

Backflow Prevention and Cross Connection Control Manual

City of Winter Springs
Adopted July 23rd, 1990



TABLE OF CONTENTS

| <u>MANUAL SECTION PAGES</u> | <u>PAGES</u> |
|---|--------------|
| SECTION 1 INTRODUCTION | 1 |
| 1.01 Purpose | 1 |
| 1.02 Legal Authority | 1 |
| 1.03 Causes of Backflow | 1 |
| SECTION 2 OBJECTIVES | 2 |
| SECTION 3 RESPONSIBILITY | 2 |
| 3.01 Cross Connection Control | 2 |
| 3.02 Consumers | 3 |
| 3.03 Backflow Prevention Device Installer | 3 |
| SECTION 4 POLICY | 3 |
| 4.01 Regulations | 3 |
| 4.02 Complaints and Emergencies | 4 |
| 4.03 Public Education | 4 |
| SECTION 5 INSPECTIONS | 5 |
| 5.01 Frequency | 5 |
| 5.02 New Construction | 5 |
| 5.03 New and Existing Facilities | 5 |
| SECTION 6 DEFINITIONS | 5 |
| SECTION 7 APPLICABLE STANDARD AND DESCRIPTIONS FOR BACKFLOW PREVENTION DEVICES | 10 |
| 7.01 Applicable Standards | 10 |
| 7.02 Abbreviations for Protective Devices | 10 |
| 7.03 Types and Descriptions of Backflow Prevention Devices | 10 |
| 7.04 Typical Facilities Requiring Backflow Prevention Devices | 13 |
| 7.05 Typical Plumbing Arrangements Requiring BFPD | 14 |
| SECTION 8 TESTING OF BACKFLOW PREVENTERS | 19 |
| 8.01 General Requirements | 19 |
| 8.02 Parallel Installation | 19 |
| 8.03 Records | 20 |
| 8.04 Testers | 20 |
| SECTION 9 RESULTS OF NON-COMPLIANCE | 20 |
| SECTION 10 PROVIDING PENALTY FOR VIOLATIONS | 20 |
| SECTION 11 INSTALLATION AND CONSTRUCTION STANDARDS | 20 |
| SECTION 12 RECLAIMED WATER | 21 |
| 12.1 Fire Protection | 22 |
| 12.2 Restriction for the use of reclaimed water | 22 |
| 12.3 Reclaimed water construction standards | 23 |
| 12.4 Special Items | 24 |
| SECTION 13 Drawings | 25 |

MANUAL OF CROSS CONNECTION CONTROL

SECTION 1 INTRODUCTION

A cross connection is defined by the American Water Works Association (AWWA) as: "any connection or structural arrangement between public or a consumer's potable water system and any non-potable source or system through which backflow can occur. Bypass arrangements, jumper connections, removable sections, and other temporary or permanent devices through which or because of which, backflow can occur are considered cross connection."

Backflow, literally a reversal in the normal direction of flow within a water system, is what turns a cross connection into a health hazard. Consequently, cross connection and the chance of backflow must be eliminated to prevent these "unseen hazards" from degrading the quality of water that water providers strive to maintain.

1.01 Purpose

The purpose of a cross connection control program is to prevent diseases and contamination from entering the potable water distribution system and the water we drink. The program aims to protect the consumers and the City from those water using establishments which could possibly reduce the quality and safety of the municipal water supply through backflow and cross connection.

1.02 Legal Authority

Winter Springs has adopted Ordinance No. 493 dated July 23, 1990, Backflow Prevention and Cross Connection Control Program. This ordinance is the local legal authority for the program described herein and incorporates this manual by reference. The Safe Drinking Water Act, signed by President Ford on December 16, 1974, created new authority through a chain of laws and regulations that resulted in the State requirement (Florida Safe Drinking Water Section 403.850-403.864, Florida Statutes) for all public water systems to have a cross connection control program contained within the rules of the Department of Environmental Protection (DEP), Chapter 62-555 (Formerly 17-22). The State of Florida, on November 9, 1977, adopted the following policy: "Community water systems are required to establish a routine cross connection program for the purpose of detecting and preventing cross connections that create an imminent and substantial danger to the public health by and from contamination due to the cross connection. Upon detection of a prohibited cross connection, both community and non-community water systems shall either eliminate the cross-connection by installation of an appropriate backflow prevention device acceptable to the DEP or discontinue service until the contaminate source is eliminated." 62.555.360 (Formerly 17-22.160 F.A.C).

1.03 Causes of Backflow

Where cross connections exist, protection against backflow is needed to reduce the possibility of contamination. The causes of backflow cannot usually be eliminated completely since backflow is often initiated by accidents or unexpected circumstances. However, some causes of backflow can be partially controlled by good design and informed maintenance. Listed below are the major causes of backflow as outlined under the two types of backflow-backsiphonage and backpressure.

A. Backsiphonage

Backsiphonage is caused by reduced or negative pressure in the supply piping. A major cause of backsiphonage is the interruption of the supply pressure. This allows negative pressure to be created by water trying to flow to a lower point in the system. Another cause is undersized piping. If water is withdrawn from a pipe at a very high velocity, the pressure in the pipe is reduced and the pressure

differential created can cause water to flow into the pipe from a contaminated source. The potable water supply can thus become contaminated due to backsiphonage of contaminants into the potable water supply creating the potential for serious health problems.

The principal causes of backsiphonage are:

1. A line repair or break which occurs at a lower elevation than the service point.
2. Undersized pipe.
3. Lower pressure in a water main due to a high water withdrawal rate such as fire-fighting, water main flushing, or water main breaks.
4. Reduced supply main pressure on the suction side of a booster pump.

B. Backpressure

Backpressure may cause backflow to occur where a potable water system is connected to a non-potable water system and the pressure in the non-potable water system is higher. High pressures may be created by means of pumps, boilers, etc. There is a risk of non-potable water being forced into the potable water system whenever these types of cross connections are not properly protected.

The principal causes of backpressure are:

1. Booster pump system designed without backflow prevention devices.
2. Potable water connection to boilers and other pressure systems without backflow prevention devices.
3. Connections with a non-potable system which may, at times have a high pressure.
4. Non-potable water stored in tanks or plumbing systems, which, by virtue of their elevation, would create head sufficient to cause backflow if pressure were lowered in the public system.

SECTION 2 OBJECTIVES

The objectives of the City of Winter Springs Utility Department Cross Connection Control Program are as follows:

1. To protect the City water supply from the possibility of contamination by containing within its consumer's private water system, contaminants or pollutants which could, under adverse conditions, backflow through uncontrolled cross connections into the public water system.
2. To eliminate or control existing cross connections, actual or potential, between the consumer's on-premise potable water system and non-potable water systems, plumbing fixtures, and industrial piping systems.
3. To provide an inspection program of cross connection control, which will systematically and effectively control all actual or potential cross connections which exist presently or may exist in the future.

SECTION 3 RESPONSIBILITIES

3.01 Cross Connection Control

Under the rules of the Florida Department of Environmental Protection (FDEP), Section 62.555 relating to cross connections the water purveyor has the primary responsibility to prevent water from unapproved sources, or any other substances, from entering the public water system upon detection of a prohibited cross connection. The Winter Springs Utility Department is directed to either eliminate the cross-connection by requiring the installation of an approved backflow device or discontinue service until the contaminate source is eliminated.

3.02 Consumers

The consumer's responsibility starts at the point of delivery from the public potable water system and includes all of their water system. The consumer, at his/her own expense, shall install, operate, and maintain an approved backflow prevention device. The City of Winter Springs Utility Department shall cause all backflow prevention devices to be inspected and tested on an annual basis. The testing fee per each test performed by the City's certified backflow prevention technician shall be in accordance with the City Code of Ordinances. The consumer shall maintain accurate records of repairs made to the backflow prevention devices and provide the Utility Department with copies of such records. The records shall be on forms approved or provided by the Winter Springs Utility Department.

In the event of accidental pollution of consumer's potable water system due to backflow on or from consumer's premises, the owner shall promptly take steps to confine further spread of pollution or contamination within the consumer's premises, and shall immediately notify the Winter Springs Utility Department of the hazardous condition.

3.03 Backflow Prevention Device Installer

The installer's responsibility is to properly install backflow prevention devices in accordance with the manufacturer's installation instructions and those furnished by the Winter Springs Utility Department. See examples of backflow prevention device installation on Pages 47 through 59. The installer is also responsible for making sure a device is working properly when it is installed, and is required to furnish the following information to the Cross Connection Control Program immediately after a reduced pressure principle backflow preventer (RP), double check valve assembly (DCVA) or pressure vacuum breaker (PVB) is installed:

1. Service address where device is located
2. Owner
3. Description of device's location
4. Date of installation
5. Type of device
6. Manufacturer
7. Model number
8. Serial number

After installation, all RP's, DCVA's, and PVB's shall be inspected and tested by the City of Winter Springs to ensure proper operation of these devices.

SECTION 4 POLICIES

4.01 Regulations

The Winter Springs Utility Department will provide continuing inspection of all industrial and commercial users of potable water where it is probable that a pollution, health, or system hazard may be created or where materials dangerous to health, handled in tanks, piping systems, or other vessels on the premises or where the water system is unstable and cross connections may occur.

The following regulations to cross connection will apply:

1. Should the connection be between two (2) approved public water supplies, common gate or check valve may be used provided this has the approval of both water supplies and the FDEP.

2. Should the connection be between an approved public water supply and a service or other water supply not hazardous to health but not meeting the standards of the approved water supply, and not cross-connected within its system with a potentially dangerous water or liquid, an approved double check valve assembly (DCVA) may be used.
3. Should the connection be between an approved public water supply and a service or other water supply which has or may have any material in the water dangerous to health, that is, or may be handled under pressure, subject to negative pressures, protection shall be by an approved air-gap separation (AG). The air-gap shall be located as close as practicable to the service cock or other connection to approved supply. All piping between such connections and air-gap shall be entirely visible. If these conditions cannot reasonably be met, the public water supply shall be protected with an approved reduced pressure principle backflow device (RP), provided the alternative is acceptable to the water purveyor.

