VOLUME 2 - RULES AND REGULATIONS

Part C - Cross-Connection Control Plan

1. Introduction

A cross-connection is defined as "Any physical arrangement whereby a public water supply is connected, directly or indirectly with any other water supply system; sewer; drain; conduit; pool; storage reservoir; plumbing fixture, or other device which contains or may be capable of imparting contamination to the public water supply as the result of changeable devices and other temporary or permanent devices through which or because of which backflow could occur are considered to be cross connections." Consequently, either cross-connections or the change of backflow must be eliminated to prevent degrading the high quality of water that water purveyors strive to maintain.

Cross-Connection Control Programs, as administered by water purveyors, are relatively new to Virginia. Initially, the primary responsibility for safeguarding water quality on private property was left to local health agencies and building and inspection departments. Then, beginning with the Safe Drinking Water Act, signed by President Ford on December 16, 1974, a chain of laws and regulations evolved that resulted in the State requirement, (Waterworks Regulations Commonwealth of Virginia), for all the public water systems to have a Cross-Connection Control Program.

In compliance with this mandate, the following is the Fauquier County Water and Sanitation Authority (hereinafter the "Authority") policy regarding Cross-Connection and Backflow Prevention.

We urge you to acquaint yourself with the policies and information presented in this plan. It is only through the education and commitment of persons like yourself that we can control the hazards presented by cross-connections within our public drinking water supply. The Authority stands behind this policy and its enforcement and will offer its assistance to all who share the responsibility of safe water.

2. Overview

2.1 Purpose

The purpose of this Policy is to protect the public potable water supply of the Authority from the possibility of contamination. To promote the elimination or control of existing cross- connections, actual or potential, between its customers implant plumbing fixtures and industrial piping and the public water supply; and to provide for the maintenance of a continuing program of cross-connection control and backflow prevention which will systematically and effectively prevent the contamination of the potable water distribution system. More exactly, the Policy is intended to prevent delivered water, (water that has passed beyond the public water system and into the private distribution systems of consumers), from re-entering the public distribution system and being subsequently delivered to consumers, and to allow persons, active in piping design and installation, to incorporate and install appropriate backflow prevention devices correctly.

2.2 Causes of Backflow

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 being created in the supply piping. The principal causes of backsiphonage are:

1. Line repair or break which is lower than a service point. This will allow negative pressures to be created by water trying to flow to a lower point in the system.

2. 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.

3. Lowered pressure in water main due to 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 system of piping, and the pressure in the

non-potable system exceeds that in the potable system. The principal causes of backpressure are:

1. Booster pump systems designed without backflow prevention devices.

2. Potable water connections to boilers and other pressure systems without backflow prevention devices.

3. Connections with another system which may at times, have a higher pressure.

4. 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.

3. Responsibility

3.1 Cross-Connection Control Program

The responsibilities of the Authority's Cross-Connection Control program in accord with the Commonwealth of Virginia/State Board of Health "Waterworks Regulations" are as follows:

A. It is the responsibility of the purveyor to establish or cause to be established and operate a Cross-Connection Control and Backflow Prevention Program consistent with the extent of the system and the type of consumer served. This program shall include at least one designated individual who shall be responsible for the inspection of the waterworks for cross-connection and backflow prevention control. The Authority's Water Leader shall be the individual charged with these duties. This program shall be carried out in accordance with the Uniform Statewide Building Code and shall be a continuing program. As required by the Virginia "Waterworks Regulations", the following questionnaires are completed and reviewed every three years.

B. Certified plans for fire service connections and extensive lawn or irrigation systems served by waterworks and other facilities requiring approved backflow prevention devices, shall be submitted to the water purveyor prior to construction. The water purveyor shall review the plans and advise if the plans are approved or disapproved. If disapproved, the designer and the purveyor shall consult with the Virginia Department of Health for a determination of what will be approved. The revised design shall be resubmitted for additional reviews. Only after final approval by the water purveyor, will it be permissible to proceed with the final construction. All plans should be submitted to the purveyor with sufficient copies for the purveyor to forward an approved copy to the Virginia Department of Health.

C. It shall be the duty of the purveyor to have thorough inspections and operational tests made annually of backflow prevention devices or low pressure cut-off devices which are required and installed. Where storage facilities are provided, it is suggested that at least one sample per month be tested to verify that the water remains of satisfactory bacteriological quality. Copies of results of these inspections and tests shall be kept on file and made available to the Virginia Department of Health. The devices shall be repaired, overhauled, or replaced when needed. Nothing in this section shall prevent the purveyor from installing and operating approved devices or making repairs.

D. The water purveyor may deny or discontinue the water service to a consumer if the required backflow prevention device is not installed. If it is found that the device(s) has been removed or bypassed or if a cross-

connection exists on the premises, or if the pressure in the waterworks is lowered below 10 psi gauge, the purveyor shall take positive action to ensure that the waterworks is adequately protected at all times. Water service to such premises shall not be restored until the deficiencies have been corrected or eliminated in accordance with these Regulations and to the satisfaction of the purveyor.

3.2 Customers

The customers responsibility starts at the point of delivery from the public potable water system and includes all of his water systems. The customer, at his own expense, shall install, operate, test and maintain approved backflow prevention devices as directed by the Authority. The customer shall maintain accurate records of tests and repairs made to backflow prevention devices and provide the Authority with copies of such records. The records shall be on forms approved or provided by the Authority. In the event of accidental pollution or contamination of the public or consumer's potable water system due to backflow on or from the customer's premises, the owner shall promptly take steps to confine further spread of pollution or contamination within the customer's premises, and shall immediately notify the Authority.

3.3 Backflow Prevention Device Installers

The installer's responsibility is to make proper installation of backflow prevention devices in accordance with the manufacturer's installation instructions and any additional instructions approved by the Authority.

The installer is also responsible to make sure a device is working properly when it is installed, and is required to furnish the following information to the Authority immediately after a reduced pressure principle backflow preventer (RP), double check valve assembly (DCVA) or pressure vacuum breaker (PVB) is installed:

A. Service address where device is located

B. Owner

C. Description of device's location and size

D. Date of installation

E. Type of device

F. Manufacturer

G. Model number

H. Serial number

All RP, DCVA, and PVB are required to be tested following installation by a Certified Backflow Prevention Device Technician, as defined in Section 5.

4. Inspections

4.1 Frequency

Due to changes in models 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 otherwise ineffective; therefore, an annual detailed inspection of the customer's premises by the Authority is required.

4.2 Proposed Constructions

All new construction plans and specifications shall be reviewed by the Authority to determine the degree of possible cross-connections hazard. At this time, backflow prevention requirements in accordance with this policy will be made.

4.3 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 system. This survey need not 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.

5. Definitions

A. Air-Gap-Separation a physical separation between the free-flowing discharge end of a potable water supply 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.

