			
8	Entire irrigation system connection has been exposed for plumbing inspector.			
9	Plumber has entered building to personally perform cross-connection check:			
	a. Capped off irrigation and checked all interior plumbing fixtures for water flow before connecting irrigation line to reuse meter.			
	b. Turned off potable water system and checked all irrigation zones for operations using the mechanical timer device, if possible.			
	c. Turned off reuse system and checked interior plumbing fixtures as well as external hose bibbs, docks and pools for water flow.			
10	All zones of the irrigation system have been tested after the reuse connection to be sure that irrigation system is working (if it was working prior to connection).			

Document condition of existing irrigation system:

No irrigation system  Working irrigation system

Not working/disrepair irrigation system (describe deficiencies): \_\_\_\_\_

Signature of Plumber: \_\_\_\_\_ Date: \_\_\_\_\_

City Plumbing Inspector Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Inspector's notes: \_\_\_\_\_

FIGURE 1 DOUBLE CHECK DETECTOR ASSEMBLY



Most commonly used on Commercial and Multi-Family Fire only meters 2 ½ "–8"

FIGURE 2 DOUBLE CHECK BACKFLOW PREVENTION ASSEMBLY



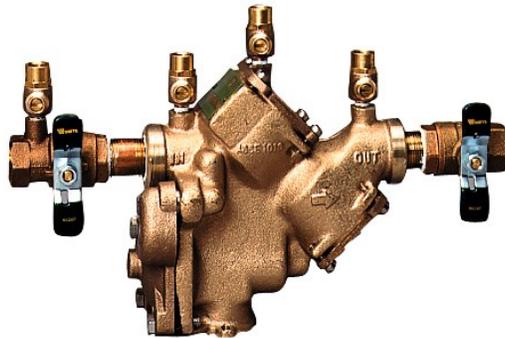
Two examples of most commonly used on Residential meters  $\frac{3}{4}$ " – 2" for Reclaim Water or 13 D fire systems

## FIGURE 3 PRESSURE VACUUM BREAKER ASSEMBLY

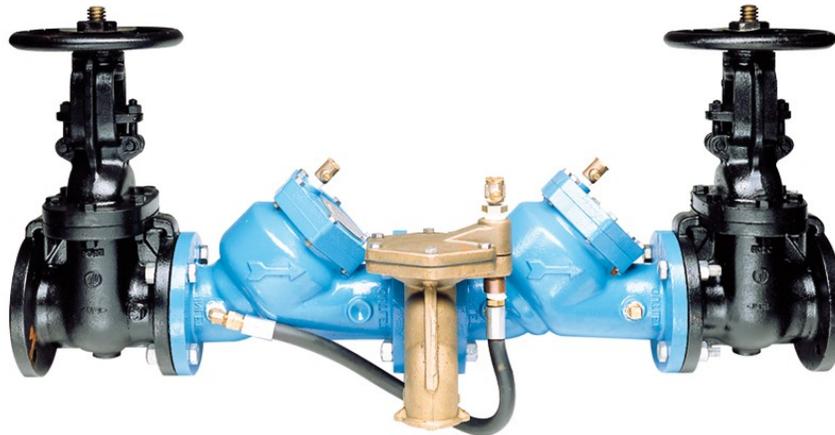


Used on irrigation only meters  $\frac{3}{4}$ " to 2"

FIGURE 4 REDUCED PRESSURE PRINCIPLE BACKFLOW ASSEMBLY



Two examples of most commonly used on high hazard or Commercial units  $\frac{3}{4}$ "–2".



Example of most commonly used on Large Scale Commercial Application 2  $\frac{1}{2}$ "–8".

FIGURE 5 DUAL CHECK DEVICE



Used for single family residential properties with a second level of protection such as Automated Metering Infrastructure (AMI).

# FIGURE 6 BACKFLOW PREVENTION ASSEMBLY TEST REPORT



**Utility Field Operations**  
**Backflow Prevention Program**  
 Wastewater Pumping  
 Wastewater Transmission  
 Stormwater  
 Water Distribution

## Backflow Prevention Assembly Test Report

<b>Test Due</b> //	<b>Test Result</b> Passed <input type="checkbox"/> Failed <input type="checkbox"/>
<b>Test Date</b> _____	<b>Permit #</b> _____

<u>Mailing Address</u>		<u>Service Address</u>	
<u>Correct?</u> Location: <input type="checkbox"/> _____ Hazard: <input type="checkbox"/> _____		<u>Correct?</u> Meter #: <input type="checkbox"/> _____ Serial #: <input type="checkbox"/> _____ Mfg <input type="checkbox"/> _____ Model: <input type="checkbox"/> _____ Type: <input type="checkbox"/> _____ Size: <input type="checkbox"/> _____	
<b>Reduced Pressure Principle Assembly</b>		Dual Check Replaced Yes <input type="checkbox"/> No <input type="checkbox"/>	
<b>Double Check Valve Assembly</b>		RP <input type="checkbox"/> DC <input type="checkbox"/> RPDA <input type="checkbox"/> DCDA <input type="checkbox"/> PVB <input type="checkbox"/> Air Gap <input type="checkbox"/> SVB <input type="checkbox"/> AVB <input type="checkbox"/>	
	<b>Check Valve #1</b>	<b>Check Valve #2</b>	<b>Relief Valve</b>
<b>Initial Test</b>	Leaked <input type="checkbox"/> Closed Tight <input type="checkbox"/> Held at _____ PSID	Leaked <input type="checkbox"/> Closed Tight <input type="checkbox"/> Held at _____ PSID	Did not Open <input type="checkbox"/> Opened at _____ PSID
<b>Repairs</b>	Cleaned <input type="checkbox"/> Replaced <input type="checkbox"/>	Cleaned <input type="checkbox"/> Replaced <input type="checkbox"/>	Cleaned <input type="checkbox"/> Replaced <input type="checkbox"/>
<b>Details</b>			<b>PVB/SVB</b> AIR INLET Did not Open <input type="checkbox"/> Opened at _____ PSID  CHECK VALVE Leaked <input type="checkbox"/> Held at _____ PSID  Cleaned <input type="checkbox"/> Replaced <input type="checkbox"/>  AIR INLET Opened at _____ PSID CHECK VALVE Held at _____ PSID
<b>Final Test</b>	Closed Tight <input type="checkbox"/> Held at _____ PSID	Closed Tight <input type="checkbox"/> Held at _____ PSID	New <input type="checkbox"/> Existing <input type="checkbox"/> Replaced <input type="checkbox"/> Date Installed _____ Replaced Serial # _____
<b>Orientation</b> Vertical Up <input type="checkbox"/> Vertical Down <input type="checkbox"/> Horizontal <input type="checkbox"/>		<b>Use</b> Domestic <input type="checkbox"/> Fire <input type="checkbox"/> Irrigation <input type="checkbox"/>	
<b>Protection</b> Containment <input type="checkbox"/> Isolation <input type="checkbox"/> Line Pressure _____		<b>Outlet Shutoff Valve</b> Closed Tight <input type="checkbox"/> Leaked <input type="checkbox"/>	
<b>Comments</b> _____ _____			
Test Kit Make _____ Model _____ Serial # _____ Calibration Date _____ Tester certifies that this assembly has been tested and verifies that shut-off valves were returned to pre-test orientation. Tester # _____ Certification Expiration Date _____ Tester Name _____ Tester Signature _____			