4.02 Complaints and Emergencies

In the event a cross-connection is discovered, the City's potable water system shall be assumed to be in danger of contamination and the following procedures shall be implemented:

1. Shut off the water to the premises
2. Immediately contact the City of Winter Springs Utility Department
3. The Utility Department shall immediately report to the affected area, confirm the area is contaminated and isolate the water system within the area
4. The Utility Department shall immediately notify the State of Florida, Department of Health, and the Department of Environmental Protection
5. The Utility Department shall take water samples at various stations of the water system to determine the extent of the contamination
6. The Utility Department shall provide a written report to FDEP and the State of Florida Department of Health local office within thirty (30) days after discovery of the backflow incident as set forth in Chapter 62-550, F.A.C.

4.03 Public Education

In order to provide education to homeowners regarding cross connection and backflow prevention, the Winter Springs Utility Department shall:

1. Post the Backflow Prevention and Cross Connection Control Manual on the City website.
2. Provide literature on the potential causes and hazards of cross connection and backflow and how to avoid them. Literature is:
 - Provided in the City hall lobby
 - Provided at City events
 - Given to homeowners who receive irrigation audits

- Provided to new residents who activate a utility account
- Provided to existing customers in the annual water quality report

SECTION 5 INSPECTIONS

5.01 Frequency

Due to changes in model or components of equipment, methods of manufacturing and additions to plants, buildings, etc., water use requirements undergo continual change. As a result, new cross connections may be installed and existing protection may be bypassed, removed, or made otherwise ineffective; therefore, an annual or more frequent detailed inspection of all industrial, commercial and in some cases privately owned water usage is required.

5.02 New Construction

All new construction plans and specifications for industrial or commercial facilities shall be made available to the Utility Department to determine the degree of possible cross connection hazards.

5.03 New and Existing Facilities

In order to determine the degree of hazard to the public potable water system, a survey will be made of the consumer's presently installed water system. This survey need not be a detailed inspection of the location or disposition of the water lines, but can be confined to establishing the water uses on the premises, the existence of cross connections, and the availability of auxiliary or used water supplies. Onsite inspections are made of new and existing facilities and should any devices or plumbing changes be required, a follow-up inspection will be made of the same facilities at a later date.

SECTION 6 DEFINITIONS

AIR-GAP SEPARATION - The term air-gap separation shall mean a physical separation between the free-flowing discharge end of a potable water supply pipeline and an open or non-pressure receiving vessel. An approved air-gap separation shall be a distance of at least two (2) times the diameter of the supply pipe measured vertically above the top rim of the vessel - with a minimum distance of one (1) inch.

APPROVED - a) The term approved, as herein used in reference to a water supply, shall mean a water supply that has been approved by the FDEP. b) The term approved, as herein used in reference to air-gap separation, a double check valve assembly, or a reduced pressure principle backflow prevention device or method, shall mean as approved by the City of Winter Springs Utility Department.

AUXILIARY INTAKE - The term auxiliary intake shall mean any piping connection or other device whereby water may be secured from a source other than that normally used.

BACKFLOW - The term backflow, shall mean the undesirable reversal of the flow of water or other liquids, mixtures, gases, or other substances into or towards the distribution piping of a potable supply of water from any source or sources.

BACKFLOW PREVENTION DEVICE - A backflow prevention device, shall mean any effective device, method, or construction used to prevent backflow into a potable water system. The type of device used shall be based on the degree of hazard, either existing or potential, and identified by the condition, which it is designed to prevent.

BACKFLOW PREVENTION DEVICE - APPROVED - The term approved backflow prevention device shall mean a device that meets the requirements of DEP Rule 62-555.360(4) and has been investigated and approved by the City of Winter Springs Utility Department and has been shown to meet the design and performance standards of the American Society of Sanitary Engineers (ASSE) and/or the American Water Works Association (AWWA). The approval of backflow prevention devices by the City Utility Department is based on a favorable report by an approved testing laboratory, recommending such an approval.

BACKFLOW PREVENTION DEVICE TESTER - CERTIFIED - The term backflow prevention device tester shall mean a person who has proven his/her competency to the satisfaction of the City Utility Department. Each person who is certified to make competent tests or to repair, overhaul, and make reports on backflow prevention devices shall be conversant with applicable laws, rules and regulations, have had at least two years of experience under a licensed plumber or have other qualifications which in the opinion of the City Utility Department are equivalent, and shall have attended and successfully completed the TREE (Training, Research, and Education for Environmental Occupations) Certification Program for Backflow Prevention Device Testers, or other USCFHR or DEP approved program.

BACKPRESSURE -Backpressure shall mean any elevation or pressure in the downstream piping system (by pump, elevation of piping, or stream and/or air pressure) above the supply pressure at the point of consideration which would cause or tend to cause a reversal of the normal flow through a backflow prevention device.

BACKSIPHONAGE -Backsiphonage shall mean a reversal of the normal direction of flow in the pipeline due to a negative pressure (vacuum) being created in the supply line with the backflow source subject to atmospheric pressure.

CONSUMER - A consumer is any person, firm or Corporation using or receiving water from the City's water system.

CONTAMINATION - The term contamination shall mean an impairment of the quality of the City water supply by sewage, industrial fluids, or any other foreign substance to a degree which creates an actual hazard to the public health through the potential spread of disease or toxic substances.

CRITICAL LEVEL - The term critical level shall mean the marking of a vacuum breaker which determines a minimum elevation above the flood level rim of the fixture or receptacle served at which the device may be installed.

CROSS CONNECTION - The term cross connection shall mean any unprotected connection between any part of a water system used or intended to supply water for drinking purposes and any source or system containing water or substances that is contaminated or cannot be approved as safe, wholesome and potable for human consumption. Bypass arrangements, jumper connections, removable sections, swivel or change-over devices and other temporary or permanent devices through which or because of which "backflow" can or may occur are considered to be cross connections.

DOUBLE CHECK VALVE ASSEMBLY - 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 (test cocks) for testing the water tightness of each check valve. A check valve is a valve that is drip-tight in the normal direction of flow when the inlet pressure is one psi and the out-let pressure is zero. The check valve shall permit no leakage in a direction reverse to the normal flow. The closure element (e.g., clapper) shall be internally weighted or otherwise internally loaded to promote rapid and positive closure.

FIRE SPRINKLER SYSTEM - A sprinkler system for fire protection purposes is an integrated system of underground and overhead piping designed in accordance with fire protection and engineering standards. An installation supplied by potable water shall not also be supplied by a non-potable water supply. A fire sprinkler system designed to connect to the reclaimed water system shall have color-coded piping (purple) and labeled reclaimed water supply. In accordance with

DEP rule 62.610.477(2) F.A.C. residents or guests shall not be allowed access to a plumbing system supplied by reclaimed water for the purpose of repairs or modifications.

FLOOD LEVEL RIM - The edge of the receptacle from which water overflows is the flood level rim.

HAZARD, DEGREE OF - The term degree of hazard is a qualification of what potential and actual harm may result from cross connections within a water-using facility.

Establishing the degree of hazard is directly related to the type and toxicity of contaminants that could feasibly enter the public water supply water system and can be classified as either a "pollutional" (non-health) or a "contamination" (health) hazard.

HAZARD, HEALTH - The term health hazard shall mean an actual or potential threat of contamination or pollution of a physical or toxic nature to the public potable water system of the consumer's potable water system to such a degree or intensity that there would be a danger to health.

HAZARD, PLUMBING - The term plumbing hazard shall mean plumbing type cross connection in a consumer's potable water system that has not been properly protected by a vacuum breaker, air-gap separation, or other device. Unprotected plumbing type cross connections are considered to be a health hazard. They include, but are not limited to, cross connections, to toilets, sinks, laboratories, wash trays, domestic washing machines, and lawn sprinkler systems. Plumbing type cross connections can be located in many types of structures, including homes, apartment houses, hotels, and commercial and industrial establishments. Such a connection, if permitted to exist, must be properly protected by an appropriate type of cross connection control assembly.

HAZARD, POLLUTION - The term pollution hazard shall mean an actual or potential threat to the physical properties of the water system or the potability of the public or the consumer's potable water system, but which would not constitute health or system hazard, as defined. The maximum degree of intensity of pollution to which the potable water system could be degraded under this definition would cause a nuisance, or be aesthetically objectionable, or could cause minor damage to the system or its appurtenances

HAZARD, SYSTEM - The term hazard system shall mean an actual or potential threat of severe damage to the physical properties of the public or the consumer's potable water system, or of a pollution or contamination which would have a protracted effect on the quality of the potable water in the system .

HEALTH AGENCY - The term health agency shall mean the health authority having jurisdiction.

HOSPITAL - The term hospital shall mean an institution, place, building, or agency which maintains and operates organized facilities for one or more persons for the diagnosis, care, and treatment of human or animal illness, including convalescence care during and after pregnancy, or which maintains and operates organized facilities for any such purpose and to which persons may be admitted for an overnight stay or longer. "Hospital" includes sanitariums, nursing homes, maternity homes, dentistry's, laboratories, and veterinarians.

INDUSTRIAL FLUID - The term industrial fluid shall mean any fluid or solution which may be chemically, biologically, or otherwise contaminated or polluted in a form or concentration such as would constitute a health, system, pollution, or plumbing hazard if introduced into an approved water supply. This may include, but is not limited to: polluted or contaminated used water; all types of process water and "used waters" originating from the public potable water system which may deteriorate in sanitary quality; chemicals in fluid form; plating acids and alkalies; circulated cooling waters connected to an open cooling tower and/or cooling water that are chemically or biologically treated or stabilized with toxic substances; contaminated natural waters such as from wells, springs, streams, rivers, bays, harbors,

seas, irrigation canals or systems, etc.; oils, gases, glycerin, paraffin's, caustic and acid solutions; and other liquid and gaseous fluids used in industrial or other processes or for firefighting purposes.

INDUSTRIAL PIPING SYSTEM, CONSUMER'S - The term consumer's industrial piping system shall mean any system used by the consumer for transmission of or to store any fluid, solid, or gaseous substance other than an approved water supply. Such a system would include all pipes, conduits, tanks, receptacles, fixtures, equipment, and appurtenances to produce, convey or store substances which are or may be polluted or contaminated.

INLET - The open end of the water supply pipe through which the water is discharged into the plumbing fixture shall be the inlet.

LABORATORY, APPROVED TESTING - Reference to an approved testing laboratory shall mean the Foundation for Cross Connection Control Research of the University of Southern California, or any other laboratory having the equivalent facilities for both the laboratory and field evaluation of the devices approved by the American Water Works Association or American Society of Sanitary Engineers.

PLUMBING OFFICIAL - The term plumbing official shall mean the individual, board, department, or agency established and authorized by state, county, city, or other political subdivision created by law to administer and enforce the provisions of the Standard Plumbing Code as adopted or amended.