B. Approved accepted by the Authority as meeting an applicable specification of the Authority and accepted by the Virginia Department of Health in accordance with Title 32.1, Chapter 6, Article 2 of the Code of Virginia entitled "Public Water Supply".

C. Auxiliary Water Supply 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 a private non-potable water supply or any natural source(s) such as a well; spring; river; stream; harbor; etc., or "used waters" or "industrial fluids". These waters may be contaminated or they may be objectionable, and constitute an unacceptable water source over which the water purveyor does not have sanitary control.

D. Backflow the flow of water or other liquids, mixtures, or substances under pressure into the distribution pipes of a potable water supply system from any source or sources other than its intended source.

E. Backflow Prevention Device any effective device, method of construction used to prevent backflow into a potable water system. The type of device used should be based on the degree of hazard, either existing or potential.

F. Backflow Prevention Device - Approved a device that has met the requirements of one or more of the following standards:

(1)	AWWA-C-506	Reduced Pressure Principle and Double Check - (RP) & (DCVA)
(2)	ASSE-1001	Atmospheric Vacuum Breakers - (AVB)
(3)	ASSE-1011	Hose Bibb Vacuum Breakers - (HBVB)
(4)	ASSE-1013	Reduced Pressure Principle Device - (RP)
(5)	ASSE-1015	Double Check Valve Assembly - (DCVA)
(6)	ASSE-1020	Pressure Vacuum Breakers - (PVB)

(7)	ASSE-1024	Dual Check Backflow Preventer (Residential Use Only) - (DCBP)
(8)	USE-FCCC	University of Southern California Foundation for Cross-Connection Control and Hydraulic Research

G. Backpressure any elevation of pressure in the downstream piping system (by pump, elevation of piping, or steam 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.

H. Backsiphonage a form of backflow due to a reduction in system pressure which causes a negative or sub-atmospheric pressure to exist at a site in the water system.

I. Certified Backflow Prevention Device Technician a person who has proven his competency to the satisfaction of the Authority's Cross-Connection Control Personnel. The technician 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. The technician shall have attended and successfully completed a certification program for Backflow Prevention acceptable to the Authority. The technician will be required to provide the Authority with a copy of his/her certificate.

J. Contamination an impairment of the quality of the potable water by any solid, liquid, or gaseous compounds or mixtures to a degree which would create an imminent danger to the public health, or would create an unacceptable taste, odor, or color to the potable water.

K. Cross-Connection any physical connection or arrangement of piping or fixtures between two otherwise separate piping systems, one of which contains potable water and the other non-potable water or industrial fluids of questionable safety, through which, or because of which, backflow or backsiphonage may occur into the potable water system. A water service connection between a public potable water distribution system and a customer's water distribution system which is cross- connected to a contaminated fixture, industrial fluid system or with potentially one type of cross-connection. Other types of cross-connections include connectors such as swing connections; removable sections; four-way plug valves; spools; dummy sections of pipe; swivel or change-over devices; sliding multiport tube; solid connections; etc.

L. Double Check Valve Assembly (DCVA) an assembly composed of two single, independently acting, check valves, including tightly closing shut-off valves located at each end of the assembly. A valve that is "drip-tight" in the normal direction of flow when the inlet pressure is one psi and the outlet 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 and suitable connections for testing the watertightness of each check valve.

M. Dual Check Valve Assembly (DCVA) an assembly composed of two single, independently acting check valves, particularly suited for installations immediately downstream from residential water meters where potential pollutants from residences could enter the water mains, or on service lines to self-draining yard hydrants (ASSE approval required).

N. Hazard - Degree of a qualification of what potential and actual harm may result from cross-connections within a water-using facility. The word "severe" as used to qualify "Health Hazard" means a hazard to the health of the user that could reasonably be expected to result in significant morbidity or death. Establishing the degree of h a z a r d is directly related to the type and toxicity of contaminates that could feasibly enter the public water supply system and is determined by the Authority.

O. Hazard - Health any condition, device, or practice in a water system or its operation that creates or may create, a danger to the health and well-being of users.

P. Hazard - Pollution a condition through which an aesthetically objectionable or degrading material not dangerous to health, may enter the public water system or a potable consumer's water system.

Q. Hazard - System a condition posing an actual or potential threat of damage to physical properties of the public water system or a potable consumer's water system.

R. Industrial Piping System - Consumer's 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.

S. Point of Delivery/Service Connection the point at which the Consumer's Potable System is connected to the Public Potable System.

T. Point of Use the point(s) where water is being taken from the Consumer's Potable System.

U. Reduced Pressure Principle Backflow Preventer (RP) 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 check valves shall be less than the supply pressure. In case of leakage of either check valve, the differential relief valve, by discharging to atmosphere, shall operate to maintain the pressure between the check valves less than the supply pressure. The unit shall include tightly closing shut-off valves located at each end of the device. Each device shall be fitted with properly located test cocks. (RP, RPP and RPZ are all acceptable abbreviations for this device.)

V. Vacuum Breaker - Atmospheric Type (AVB) an approved device consisting of a check valve and an air inlet to relieve a vacuum. It shall effectively shut off the reverse flow of water when a negative pressure exists on the supply side of the device.

W. Vacuum Breaker - Pressure Type (PVB) 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 a pressure side of a valve.

X. Water Purveyor the 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 Virginia Department of Health. As used herein, the terms water purveyor and the Authority may be used simultaneous.

Y. Water System - Consumer's Potable that portion of the privately owned potable water system lying between the point 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.

Z. Water System - Public Potable any publicly or privately-owned water system operated as a public utility under a valid health permit to supply water for domestic purposes. This system will include all sources, facilities and appurtenances between the source and the point of delivery such as valves, pumps, pipes, conduits, tanks, receptacles, fixtures, equipment and appurtenances used to produce, convey, treat or store a potable water for public consumption or use.

AA. Water- Used any water supplied by a water purveyor from a public potable water system to a customer's water system after it has passed through the point of delivery.

6. Cross-Connection Hazards and Required Protection

6.1 Facilities

A. Type of Backflow Protection Required - An approved backflow prevention device of the type designated, shall be installed on each water service connection to the following types of facilities. This list is presented as a guideline and should not be construed as being complete.