PLUMBING SYSTEM - The term plumbing system includes the water supply and distribution pipes; plumbing fixtures and traps; soil, waste, and vent pipes; building drains and building sewers, including their respective connections, devices, and appurtenances within the property line of the premises; and water-treated or water-using equipment. Toilets supplied by reclaimed water shall have color-coded piping (purple) to differentiate from the potable water supply. Residents or guests shall not have access to reclaimed plumbing systems for repairs or maintenance, toilets supplied by reclaimed water shall not be connected to the potable water piping system.

POINT OF DELIVERY - See Service Connection

POLLUTION -Pollution shall mean an impairment of the quality of the water to a degree which does not create an actual hazard to the public health, but which does adversely and unreasonably affect if for domestic use.

REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION DEVICE (RP) -

The term reduced pressure principle backflow prevention device (RP) shall mean a device containing 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. The first check valve reduces the supply pressure a predetermined amount, so that during normal flow and at cessation of normal flow, the pressure between the checks shall be less than the supply pressure. In case of leakage of either check valve, the differential relief valve, by discharging to the atmosphere, shall operate to maintain the pressure between the checks less than the supply pressure. The unit shall include tightly closing shut-off valves located at each end of the device and each device shall be fitted with properly located test cocks.

SERVICE CONNECTION - The term service connection shall mean the terminal end of the public potable water system, i.e., where the water purveyor loses jurisdiction and sanitary control over the water at its point of delivery to the consumer's water system. If a meter is installed at the end of the service connection, then the service connection shall mean the downstream end of the meter. There shall be no unprotected takeoffs from the service line ahead of any backflow prevention device located at the point of delivery to the consumer's water system.

VACUUM BREAKER- ATMOSPHERIC TYPE - An atmospheric vacuum breaker is a backflow prevention device, which is operated by atmospheric pressure in combination with the force of gravity. The unit is designed to work on a vertical plane only. The one moving part consists of a poppet valve, which must be carefully sized to slide in a guided chamber and effectively shut off the reverse flow of water when a negative pressure exists.

VACUUM BREAKER - PRESSURE TYPE -A pressure vacuum breaker is similar to an atmospheric vacuum breaker except that the checking unit "poppet valve" is activated by a spring. This type of vacuum breaker does not require a negative pressure to react and can be used on the pressure side of a valve.

WATER, POTABLE - The term potable water shall mean water from any source which has been investigated by the Florida Department of Environmental Protection and which has been approved for human consumption by the health authority having jurisdiction. Potable water is water of excellent quality intended for drinking, cooking, and cleansing uses. This grade of water would conform to the water quality requirements of state and federal regulatory agencies.

WATER PURVEYOR - The term water purveyor shall mean the utility owner or operator of the public potable water system supplying an approved water supply to the public. The utility shall be one that is operating under a valid permit from the DEP. As used herein the terms water purveyor and City of Winter Springs Utility Department may be used synonymously.

WATER, RECLAIMED - The term reclaimed water means a highly treated effluent from the wastewater treatment plant that meets or exceeds requirements for public access as set forth by the FDEP; not for human consumption.

WATER SUPPLY, APPROVED - The term-approved water supply shall mean any public portable water supply which has been investigated and approved by the FDEP. The system must be operating under a valid health permit. In determining what constitutes an approved water supply, the DEP has reserved final judgment as to its safety and potability.

WATER SUPPLY, AUXILIARY - The term auxiliary water supply shall mean any water supply on or available to the premises other than the purveyor's approved public potable water supply. These auxiliary waters may include water from another purveyor's public potable water supply or any natural source such as a well, spring, river, stream, etc., or "used water" or "industrial fluids". They may be polluted or contaminated or objectionable and constitute an unacceptable water source over which the water purveyor does not have sanitary control.

WATER SUPPLY, UNAPPROVED - The term unapproved water supply shall mean a water supply which has not been approved for human consumption by the health agency having jurisdiction.

WATER SYSTEM, CONSUMER'S - The term consumer's water system shall include any water system located on the consumer's premises, whether supplied by the public potable water system or auxiliary water supply. The system or systems may be either a potable water system or an industrial piping system.

WATER SYSTEM, CONSUMER'S POTABLE - The term consumer's potable water system shall mean that portion of the privately owned potable water system lying between the points of delivery and point of use. This system will include all pipes, conduits, tanks, receptacles, fixtures, equipment, and appurtenances used to produce, convey, store, or use potable water.

WATER SYSTEM, PUBLIC POTABLE - The term public potable water system shall mean any publicly or privately owned water system operated as a public utility under a recent health permit to supply water for domestic purposes. This system will include all sources, facilities, and appurtenances pumps, pipes, conduits, tanks, receptacles, fixtures, equipment, and appurtenances used to produce, convey, treat, or store a potable water for public consumption or use.

WATER, USED - The term used water shall mean any water supplied by a water purveyor from a public potable water system to a consumer's water system after it has passed through the point of delivery and is no longer under the control of the water purveyor.

SECTION 7 APPLICABLE STANDARD AND DESCRIPTIONS FOR BACKFLOW PREVENTION DEVICES

7.01 Applicable Standards

The following list identifies specifications or requirements of Chapter 62-555 of the Florida Administration Code and approving agencies recognized by the City of Winter Springs. All backflow prevention devices and condition of cross connection control shall be in compliance with the standards set forth by one or more of the following agencies. The City reserves the right to state which standards apply if and when conflicts between standards arise.

AWWA - American Water Works Association - #C506 and manual M14.

ASSE -American Society of Sanitary Engineers.

FCCCHR of USC - University of Southern California, Foundation for Cross Connection and Hydraulic Research (Manual of Cross Connection Control, Seventh Edition, June 1985.)

SBCC -Southern Building Code Congress Standard Plumbing Code.

7.02 Abbreviations for Protective Devices

AG - Approved Air-Gap

AVB - Approved Atmospheric Vacuum Breaker

DCVA - Approved Double Check Valve Assembly

HBVB - Approved Hose Bib Vacuum Breaker

PVB - Approved Pressure Vacuum Breaker

RP - Approved Reduced Pressure Principle Backflow

DCB - Approved Dual Check Valve

7.03 Types and Descriptions of Backflow Prevention Devices

The following definitions apply to hazardous conditions existing at a site where backflow prevention may be required.

Degree of Hazard Definition

| | |
|----------|---|
| Low | A condition where a polluting substance may come in contact with potable water aesthetically affecting the taste, odor or appearance, but not hazardous to health (non-toxic), (e.g., pollution hazard). |
| Moderate | A condition where a polluting substance may come into high contact with potable water creating a health hazard, causing sickness or death (toxic), (e.g., system hazard, plumbing hazard, health hazard). |

Table 7.1 lists the types and applications of backflow prevention devices, a brief description of each device, and typical installation conditions.

TABLE 7.1

| TYPE & APPLICATION | TYPICAL DESCRIPTION | APPLICABLE INSTALLATION |
|---|--|---|
| Double check valve assembly for low hazard connection | Two independent check valves supplied with shut-off valves and ball type test cocks | For use on fire sprinkler protection systems and cross connections subject to backpressure where there is a low potential health hazard. Continuous pressure |
| Air-gap for moderate to high hazard cross connection | Vertical separation of 2" diameter of the supply rim. Separation must be 1" or greater | All cross connections subject to back pressure or backsiphonage where there is a high potential health hazard from contamination |
| Air-gap for moderate to high hazard cross connection | Vertical separation of 2" diameter of the supply line above vessel overflow rim. Separation must be 1" or greater | All cross connections subject to back pressure or backsiphonage where there is a high potential health hazard from contamination |
| Atmospheric vacuum breakers for low hazard cross connection | A single poppet valve sized to slide in a guided chamber, shuts off by gravity when negative pressure exists | Cross connection not subject to back pressure or continuous pressure. Install at least 12" above highest outlet. Protection against backsiphonage only |
| Hose bib vacuum breaker for residential, commercial, and industrial hose supply outlets | Hose bib vacuum breaker installs directly on hose bib. Single check with atmospheric vacuum breaker vent | Install on hose bib, service sinks, and wall hydrants. Not for continuous use |
| Pressure vacuum breakers for moderate to high hazard cross connections | Spring loaded single float and disc. Supplied with shut-off valves and ball type test cocks | This valve is designed for installation in a continuous pressure potable water supply system 12" above the overflow level of the system being supplied. Protection against backsiphonage only, not for backpressure |
| Reduced pressure principle backflow preventer for high hazard cross connection | Two independent check valves with intermediate relief valve. Supplied with shut-off valve and ball type test cocks | All cross connections subject to back pressure or backsiphonage. Continuous pressure |
| Dual check valve for low hazard applications | Two independent check valves. Check valves are removable for testing | Cross connection where there is low potential health hazard and moderate flow requirements |

Dual check valves are to be used on the potable water service line of all reclaimed water customers. Air-gap separation or vacuum breakers require continuous attention and maintenance to ensure proper operation. The use of a hose section to bridge an air-gap is strictly forbidden.

7.04 Typical Facilities Requiring Backflow Prevention Devices

1. All hospitals shall have an RP device installed on all the main service connections supplying potable water to such premises.
2. Medical buildings, sanitariums, dentistrys, laboratories, veterinarian facilities, morgues, mortuaries, autopsy facilities, nursing and convalescent homes, and clinics shall have an RP or DCVA, depending upon degree of hazard, installed at the service connection. The hazard normally to be found in a facility of this type include cross connections between the consumer's water system and contaminated or sewer connected equipment such as bedpan washers, flush valve toilets, urinals, autoclaves, specimen tanks, sterilizers, pipette tube washers, cuspidors, aspirators, autopsy, and mortuary equipment.
3. All buildings, plants, or other structures having a source of unapproved water piped into such buildings, plants, or other structures with the potential of being interconnected to the public supply, shall have an RP installed at the main supply line servicing their premises.
4. All buildings, hotels, apartment houses, public and private buildings, or any other structures having potential unprotected cross connections shall have an RP or DCVA, depending upon degree of hazard, installed at the service connection to any premises where multistoried public buildings such as hotels, apartment houses, offices, or loft buildings are operated or maintained if the buildings have unprotected cross connections, sewer pumping facilities, auxiliary water supplies, or other like sources of contamination which could create a potential hazard to the public water system. Also, an approved backflow prevention device should be installed at the service connection to any premises where there are existing cross connections or where potential cross connections exist or where it is expected that the consumer may make piping or equipment changes which would result in the installation of a cross connection.
5. All water front facilities and industries shall have an RP or DCVA, depending upon the degree of hazard, installed at their service connection to any premises where there are piers, docks, or other water front facilities, or industries, or where water from a river, stream, irrigation, ditch, canal, lake, etc., is available to be used on the premises, except that backflow protection may not be required on facilities which do not have docking facilities, or which do not have outlets available for supplying water to docks, which have not been used for such auxiliary water supplies as irrigation, fire protection, air conditioning, cooling, swimming pool supply, or other such purpose.
6. All manufacturers of chemicals, which are toxic, may be required at the discretion of the water purveyor to install an RP.
7. All sewage treatment plants shall have an RP installed on main potable water service lines serving such plants.
8. Dairies and cold storage plants shall have an RP or DCVA, depending upon the degree of hazard, installed on the service connection to any premises where a dairy, creamery, ice cream plant, cold storage, or ice manufacturing plant is operated or maintained, provided such a plant has on the premises an auxiliary water supply, industrial fluid system, sewer handling facilities, or other similar source of contamination, which if cross connected to, would create a hazard to the public system. The hazards normally found in a plant of this type include cross connections between consumer's waste system and reservoirs, cooling towers, and circulating systems which may be heavily contaminated with bird droppings, vermin, algae, bacterial slimes, or toxic water treatment compounds.