Abbreviations used are as follows:

AG	Air Gap Separation
AVB	Atmospheric Vacuum Breaker
DCVA	Double Check Valve Assembly
PVB	Pressure Vacuum Breaker
RP	Reduced Pressure Principle Backflow Preventer

B. **Type of Facility** **Minimum Typical Protection**

1. Brewery, Distillery, Bottling Plant.....DCVA
2. Buildings over three stories ..... RP
3. Car Wash with recycling system and/or adductor ..... RP
4. Chemical Plant ..... RP
5. Dairy .....DCVA
6. Dentist Office ..... RP
7. Exterminating Companies (Pesticides) ..... PVB
8. Fertilizer Plant..... RP
9. F i l m Laboratory ..... RP
10. Food or Beverage Plant .....DCVA
11. Hospital, Clinics, Medical Building..... RP
12. Irrigation System..... PVB

13. Laboratory ..... RP
14. Laundry or Dry Cleaning Plant ..... RP
15. Machine Tool Plant (Health or System Hazard) ..... RP
16. Machine Tool Plant (Pollution Hazard) .....DCVA
17. Metal Processing Plant (Health or System Hazard) ..... RP
18. Metal Processing Plant (Pollution Hazard).....DCVA
19. Metal Plating Plant..... RP
20. Morgue or Mortuary ..... RP
21. Nursing Home..... RP
22. Packing House ..... RP
23. Petroleum Storage Yard (Health or System Hazard) ..... RP
24. Petroleum Storage Yard (Pollution Hazard) .....DCVA
25. Pharmaceutical or Cosmetic Plant .....RP
26. Power Plant .....RP
27. Restaurants (Health or System Hazard) .....RP
28. Restaurants (Pollution Hazard) .....DCVA
29. Sand and Gravel Plant .....DCVA
30. School (Health or System Hazard) .....RP
31. School (Pollution Hazard) .....DCVA
32. Sewage Pumping Station.....PVB
33. Sewage Treatment Plant.....RP
34. Swimming Pools with Piped Fill Line.....AG
35. Veterinary Establishment .....RP

Vacuum breakers (Vacuum Relief Valves) designed to prevent collapse or implosion of a steam-heated pressure vessel when being cooled, are not acceptable devices for protection against backflow in potable water lines.

Single check valves will not be accepted as a means to protect the potability of drinking water and therefore may only be used to prevent backflow which would affect the functioning of a plumbing system, such as to prevent recirculation of potable hot water. Where single check valves are improperly used, they will be required to be replaced by an appropriate approved backflow prevention device.

C. In addition to and including those types of facilities listed above, an approved backflow prevention device of the type designated shall be installed on each domestic water service connection to any premises containing the following real or potential hazards:

Situation	Minimum Typical Protection
(1) Premises having an auxiliary water system not connected to public water system	RP
(2) Premises having a water storage tank, reservoir, pond, or similar appurtenance	RP
(3) Premises having a steam boiler, cooling system, or hot water heating system where chemical water conditioners are used	RP
(4) Premises having submerged inlets to equipment	RP
(5) Premises having self-draining yard hydrants, fountains, hose boxes or similar devices presenting a health or system hazard. (i.e. chemical storage plants, tank farms, bulk storage yards)	RP
(6) Premises having self-draining yard hydrants, fountains, hose boxes or similar devices presenting a pollution hazard. (i.e., parks, play fields, cemeteries)	DCVA
(7) Others specified by the Public Utilities Department	

Any device, equipment or situation not covered by this Cross-Connection Policy where water is connected or used, which may constitute a potential health hazard, will be handled at the discretion of the water purveyor or his authorized agent.

6.2 Parallel Installation

All backflow prevention devices with test clocks, are required to be tested with a minimum frequency of 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, and when it is not possible to provide water service from two separate meters, provisions shall be made for a "parallel installation" of backflow prevention devices.

Multi-story buildings which have a number of flushometer toilets, should be

equipped with parallel devices. Experience has shown, if the water is to be shut off to this type of building, flushometers may have to be manually reset.

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, e.g. one 2-inch device or two 1 ½ inch devices, one 8-inch device or two 6 inch devices.

The Authority will not accept an unprotected by-pass around a backflow preventer when the device is in need of testing, repair or replacement.

6.3 Exterminating Companies

All tanks, tank trucks, and spraying apparatus used to convey pesticides in an exterminating process are required to use only designated-protected potable water fill locations. Filling with potable water at unspecified locations or private residences is prohibited. All filling locations will consist of over-head piping arrangements with correctly installed pressure vacuum breakers. If for any reason an over-head piping arrangement cannot be used, a reduced pressure zone backflow preventer must be installed on the fill line. All filling locations must be approved by the Authority.

6.4 Fire Systems

Type of Backflow Protection Required - An approved backflow prevention device of the type designated shall be installed on each fire protection service to any premises where the fire protection system contains any of the following components, unless the Fauquier County Water & Sanitation Authority determines that no regular or potential health, pollution, or system hazard to the public water system exists. Fire systems may be divided into six (6) general classes. The following are typical:

Class	**Minimum Typical Protection**
A. Class 1 - A closed automatic fire system without pumper connection; A system having 20 heads or less	NONE
B. Class 2 - A closed automatic fire system with pumper connection	DCVA
C. Class 3 - A closed automatic fore system with pumper connection and an auxiliary water supply on or available to the premises; or an auxiliary water supply which will be located within 1,700feet of the pumper connection	RP
D. Class 4 - A closed automatic fire system with a closed pressure tank supply (this class may have a jockey pump interconnected with the public water supply and/or an air compressor connection)	RP

E. Class 5 - A closed automatic sprinkler system inter-connected with an auxiliary water supply.....RP

F. Class 6 - A fire system used for the combined purposes of supplying the automatic sprinklers, hose lines, fire hydrants and standpipes and of being used for industrial purposes.

(1) Self-Draining Fire Hydrants on premises presenting a Health or System Hazard (i.e., Chemical Plant, Petroleum Storage Plant, Bulk Storage Yard, Stock Yard, Sewage Plant, or similar facilities where ground seepage of toxic materials may occur .....RP

(2) Self-Draining Fire Hydrants on premises presenting a Pollution Hazard (i.e., Apartment House, Office Complex, Fabricating Plant, or similar facility where ground seepage of pollutional but not toxic materials may occur.....DCVA

6.5 Other Cross-Connection Hazards

A. Fixture 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.

B. Air Condition Cooling Tower - Potable water inlet shall have an air gap separation of twice the inside diameter of the inlet line or a minimum of two inches above the flood level rim. In a case where the cooling unit is completely enclosed, then an RP device must be installed.

C. Aspirators and Ejectors - 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.

D. Booster Pumps - All booster pumps shall be provided with a low-pressure cut-off unless other acceptable provisions are made to prevent the creation of low or negative pressures in the piping system.

E. Private Wells - Shall not be interconnected to any Authority public water supply system.

F. Portable Spray and Cleaning Equipment - Any portable pressure spray or cleaning units that have the capability of connection to any potable water supply and do not contain a built-in approved air gap, should be fitted with

a reduced pressure backflow device or double check valve assembly depending on the degree of hazard.

G. Uses of Water From Fire Hydrants or Meter Setters -The unmetered use of water from any fire hydrant or meter setter by other than authorized personnel is prohibited. The department may permit the use of water from a fire hydrant for construction, provided the applicant applies for and adheres to backflow requirements on hydrant permits.