9. Schools and colleges shall have a DCVA or RP installed at the service connection where water is used to supply chemical, bacteriological, and biological laboratories; or where the water is used to supply separate irrigation systems; or where there are potential unprotected sewer cross connections.

10. In commercial car washing installations, potable make-up water lines to reclaim water pits shall have an AG separation. All potable water connections to fluids such as bug cleaners, tire cleaners, and wax and soap solution make-up tanks shall have an AG separation. If this is not possible due to the design of equipment, an RP shall be installed on the main water service connection.

11. All buildings or premises where security requirements or other prohibiting restriction make it impossible or impractical to make complete inside cross connection survey, the public water system shall be protected against backflow from the premises or building by an RP installed on the main service connection serving the building or premises.

NOTE : For any potential hazards that are not addressed in this manual the potable water system shall be protected with a backflow-prevention assembly as indicated in American Water Works Associations Manual M14 (1990) Edition.

7.05 Typical Plumbing Arrangements Requiring BFPD

Note references to SBCC, Standard Plumbing Code (SPC)

1. Fixtures Inlets or Valved Outlets - Fixture inlets or valved outlets with hose attachments which may constitute a cross connection shall be protected by the proper approved vacuum breaker (AVB, HBVB etc.) installed at least six (6) inches above the highest point of usage and located on the discharge side of the last valve. Fixtures with integral vacuum breakers manufactured as a unit may be installed in accordance with their approved requirements (SPC Sec. 1204.3.4).

2. Industrial Fluid or Processed Water - Potable water pipelines connected to industrial piping systems or to equipment containing industrial fluid, sewage, used or processed water, or any other potentially contaminated liquid shall be protected by installing an RP in the interconnecting lines or by an AG separation.

3. Air Condition Cooling Tower - Potable water inlet shall have an AG separation of twice the inside diameter of the inlet line or a minimum of 2" above the flood level rim.

4. Aspirators and Ejectors shall have an AVB or PVB, depending upon the degree of hazard, on the faucet from which these devices are attached or operated (SPC Sec. G104.6).

5. Automatic Film Processors - Potable water lines connected directly to an automatic film processor shall be protected by an AG or a DCVA.

6. Autoclaves shall have an RPBA if connected to the potable water system.

7. Autopsy and mortuary equipment shall have an AVB or PVB.

8. Bath Tub with Hose Attachments shall have an AVB at faucet.

9. Bedpan Washer shall have an AVB or PVB installed in accordance with the Standard Plumbing Code (SPC Sec. G104.6).

10. Boiler Connection - Portable water connection to boiler feed water system which contains conditioning chemicals shall either be made through an AG at make-up tank or have an RP or DCVA, depending upon the degree of hazard. Feed connections to steam and hot water heating boilers, heat exchangers, etc. which do not contain chemical additives shall have either an AG or DCVA (SPC Sec. 1204.3.5.).

Note: This hazard is critical because little or no attention is given to the maintenance of vacuum breakers and they are frequently removed from the line; steam generating facilities and lines are frequently contaminated with boiler compounds such as pentachlorophenol, cyclohexamine, etc. A very particular hazard is the possibility of steam getting back into the domestic system, causing a health hazard.

11. Booster Pumps - All booster pumps shall be provided with a lowpressure cut-off unless other acceptable provisions are made to prevent the creation of low or negative pressures in the piping system (SPC Sec. 1211.6).

12. Colonic Irrigators or Douche Attachments shall have an AVB installed (SPC Sec. G104.7).

13. Cuspidors shall be connected with an AVB or PVB.

14. Dark Rooms (Photographic) - All threaded faucets shall be protected with an AVB, PVB, or HBVB.

15. Dishwashing Machine - Shall be connected with an AVB or PVB on both hot and cold water supply lines in accordance with the Standard Plumbing Code (SPC Sec. 915, 1101.2, 1204.1).

16. Dip Tanks and Vats - Potable water inlet shall have an AG separation twice the inside diameter of the inlet or a minimum of two inches above the flood level rim.

17. Garbage Disposer - Potable water supply lines connected directly to garbage disposer shall be equipped with an AVB or PVB (SPC Sec. 912.1).

18. Drinking Fountains - Shall have an AG separation (SPC Sec. 913.2).

19. Fire fighting system that use toxic liquid foam concentrates shall have RPBA.

20. Fire Sprinkler Drains shall have an AG separation to the sewer.

21. Flushing Floor Drains shall have an AVB installed (SPC Sec. G104.6).

22. Flush Valve Water Closets, Urinals, and Bidets shall have a vacuum breaker installed in accordance with the Standard Plumbing Code (SPC Sec. 1204.3.1.)

23. Foot and Sitz Bath shall have an AG separation or an AVB installed (SPC Sec. G104.7.)

24. Hydrotherapy Baths shall have an AVB installed at water connection (SPC Sec. G104.7).

25. Janitors, Mop or Slop Sink - With threaded hose faucet shall be equipped with an AVB before faucet.

26. Lab bench equipment - AVB or PVB

27. Lawn Sprinkler Systems shall have an AVB, PVB, or DCVA installed (SPC Sec. 1204.3.3).

28. Plating tanks - RPBA

29. Pipette Washer shall have an AVB installed or AG separation installed on faucet.
30. Private Wells shall not be interconnected unless the public supply is protected by an RP at the service connection.
31. Potable Water Make-Up Line - to chill water loops, heating loops, purge units, condensers, converters, and condensate tanks should be equipped with DPW/IAV, DCVA, or RP, depending upon degree of hazard.
32. Serrated Faucets shall be equipped with an AVB, PVB at the faucet. If gooseneck faucet is used "laboratory faucet type vacuum breaker" is acceptable (SPC G104.6).
33. Shampoo Basin Hose Rinse shall have an AVB installed.
34. Sinks and Bathtub Faucets shall have an AG separation above flood level rim.
35. Specimen tanks shall be equipped with an AVB or PVB.
36. Sterilizers shall have an AG separation or PVB installed.
37. Stills shall have an AG separation.
38. Swimming Pool Fill Line shall have an AG separation above the flood level rim or a DCA.
39. Wash-up Sinks with Threaded Faucets shall have an AVB or HBVB installed.
40. Washdown Hose Faucet shall have an AVB, PVB, or HVBV installed on faucet.
41. Washing Machine Drain Lines shall have an AG separation to sewer (SPC Sec. 919).
42. Water Supply Inlets - In pits, tanks, trenches, tubs, vats, or any other place that could become flooded with contaminated liquids shall have an AG separation above the flood level rim.
43. Water Operated Presses, Elevators, or other similar pressure producing equipment shall have an RP installed.
44. X-Ray Developing Tank shall have an AG separation or an AVB or PVB.

NOTE: For any potential hazards that are not addressed in this manual the potable water system shall be protected with a backflow-prevention assembly as indicated in American Water Works Associations Manual M14 (1990)

TABLE 7.2**AWWA Manual M14 - Guide to Assessment of Hazard & Selection of Assemblies for Internal Protection**

| <u>Description of Cross Connection</u> | <u>Assessment of Hazard</u> | <u>Recommended Assembly</u> |
|--|-----------------------------|-----------------------------|
| Aspirator (medical) | Health | AVB or PVB |
| Autoclaves | Health | RPBA |
| Bedpan washers | Health | AVB or PVB |
| Specimen tanks | Health | AVB or PVB |
| Sterilizers | Health | RPBA |
| Cuspidors | Health | AVB or PVB |
| Lab bench equipment | Health | AVB or PVB |
| Autopsy & mortuary equipment | Health | AVB or PVB |
| Sewage pump | Health | AG |
| Sewage ejectors | Health | AG |
| Fire-fighting system | Health | RPBA |
| Connection to sewer pipe | Health | AG |
| Connection to plating tanks | Health | RPBA |
| Irrigation systems with chemical additives or agents | Health | RPBA |
| Connection to salt-water cooling system | Health | RPBA |
| Tank, vats, or vessels containing toxic substances | Health | RPBA |
| Connection to industrial fluid system | Health | RPBA |
| Dye vats or machines | Health | RPBA |
| Cooling towers with chemical additives | Health | RPBA |
| Trap primer | Health | AG |
| Steam generators | Nonhealth | RPBA |
| Heating equipment - Commercial | Nonhealth | RPBA |
| Heating equipment - Domestic | Nonhealth | DCVA |
| Irrigation systems | Nonhealth | DCVA,AVB,PVB |
| Swimming pools - Public | Nonhealth | RPBA or AG |
| Swimming pools - Private | Nonhealth | PVB or AG |
| Vending machine | Nonhealth | RPBA or PVB |
| Ornamental fountains | Nonhealth | DCVA,AVB,PVB |
| Degreasing equipment | Nonhealth | DCVA |
| Lab bench equipment | Nonhealth | AVB or PVB |
| Hose Bibs | Nonhealth | AVB |
| Trap primers | Nonhealth | AG |
| Flexible shower head | Nonhealth | AVB or PVB |
| Steam tables | Nonhealth | AVB |
| Washing equipment | Nonhealth | AVB |
| Shampoo basins | Nonhealth | AVB |
| Kitchen equipment | Nonhealth | AVB |
| Aspirators | Nonhealth | AVB |
| Domestic space-heating boiler | Nonhealth | RPBA |

NOTE: AG=air gap; AVB=atmospheric vacuum breaker; DCVA=double check valve backflow prevention assembly; PVB=pressure vacuum breaker; RPBA=reduced pressure principle backflow prevention assembly.