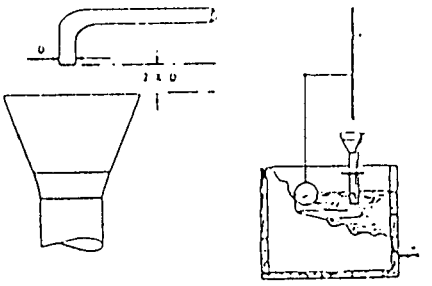
Note: Any device, equipment, or situation not covered by this cross-connection policy, which may constitute a potential health hazard, will be examined for appropriate treatment by the Authority.

6.6 Typical Backflow Prevention Devices (Illustrated)

The following are illustrations of typical backflow devices.

1 AIR-GAP

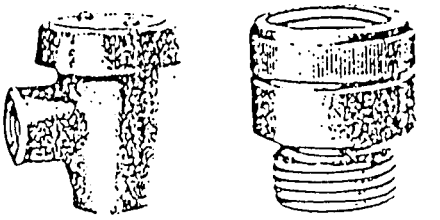
Air Gap is the physical separation of the potable and non-potable system by an air space. The vertical distance between the supply pipe and the flood level rim should be two times the diameter of the supply pipe, but never less than 1". The air gap can be used on a direct or inlet connection and for all toxic substances.



2 ATMOSPHERIC VACUUM BREAKERS

Atmospheric Vacuum Breakers may be used only on connections to a non-potable system where the vacuum breaker is never subjected to back-pressure and is installed on the discharge side of the last control valve. It must be installed above the usage point. It can not be used under continuous pressure.

Hose connection vacuum breakers may be used on sill cocks and service sinks.



ATMOSPHERIC TYPE VACUUM BREAKER

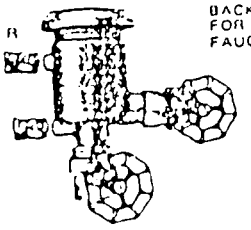
HOSE CONNECTION VACUUM BREAKER

3 PRESSURE TYPE VACUUM BREAKERS

Pressure Type Vacuum Breakers may be used as protection for connections to all types of non-potable systems where the vacuum breakers are not subject to back-pressure. These units may be used under continuous supply pressure. They must be installed above the usage point.

Backflow preventers with intermediate atmospheric vent may be used as an alternate equal for ½" and ¾" pressure type vacuum breakers and in addition, provide protection against back pressure.

PRESSURE TYPE VACUUM BREAKER

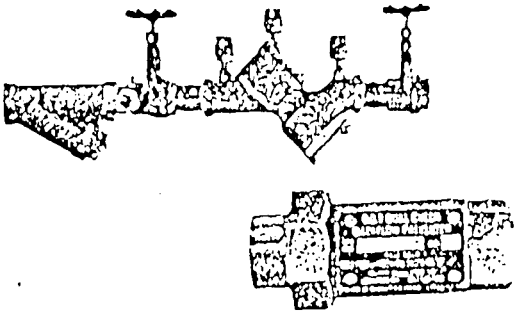


BACKFLOW PREVENTER FOR LABORATORY FAUCETS

BACKFLOW PREVENTER WITH INTERMEDIATE ATMOSPHERIC VENT

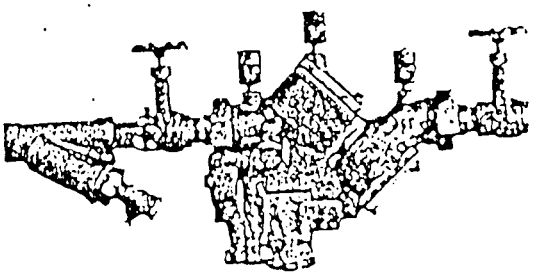
4 DOUBLE CHECK VALVE ASSEMBLY

Double Check Valve Assembly may be used as protection for all direct connections through which foreign material might enter the potable system in concentration which would constitute a nuisance or be aesthetically objectionable, such as air, steam, food, or other material which does not constitute a health hazard.



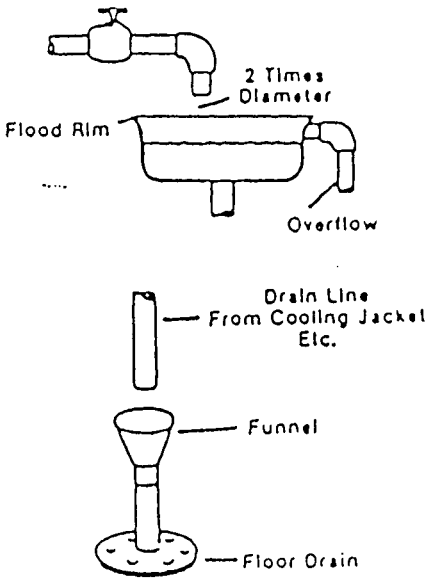
5 REDUCED PRESSURE ZONE DEVICES

Reduced Pressure Zone Devices may be used on all direct connections which may be subject to back-pressure or back-siphonage, and where there is the possibility of contamination by the material that does constitute a potential health hazard.



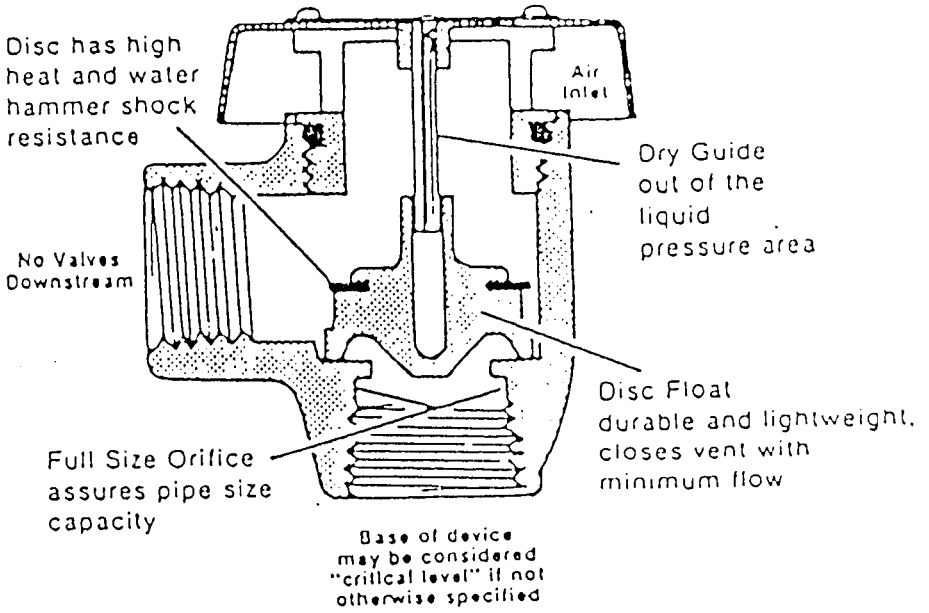
AG — Approved Air-gap

- good for toxic and non-toxic substances
- good against backpressure and backsiphonage
- a distance of 2-times the diameter of supply pipe, never less than a 1" gap
- best protection against backflow provided it is installed properly and not circumvented
- ANSI Standard No. A112.1.2