TABLE 7.3**AWWA Manual M14 - Guide to Assessment of Hazard & Selection of Assemblies for Premises Isolation**

| <u>Description of Premises</u> | <u>Assessment of Hazard</u> | <u>Recommended Assembly</u> |
|---|-----------------------------|-----------------------------|
| Hospitals, mortuaries, clinics, laboratories | Health | RPBA |
| Plants using radioactive material | Health | RPBA |
| Petroleum processing or storage facilities | Health | RPBA |
| Premises where inspection is restricted | Health | RPBA |
| Sewage treatment plant | Health | RPBA |
| Sewage lift stations | Health | RPBA |
| Commercial laundry | Health | RPBA |
| Plating or chemical plants | Health | RPBA |
| Docks or Dockside facilities | Health | RPBA |
| Food and beverage processing plants | Health | RPBA |
| Pleasure-boat marina | Health | RPBA |
| Tall buildings (protection against excessive head of water) | Nonhealth | DCVA |
| Steam plants | Nonhealth | RPBA |
| Reclaimed water systems | Health | RPBA |

NOTE: AG = air gap; AVB = atmospheric vacuum breaker; DCVA = double check valve backflow prevention assembly; PVB = pressure vacuum breaker; RPBA = reduced pressure principle backflow prevention assembly.

SECTION 8 TESTING OF BACKFLOW PREVENTERS

8.01 General Requirements

As part of a complete cross connection control program, the City of Winter Springs will require the testing of reduced pressure backflow prevention devices (RP), double check valve assemblies (DCVA), and pressure vacuum breakers (PVB) with a thorough inspection and operational test at least once a year. Proper field test procedures with calibrated gauge equipment must be used by certified personnel. The customer-user may have these devices tested by a certified private contractor with the results forwarded to the City of Winter Springs Utility Department. These inspections and tests and any maintenance or repair required as a result of the test, shall be at the expense of the customer-user and shall be performed by the device's manufacturer's representative, certified licensed plumber or by a certified device tester. All devices, failing to meet latest performance standards set forth by the American Water Works Association (AWWA 506), American Society of Sanitary Engineers (ASSE 1013), or the Foundation for Cross Connection Control at the University of Southern California (Manual of Cross Connection Control), shall be repaired and retested promptly. Devices repeatedly found not to meet the standards are to be replaced with new devices. If such testing indicates wear or other malfunctions, the devices shall be overhauled. Such an overhaul should consist of the replacement of all seats, diaphragms, gaskets, etc. which are subject to wear, and any other parts found to be worn or otherwise in questionable condition.

8.02 Parallel Installation

All backflow prevention devices with test cocks are required to be tested once per year. Testing requires a water shutdown usually lasting five (5) to twenty (20) minutes. For facilities that require an uninterrupted supply of water service from two separate meters, provisions shall be made for a "parallel installation" of backflow prevention devices. During testing, one device is left on while the other is being tested. Usually the two devices are sized one device size smaller than the service line, one 2 inch device or two 1-1/2 inch devices. One 8-inch device or two 6-inch devices.

The City of Winter Springs Utility Department will not accept an unprotected bypass around a backflow preventer when the device is in need of testing, repair, or replacement. Installation requiring continuous service and a parallel installation of backflow prevention devices are listed as follows:

1. Aircraft and Missile Plants
2. Automotive Plants
3. Auxiliary Water Systems
 - a. Private Water Systems
 - b. Used Water and Industrial Fluids
4. Beverage Bottling Plants
5. Breweries
6. Buildings - Hotels, apartment houses, public and private buildings, or any other structures having unprotected cross connections
7. Canneries, Packing Houses, and Reduction Plants

8. Chemical Plants - Manufacturing, processing, and compounding or treatment
9. Hospitals, Medical Buildings, Sanitariums, Morgues, Mortuaries, Autopsy Facilities, Nursing and Convalescent Homes and Clinics
10. Laundries and dye work
11. Paper and Paper Product Plants
12. Power Plants
13. Restricted, Classified, or Other Closed Facilities
14. Schools and College.

8.03 Records

The water purveyor will notify the customer when tests are to be performed and results of the tests shall be supplied to the customer. A full report shall be made available of any maintenance or repairs to backflow prevention devices and are to be routed promptly to the City of Winter Springs.

8.04 Testers

To ensure continued satisfactory operation of a backflow prevention device, testing shall be performed by individuals who are certified and understand the design and intended operation of the device. Only certified device testers will be accepted by the City Utility Department to perform testing of backflow prevention devices if customer wishes to have them tested by a private contractor. The contractor or individuals who are certified must provide the City of Winter Springs Utility Department with a valid Backflow Prevention Technician certification through or from the University of Florida. A program to train individuals in the testing of backflow preventers is available regionally and nationally. The water purveyor will have the necessary information on how to register and participate in these programs.

SECTION 9 RESULTS OF NON-COMPLIANCE

A letter listing all potential cross connections found during the inspection will be sent to the owner or authorized agent of the owner of the building or premises, stating that correction should be made and setting a reasonable time for compliance. Upon failure of the owner or authorized agent of the owner of the building or premises to have the defects corrected by the specified time and the water purveyor may cause the water service to the building on premises terminated. The water purveyor may cause the discontinuance of water service if a reduced pressure backflow prevention device has been bypassed or failed to be properly maintained as required by the City of Winter Springs and/or policy statements contained in this manual. In general, violations involving moderate-to-high degrees of hazard must be corrected immediately. Violations involving low degrees of hazard shall be corrected within (60) days of the date the deficiency was brought to the attention of the customer-user. If discontinuance of service is required, the matter shall be simultaneously brought to the attention of the City Manager.

SECTION 10 PROVIDING PENALTY FOR VIOLATIONS

Any person found in violation of any provision of the Cross-Connection Control code herein adopted, shall be punished as provided in the City Ordinance.

SECTION 11 INSTALLATION AND CONSTRUCTION STANDARDS

INSTALLATION

Manufacturer's installation instructions must be followed to ensure proper operation and to protect the equipment's warranty. General installation guidelines are as follows:

1. The backflow prevention device herein referred to as the device comes as a complete assembly with tightly closing shut off valves and test cocks.
2. The device should be installed in a horizontal position and have at least 12" between the bottom of the device and final grade or floor.
3. Lateral clearance around the device must be provided to facilitate testing, maintenance, and replacement.
4. Two devices should be installed in parallel for any facility that must have uninterrupted flow during device testing or repair (e.g., hospitals).
5. Though not recommended, devices may be installed in pits that are well drained; no part of a device should ever be under water.
6. If a device is installed inside a building, a floor drain is helpful to eliminate spillage caused by testing or flushing.
7. Since the relief valve on a RP will periodically drip or spit and may dump, the relief vent may be fitted with a drain line if spillage is objectionable or hazardous (e.g., electrical hazards). The end of the drain line must terminate 12" above ground or flood level and be clearly visible and accessible.
8. The assembled piping should be thoroughly flushed before installing the device.
9. The device should be adequately supported.

CONSTRUCTION STANDARDS

All assemblies which consist of independent units assembled for the purpose of preventing backflow shall comply with the material, the operational, and other specifications of the American Water Works Association (AWWA) the American Society of Sanitary Engineering (ASSE) or the Foundation for Cross-Connection Control Research University of Southern California (FCCCHR) as required for backflow prevention assemblies. In order to ensure proper installation, all backflow prevention devices shall be delivered for installation completely assembled by the original manufacturer with all components as approved. Resilient seated shut-off valves and test cocks are considered an integral part of the assembly.

SECTION 12 RECLAIMED WATER

Winter Springs Ordinance 443 adopted January 9th, 1989 enacted provisions pertaining to the reclaimed water system. The intent of this Ordinance is to supply customers with reclaimed water for irrigation purposes only. As the reclaimed water system expands the City may find it beneficial to expand the uses of reclaimed water for purposes other than irrigation only. The following requirements are for the use of reclaimed water.

12.1 Fire Protection

- a. Sprinkler systems: All the components of a fire sprinkler system supplied with reclaimed water shall be color coded to differentiate the reclaimed water from the potable water system. The color-coding for reclaimed for the City is purple. Double check valve assemblies with detection meters are required.
- b. Where reclaimed water is used for fire sprinkler systems, connections from that system to the potable water system are prohibited.
- c. Fire hydrants connected to the reclaimed water system shall be color coded to differentiate from the potable water system (green barrel with white reflective top).
- d. Reclaimed water fire hydrants shall be designed and operated in accordance with local fire protection codes, regulations, and ordinances.
- e. Reclaimed water fire hydrants shall have tamper proof hold-down nuts and will require a special wrench to operate.
- f. Reclaimed water fire hydrants sole source of water is the reclaimed water system, connections to any other source of water is not permissible.

12.2 Restriction for the use of reclaimed water

- a. Where reclaimed water is used for (commercial or industrial) toilet flushing, or fire sprinkler systems all piping is to be colored coded to differentiate from the potable water system and customers are to be restricted from having access to the reuse plumbing (except for shut off valve) for modifications or maintenance. No other connection to a building from the reclaimed water system shall be allowed.
- b. Reduced pressure backflow prevention devices are required on customer's potable water system where reclaimed water is used for commercial toilet flushing. Meters are required on any reuse service line used for toilet flushing to monitor water usage.
- c. Reclaimed water irrigation customers are prohibited from using irrigation wells. Customers with irrigation wells wishing to connect to the City's reclaimed water system must abandon the irrigation well to protect the ground water. Under no circumstances are connections between the reclaimed water system and any other irrigation sources allowed.
- d. Water tank trucks may be used for transporting irrigation water to irrigate landscape areas and road construction (dust control, etc.). Tank trucks used for transporting potable water or other liquids are prohibited from using reclaimed water.
- e. Where reclaimed water is used for irrigation of agricultural land, all potable water lines servicing any agricultural property shall be protected by installing RPVs.
- f. Irrigation of citrus or edible crops that will be peeled, skinned, cooked or thermally processed before consumption is allowed.
- g. Irrigation of edible crops that will not be peeled, skinned, cooked or thermally processed before consumption is prohibited.

- h. Using reclaimed water for filling pools, hot tubs, or wading pools is prohibited.
- i. Cross-connections to the any potable water system with reclaimed water or any non-potable water is prohibited.

12.3 Reclaimed water construction standards

- a. PVC pipe used in the construction of the reclaimed water system shall be C-200 (SDR-21) at a minimum. Ductile iron pipe shall be Class 150 minimum. Installation shall be performed in accordance with applicable provisions of AWWA Standard C600 (ductile iron) and AWWA Manual M23 (PVC pipe)
- b. PVC pipe used for reclaimed lines shall be color coded by use of an acceptable purple pigment. The pigmentation shall impart no qualities to the pipe other than color and the pipe shall be NSF approved.
- c. Adhesive Plastic identification tape shall be installed on all potable water, reclaimed water and sewer force mains that are not properly color-coded.
- d. Pipeline identification locator wire is to be installed on all potable water, reuse water and sewer force mains. Locator wire shall be a single strand 14 gauge plastic coated electric wire laid on top of, and continuously over the entire length of the main. Valve boxes are to be used as junction points to access the wires. Locator wires are to be secured to the main approximately five-(5) feet.
- e. The following are color codes for water mains installed in the City of Winter Springs
 - 1. Potable water (blue)
 - 2. Reclaimed water (purple)
 - 3. Sewer force mains (brown)
 - 4. Sewer gravity mains (green)
- f. All service line piping, valves and service boxes shall be properly color coded and/or marked to differentiate the reclaimed water from potable water.
- g. A maximum separation of reclaimed water mains and potable water mains shall be maintained. A minimum horizontal separation of five-(5) feet center to center, but not less than three (3) feet between outside edges of pipe shall be maintained. Where reclaimed water mains and potable water mains cross with less than eighteen (18) inches vertical clearance, the reclaimed water main shall be twenty (20) feet of ductile iron pipe centered on the point the of crossing.
- h. A minimum set back distance of seventy-five (75) feet shall be maintained from a reclaimed transmission facility/transmission mains from any public or private potable water supply well. This set back distance requirement does not apply to closed loop heating or air condition return wells.
- i. A minimum set back distance of seventy-five (75) feet shall be maintained from public access reuse wetted areas to any public or private potable water supply well.
- j. All reclaimed water hose bibs, hand-operated connections and outlets shall be contained in underground vaults or shall be appropriately tagged or labeled and color coded to warn the public and employees that the water is not intended for drinking.

k. Vaults for reclaimed water hose bibs and outlets shall be locked or require a special tool to operate the hose bib or outlets.

l. Standard AWWA C901-88 PE 3406 (purple) polyethylene tubing shall be used on all reclaimed water service lines up to two (2) inches in diameter. Single service residential service lines shall one (1) inch diameter and double service lines shall be one and a half inch (1 1/2) with a 1 1/2" X 1" X 1" Y branch (Ford No. Y44-264) or equivalent.

m. Valves for Underground Service shall be resilient-seated gate valves conforming to AWWA C509 non-rising stem type and shall be equipped with 2-inch square cast iron wrench nuts.

n. Service line valves installed on the main one (1) inch to two-(2) inch shall be corporation stops with pack joint couplings (Ford type FB1000 or equivalent). And curb stops (Ford type B43-454-W) or equivalent for one (1) inch service lines.

12.4 Special Items

a) Tapping Saddles

Tapping saddles shall be fabricated of ductile iron and suitable for either wet or dry installation and shall be as manufactured by American Cast Iron Pipe Company or approved equal. The sealing gasket shall be the "O" Ring type suitable for the applicable service. Outlet flange shall be ANSI B16.1, 125 lb. standard. The straps and bolts shall be a corrosion resistant alloy steel.

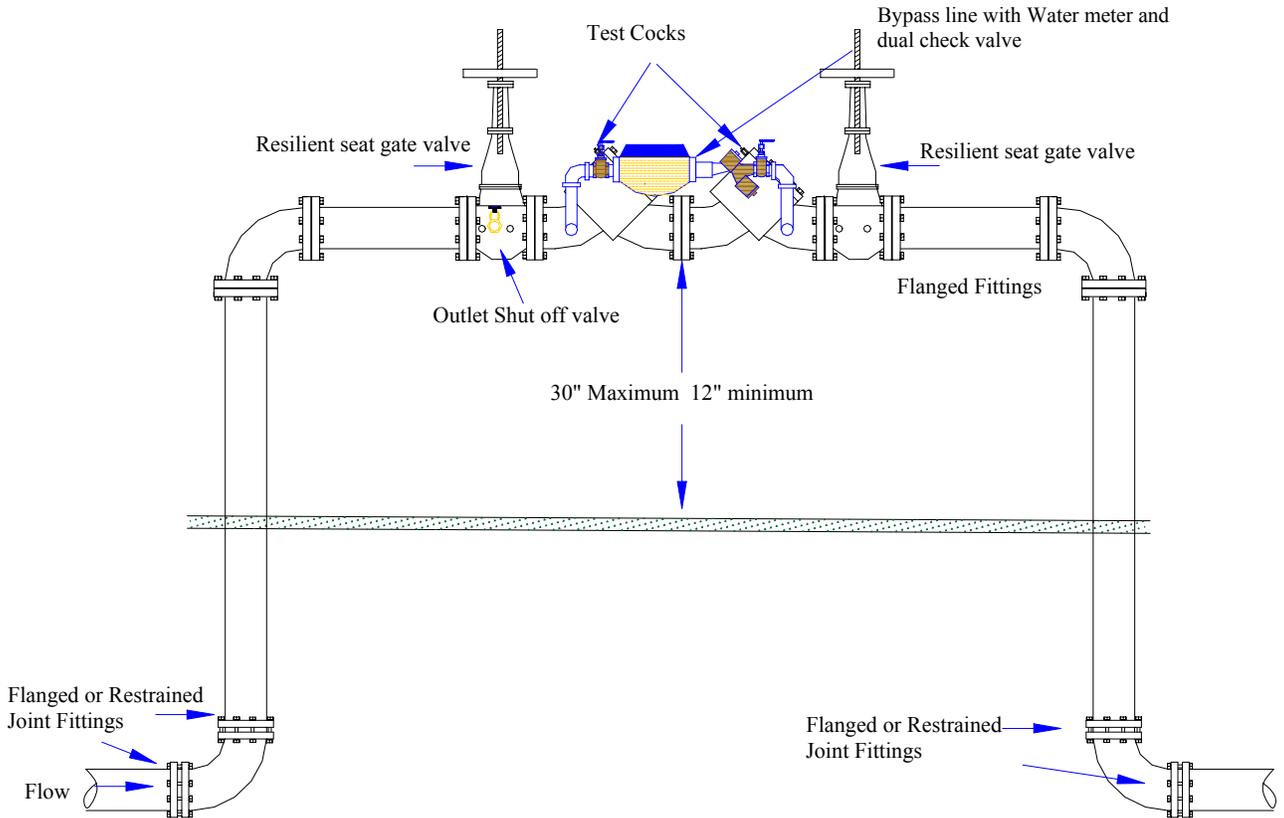
b) Service Saddles

Units for cast or ductile iron pipe shall be double strap, ductile iron, Type 313 for plastic pipe, Types 342 or 352, as applicable. Sealing gaskets shall be suitable for the applicable service and straps shall be corrosion resistant alloy steel. Service tapping saddles for one (1) inch through two (2) inch taps shall be (Ford style F202 double strap or style FC101) or equivalent.

c) Valve boxes

Reclaimed water valve shall be adjustable, cast iron, minimum interior diameter of 5 inches, with 6"X 6" square covers cast with the applicable inscription in legible lettering on the top; "RECLAIMED WATER" Boxes shall be suitable for the applicable surface loading and valve size. Valve boxes not in the pavement shall have around their tops concrete pads, which will be flush with the finished grade at valve site (top of the curb or above if necessary) with minimum dimensions of 18 by 18 by 3 inches.

Double Detector Check Valve Backflow Prevention Device



Typical Double Detector Check Valve Assemblies are installed on building fire systems.

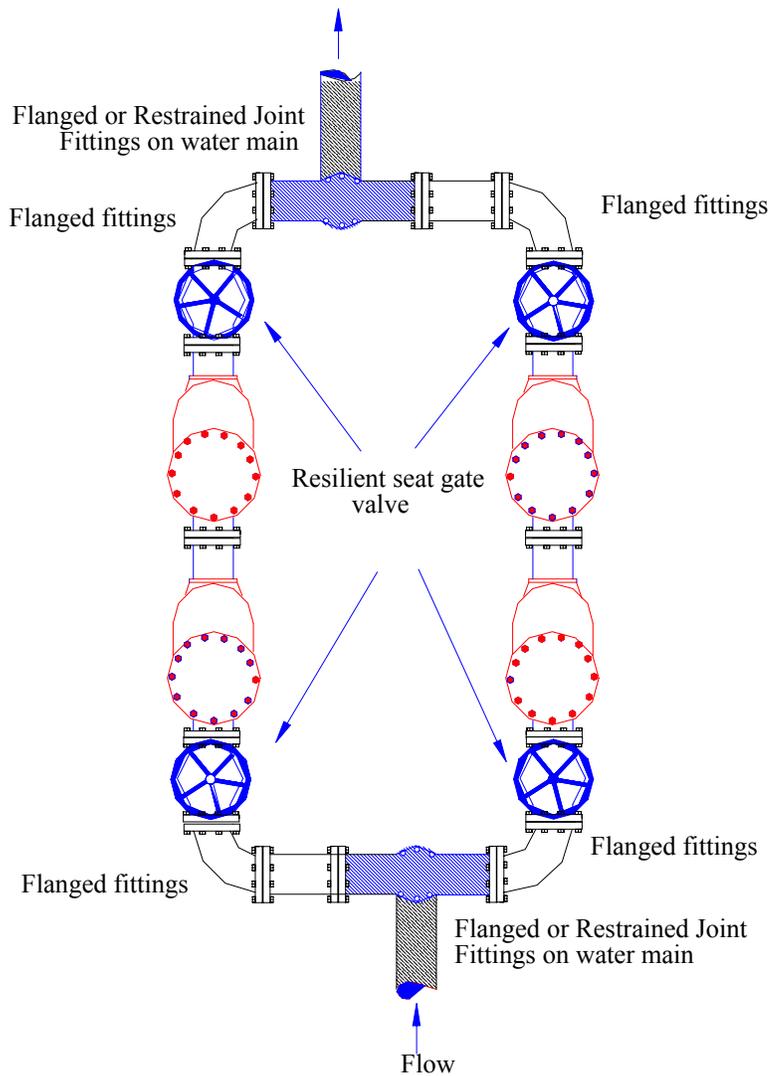
Can be installed horizontally or vertically with flow up.