AVB — Approved Atmospheric Vacuum Breaker

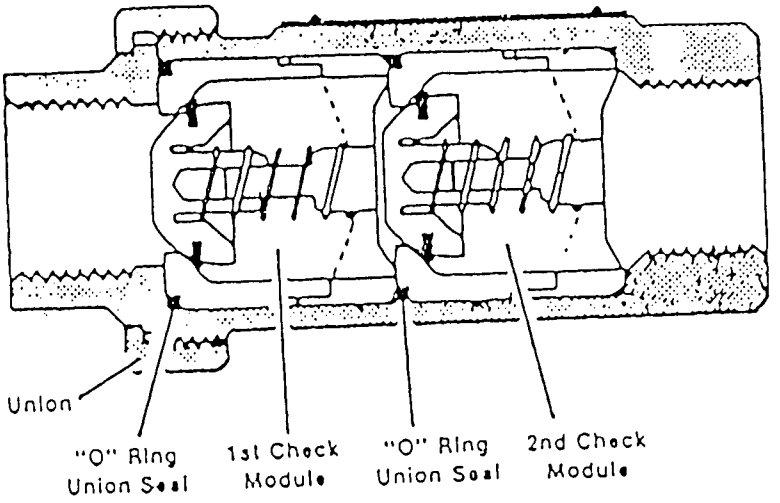
- good for most toxic and all non-toxic substances
- good for backsiphonage ONLY
- no control valves on discharge side of device
- minimum of 6" between base of device and highest outlet
- no more than 12 hours continuous service in a day
- sizes available: ¼" - 3
- ASSE Standard No. 1001



Dual Check Valves

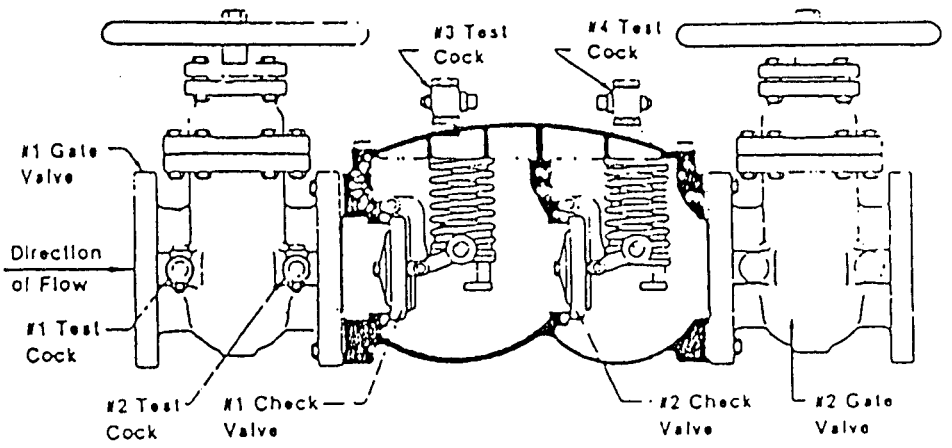
• ASSE Standard No. 1024 suited particularly for installations immediately downstream from residential water meters where potential pollutants from residences could enter the water mains.

(APPROVED FOR RESIDENTIAL USE ONLY)



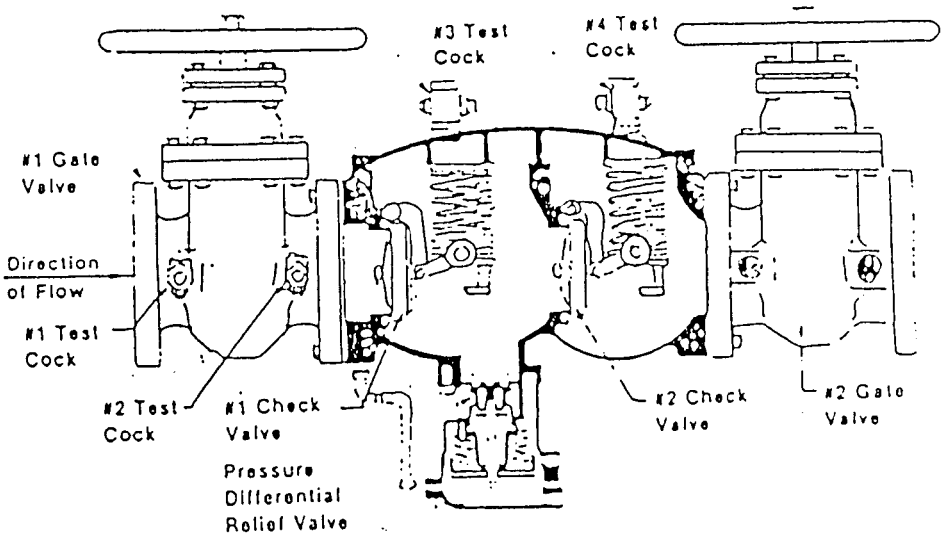
DCVA — Approved Double Check Valve Assembly

- good for non-toxic substances such as steam, air, food, beverages
- good against backsiphonage and backpressure
- installed minimum of 12" above ground or flood level
- must be tested annually
- sizes available: ¾" - 10"
- ASSE Standard No. 1015 or AWWA Standard C506-78



RP — Approved Reduced Pressure Principle Backflow Preventer

- good for toxic and non-toxic substances
- good against backsiphonage and backpressure
- installed minimum of 12" above ground or flood level
- must be tested annually
- sizes available: ¾" - 10"
- ASSE Standard No. 1013 or AWWA Standard C506-78

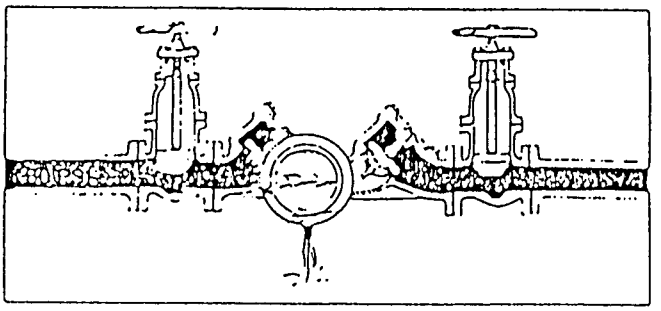


6.7 Typical Backflow Prevention Device Installations (Illustrated)

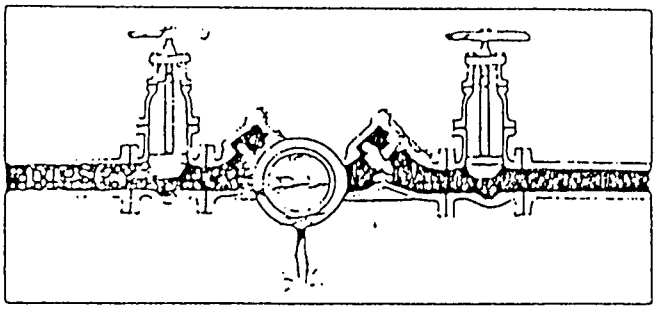
The following are illustrations of typical backflow device installations.