Install with adequate clearance and easy accessibility for testing and maintenance.

Install supports for 3" and larger.



Double Check or Reduced Pressure Backflow Preventer Dual Service

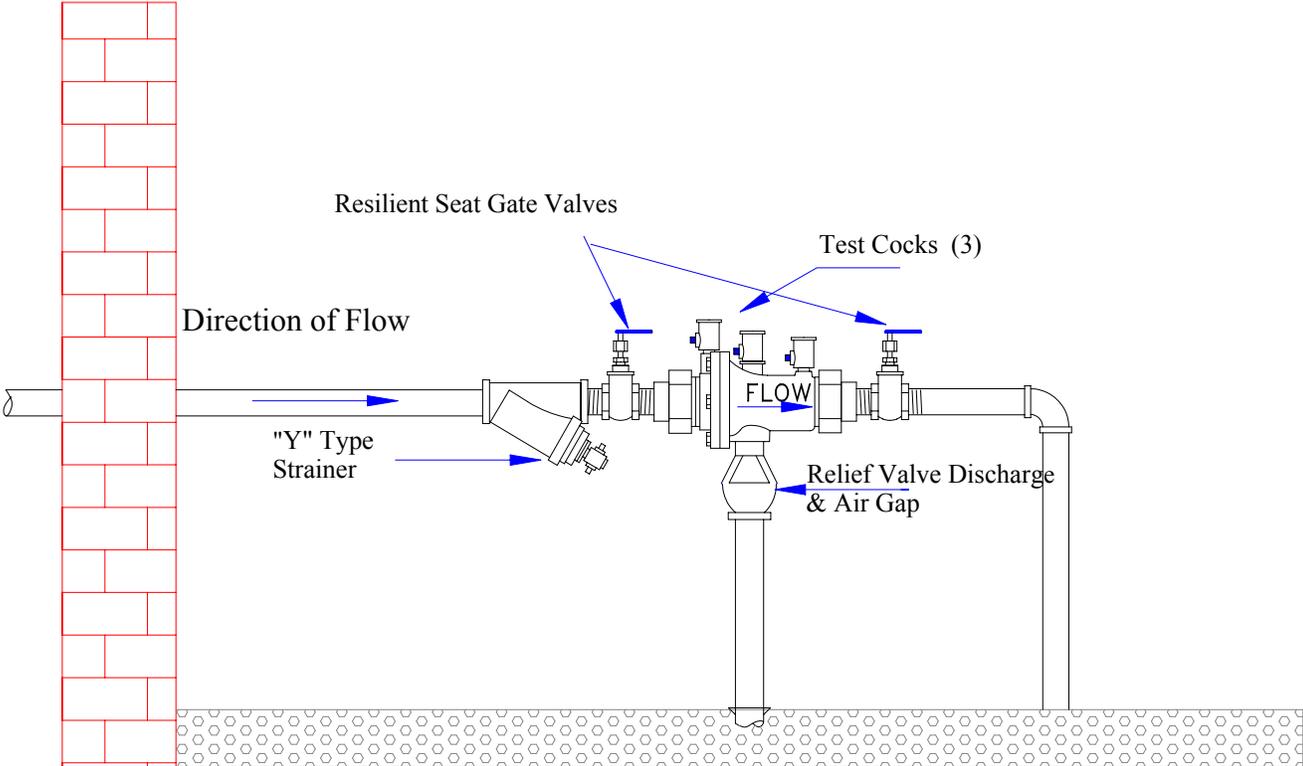


Install on service line for facilities that require an uninterrupted supply of water.

Install with adequate clearance and easy accessibility for testing and maintenance.



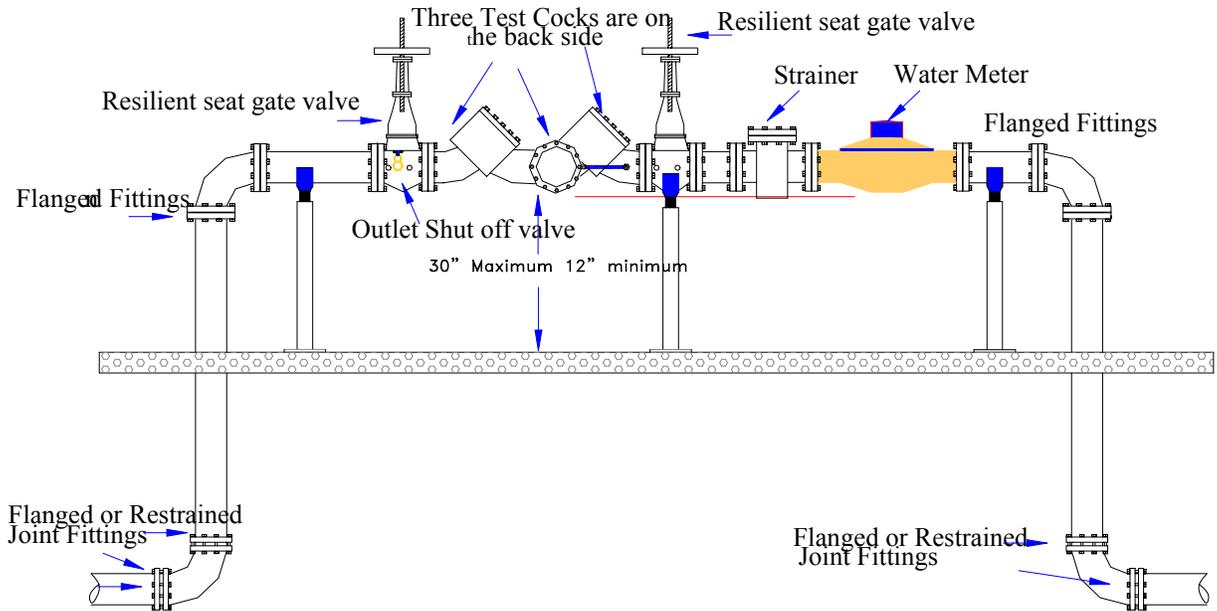
Indoor Reduced Pressure Backflow Prevention Device



Typical indoor installation is on a 3/4" to 2" line subject to back pressure or backsiphonage where there is a high potential health hazard from contamination. Must be horizontally installed. Can be operated under continuous pressure. Install with adequate clearance and easy accessibility for testing and maintenance.



Metered Reduced Pressure Backflow Device



Install with adequate clearance and easy accessibility for testing and maintenance.

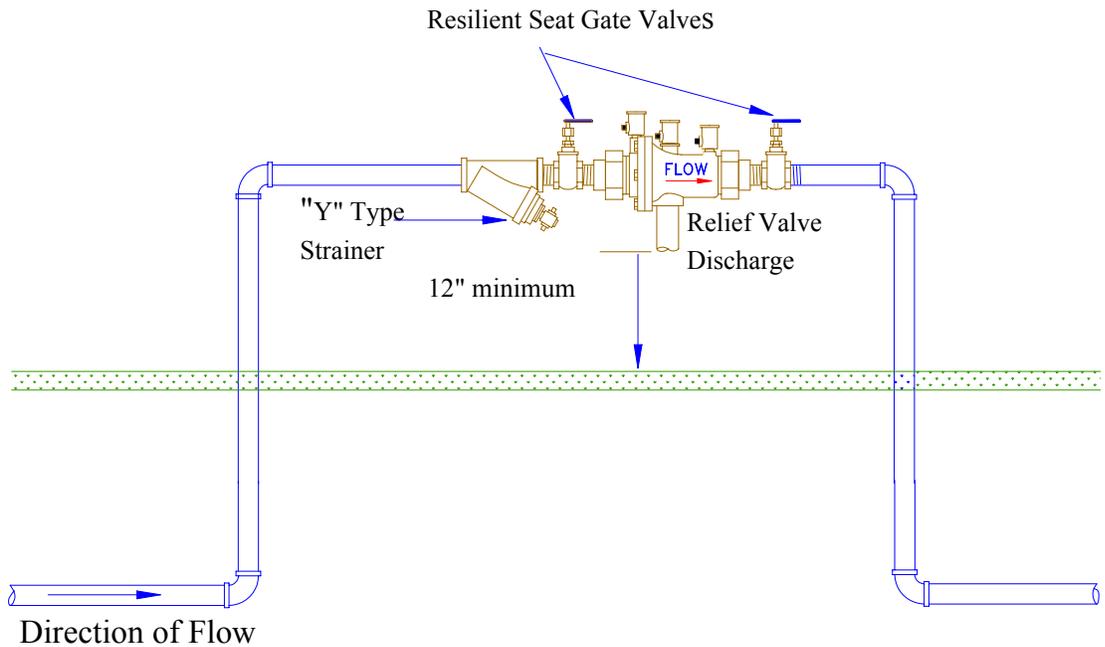
Install in a horizontal position.