How Backflow Prevention Devices Work

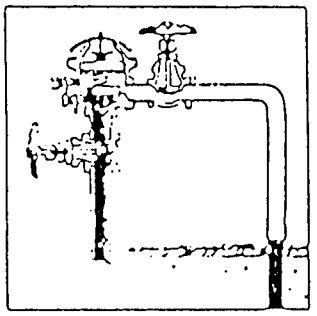
This figure shows an RP device during a back-siphonage condition. If you will notice both checks are closed tight and the pressure differential relief valve is discharging to atmosphere This is due to the fact that the relief valve is designed to maintain a lower pressure in the zone between the two check valves than the supply pressure



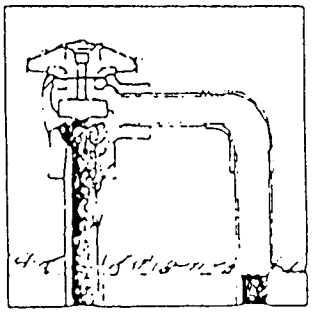
In this figure of an RP device, there is a backpressure condition. The second check is fouled with a piece of pipe scale which permits the higher pressure to flow back into the zone. Here the relief valve discharges the water to atmosphere maintaining the pressure in the zone lower than the supply pressure



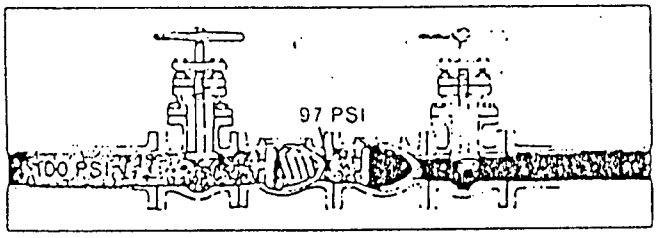
In this view of a pressure vacuum breaker, a back-siphonage condition has caused the check to close against its seat and the air-inlet has opened so that the pressure in the body of the device is atmospheric If the check was fouled by some foreign material, only air would be pulled back into the domestic supply system instead of the non-potable water downstream of the device



In this picture of an atmospheric vacuum breaker, a backsiphonage condition exists This condition has caused the check-float to drop away from the air-inlet and seal on the check seat, which prevents the non-potable water from being backsiphoned. If the check-float did not seat properly, again only air would be sucked back into the domestic water system.



In this view of a double check valve, there is backpressure from a source downstream which has caused the second check to close tightly against this reverse pressure. The first check has closed tightly by itself, thus giving two barriers against the backflow condition

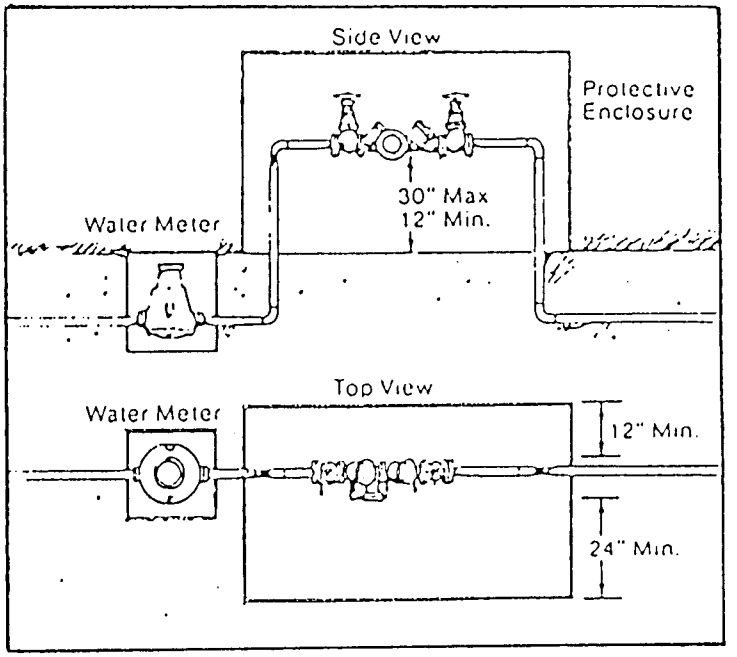


The selection of the proper type of device is important. Depending upon the fluid that can backflow, whether it is toxic or non-toxic; and whether there can be backpressure or backsiphonage; it will govern the type of device selected. The following chart will help you to decide what type of device to use.

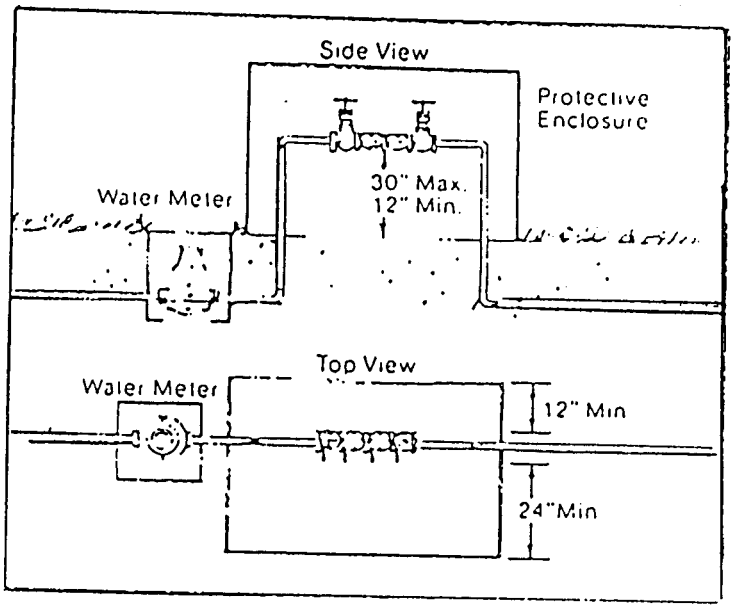
		RP	DC	PVB	AVB
Backpressure	Toxic	X			
	Non-toxic	X	X		
Backsiphonage	Toxic	X		X	
	Non-toxic	X	X	X	X

Having a device on the connection is not enough, the device MUST be installed correctly. The following details and illustrations will help you in the proper installation of the devices.