Install supports for 3" and larger

For high hazard, continuous pressure, possible back pressure



Reduced Pressure Backflow Prevention Device



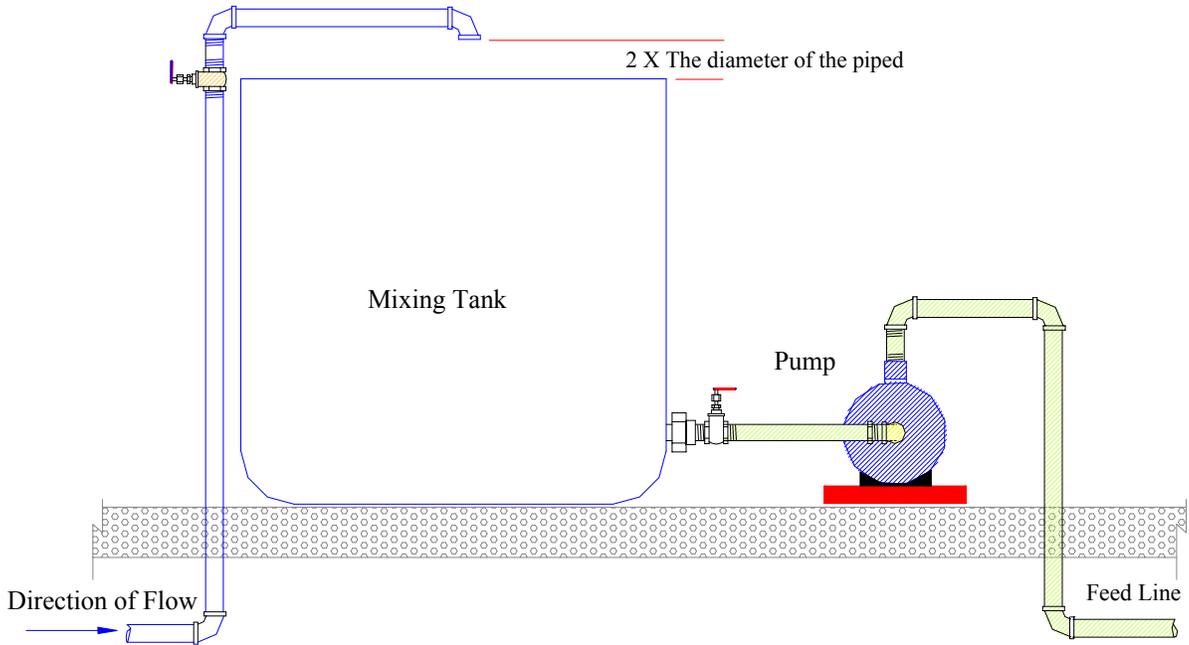
Typical installation is on a 3/4" to 2" line subject to back pressure or backsiphonage where there is a high potential health hazard from contamination.

Install with adequate clearance and easy accessibility for testing and maintenance.

Can be operated under continuous pressure.



Typical Air Gap Separation

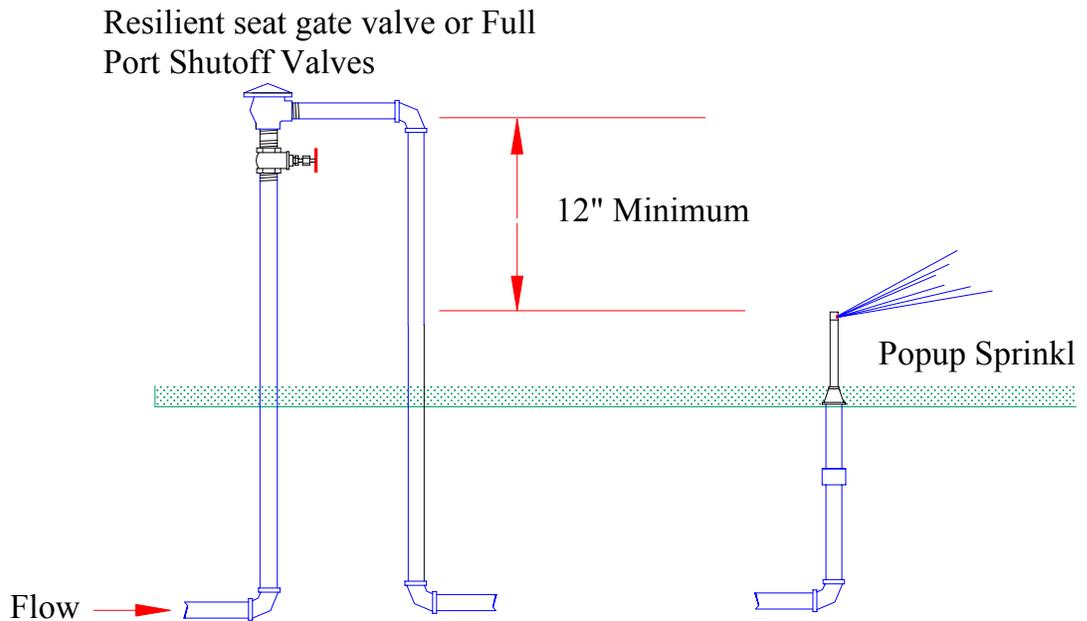


An Air gap separation means the unobstructed vertical distance through free atmosphere between the lowest opening from any pipe or faucet supplying potable water to a tank, plumbing fixture, or other device and the flood level overflow rim of the receptacle.

The approved air gap separation shall be at least double the diameter of the supply pipe measured vertically above the overflow rim of the vessel and in no case shall the gap be less than one (1) inch.



Atmospheric Vacuum Breaker. (A.V.B.)



The Atmospheric Vacuum Breaker cannot be installed where it will be subject to back pressure. It can only provide protection against backsiphonage of non-toxic pollutants.

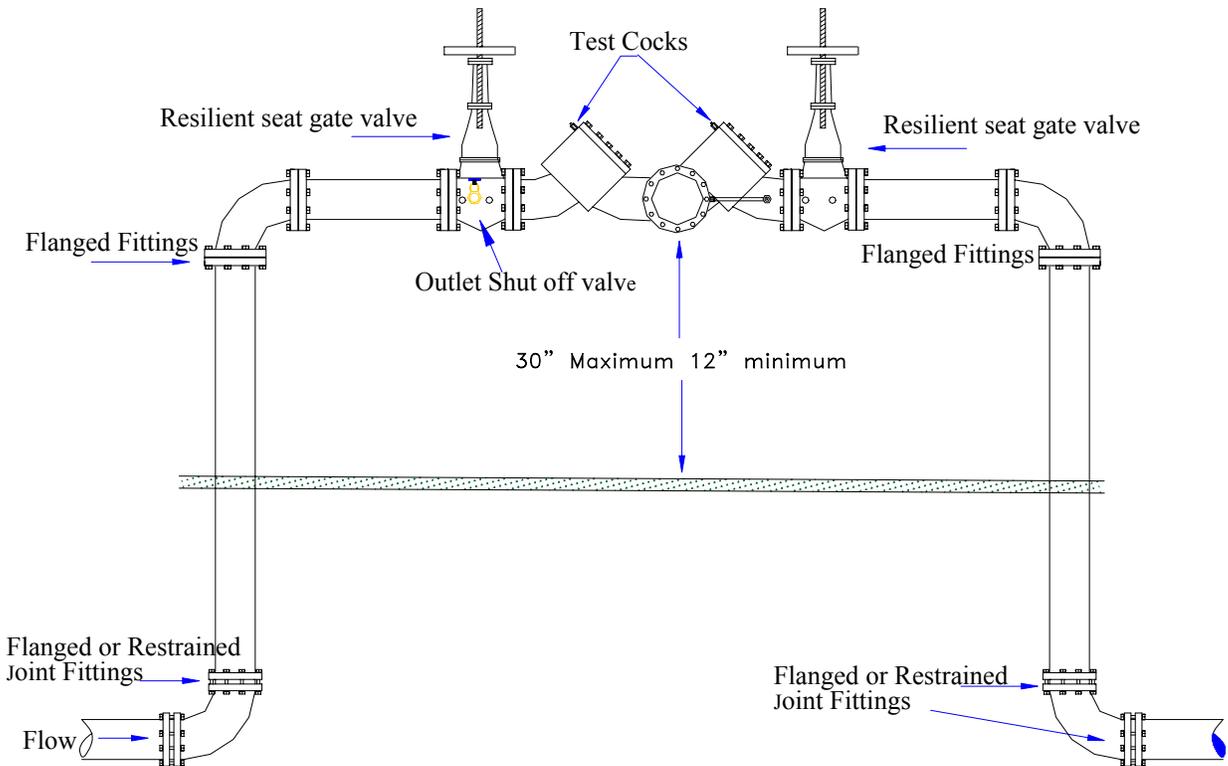
Each device shall be installed in an accessible location to facilitate inspection and maintenance.

Each atmospheric vacuum breaker shall be installed downstream of the shutoff valve and at least 12 inches above the highest sprinkler head. No valve may be located downstream from the device

Under no circumstances should the A.V.B be installed where it will under continuous operating for more than 12 hours in any 24 hour period.



Reduced Pressure Backflow Prevention Device



Install with adequate clearance and easy accessibility for testing and maintenance.

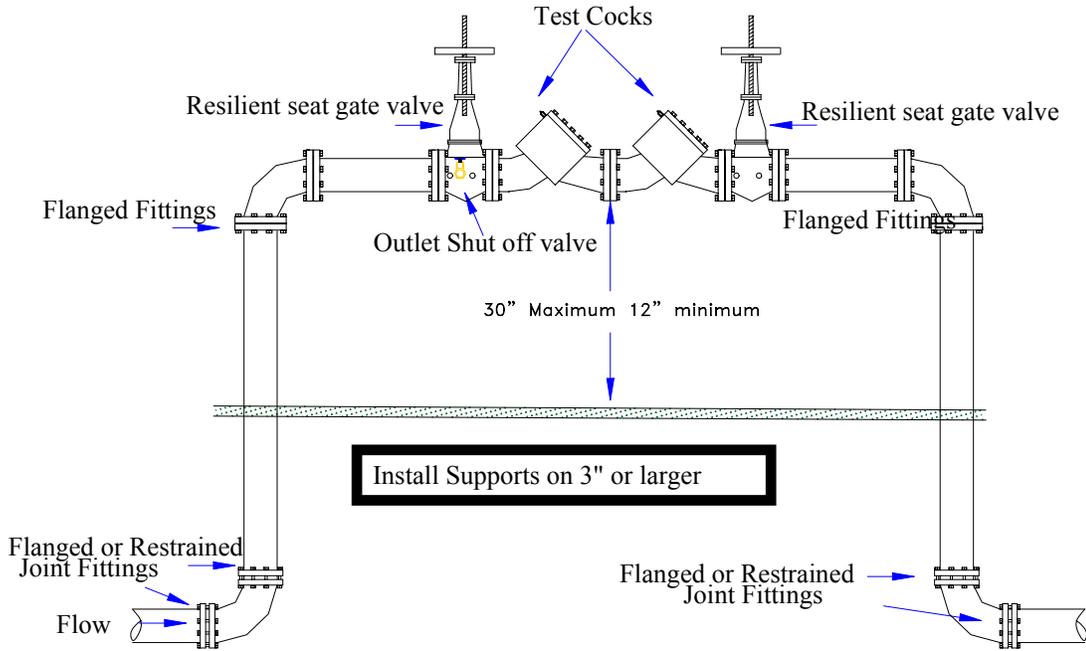
Install in a horizontal position.

Install supports for 3" and larger

For high hazard, continuous pressure, possible back pressure



Double Check Valve Backflow Prevention Device



Install with adequate clearance and easy accessibility for testing and maintenance.

Install in a horizontal position.

Low Hazard, Continuous Pressure, Possible Back pressure