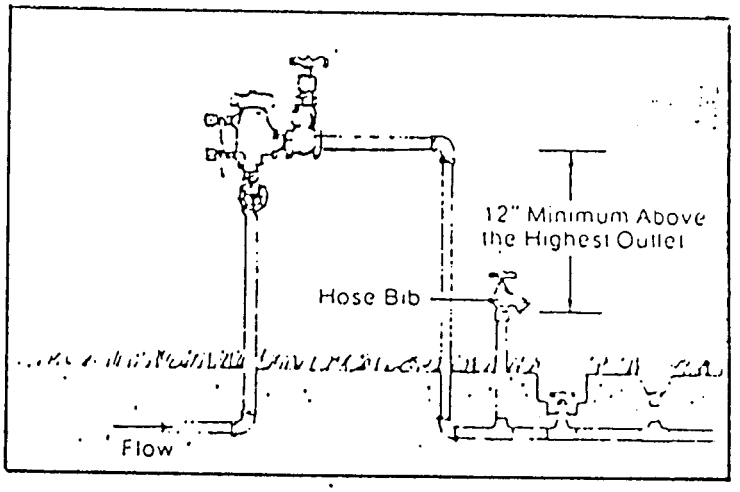
Reduced Pressure Device
In these figures, the RP device is shown on the service connection. The RP can also be used for internal protection. The minimum clearance of 12" above the floor or grade is to ensure an air gap between the relief valve and any water that might puddle beneath the device. The maximum height is so that the device will be easy to work on during testing and maintenance. If the device is in a protective enclosure or mounted against a wall, the minimum distances are so that the device can be tested and maintained.



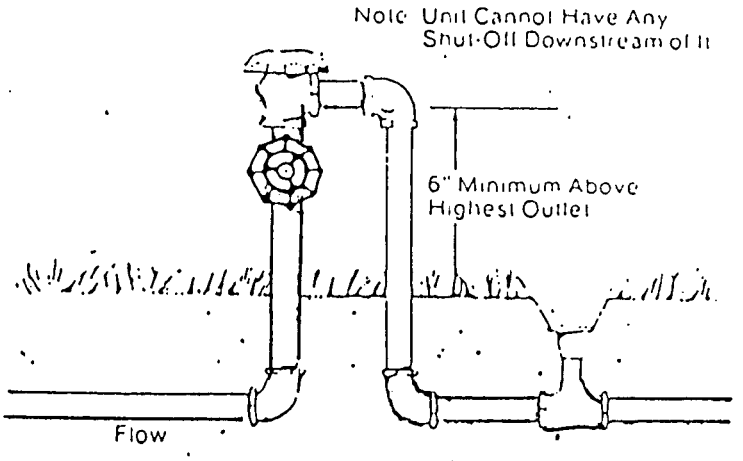
Double Check Valve
In these figures, the double check valve is shown on the service connection, it can also be used for internal protection as well. The minimum and the maximum distances are the same as they are for the RP device.



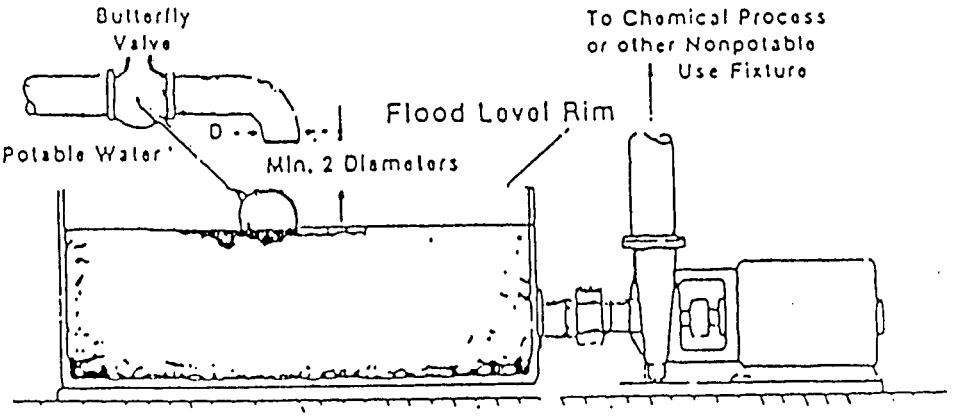
Pressure Vacuum Breaker
The pressure vacuum breaker cannot be installed where there can be backpressure, only where there can be backsiphonage. The pressure vacuum breaker can have shut-off valves downstream of the device. The PVB must be installed at least 12" above the highest outlet or, if it is feeding an open tank, at least 12" above the highest overflow rim of the tank. The following figure shows a typical installation on a sprinkler system



Atmospheric Vacuum Breaker
Just as the pressure vacuum breaker, the atmospheric vacuum breaker cannot be installed where there can be backpressure, only where there can be backsiphonage. The atmospheric vacuum breaker cannot have any shut-off valves downstream of it. It also must be installed at least 6" above the highest outlet or the topmost overflow rim of a non-pressure tank. The following illustration shows the AVB on a sprinkler system

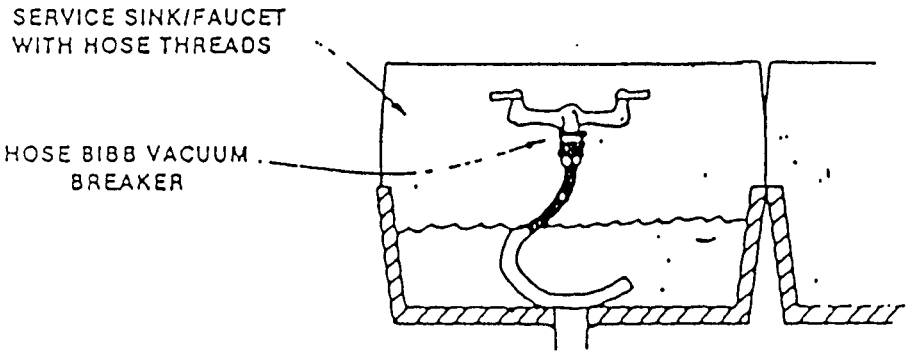


Airgap Separation

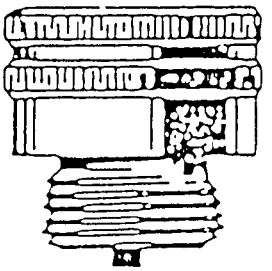


Surge tank and booster pump.

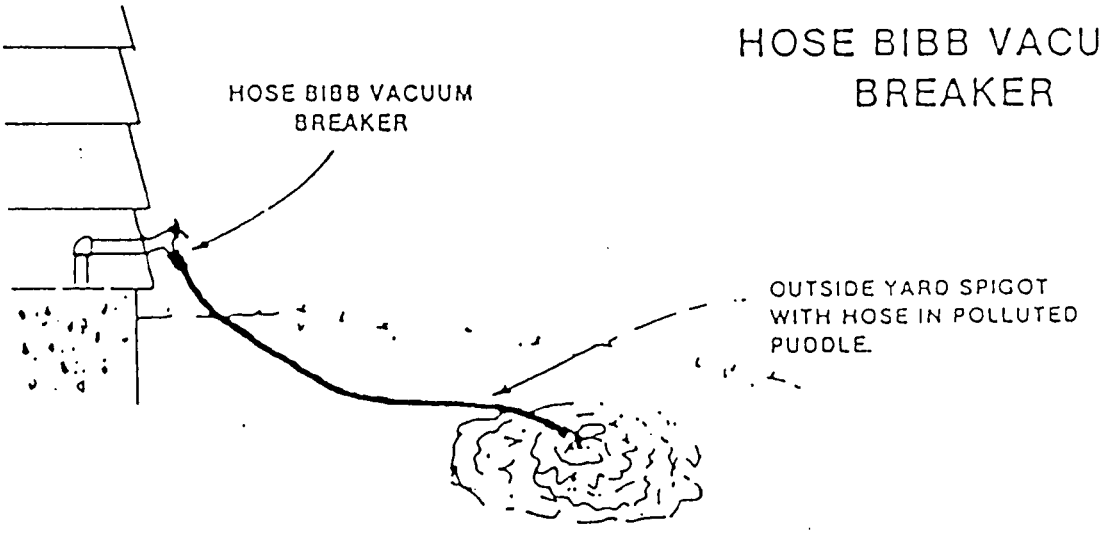
HOSE BIBB VACUUM BREAKER



TYPICAL INSTALLATION ON SERVICE SINKS, LAUNDRY TUBS, DEVELOPING TANKS AND WASHING MACHINES.



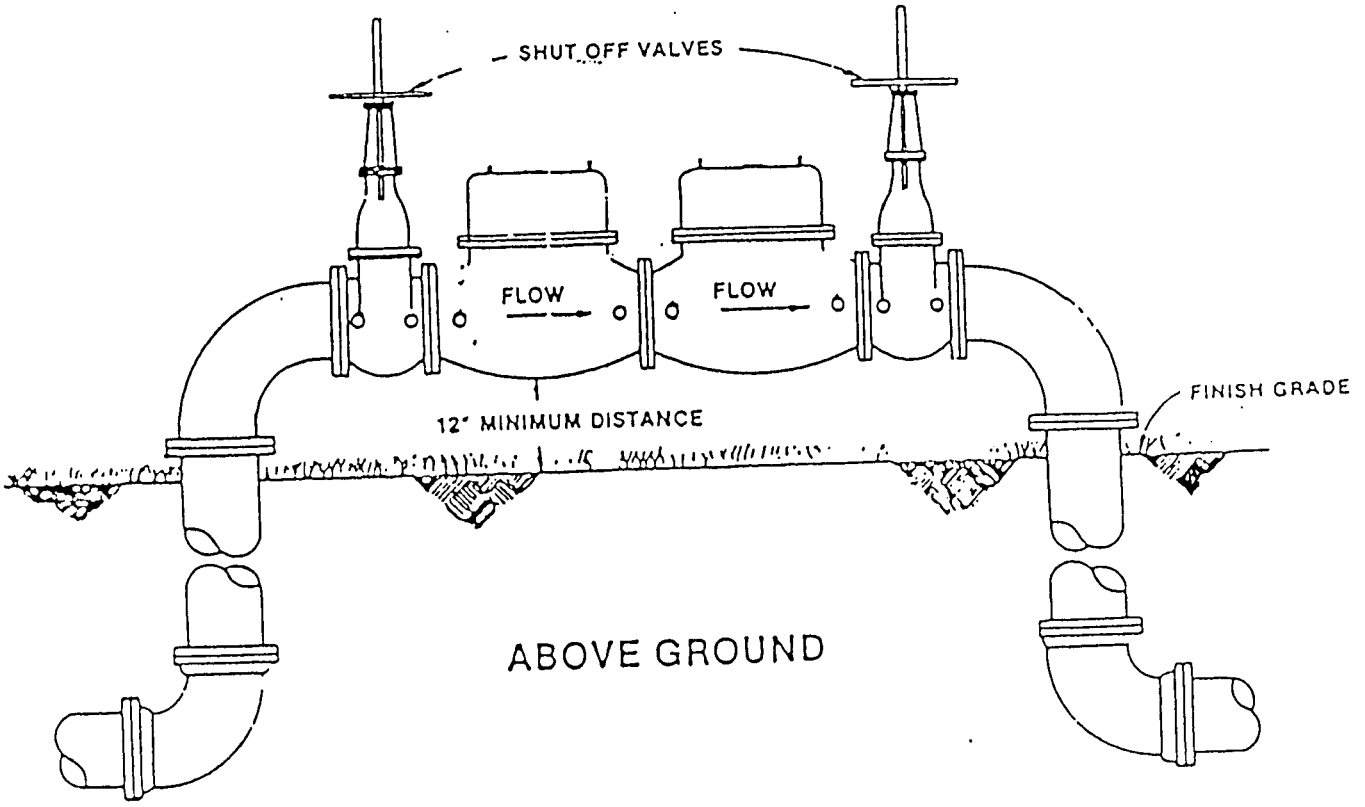
HOSE BIBB VACUUM BREAKER



TYPICAL INSTALLATION ON SILL COCKS, HOSE BIBBS, YARD HYDRANTS, SWIMMING POOLS, WASH RACKS AND OTHER FAUCETS WITH GARDEN HOSES.

DOUBLE CHECK VALVE ASSEMBLY

TYPICAL INSTALLATION



7. Testing of Backflow Preventers

It shall be the duty of the customer-user at any premises where reduced pressure backflow prevention devices (RP), double check valve assemblies (DCVA), and pressure vacuum breakers (PVB) are installed to have thorough inspections and operational tests made at least once a year or more often in those instances where inspections indicate a need. These inspections and tests shall be at the expense of the water user and be performed by the device manufacturer's representative, or by a certified device technician. The water purveyor will notify the customer or user when tests are required and supply the necessary test forms and instructions.

8. Penalties for Non-Compliance

8.1 Termination of Service - A written notification detailing all 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 corrections must 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 defect(s) corrected by the specified time the water purveyor shall cause the water service to the building or premises to be terminated. The water purveyor shall cause discontinuance of water service if a required backflow prevention device has been bypassed or failed to be tested or properly maintained as required by this policy statement. The water purveyor shall also discontinue water service if an air gap separation system is compromised.

8.2 Monetary Penalties - Violations of any provisions concerning cross-connections within the Authority Cross-Connection and Backflow Prevention Policy shall be punished as a Fauquier County Class 3 Misdemeanor. Under this Policy each day any violation shall continue shall constitute a separate offense.

9. References

The following references provide additional details regarding backflow regulatory requirements and compliance measures.

A. "Safe Drinking Water Act", Public Law 93-523, December 16, 1974.

B. "Cross-Connection Control Manual", U.S. Environmental Protection Agency, Washington, D.C., 1973

C. "Waterworks Regulations", Commonwealth of Virginia/State Board of Health, February 1, 1982.

D. "Section P-1505.0 Protection of Potable Water Supply", The BOCA Basic/National Plumbing Code, 1984.