APPENDIX V

CROSS-CONNECTION CONTROL PROGRAM

Chapter 18.13 - System Cross Connections

Sections:

18.13.010 Purpose

It is the purpose of this section to provide enforcement authority and to establish local regulating standards in accordance with state regulations in order to protect the City's water supply from contamination or pollution from unprotected service connections. (Ord. 4-88: Ord. 32-07).

18.13.020 Established Criteria for Control and Elimination of Cross Connections

The control or elimination of cross connections shall be governed by Washington Administrative Code 248-54-285 as it now exists or as it may hereafter be amended. The policies, procedures and other criteria for determining appropriate levels of protection shall be in accordance with the "Accepted Procedure and Practice in Cross Connection Control Manual", Pacific Northwest Section, American Water Work Association Sixth Edition or any superceding edition. (Ord. 4-88: Ord. 06-04).

18.13.030 Program Administration

The cross connection control program will be administered by the Public Works Department. The director shall be known as the water purveyor as per the state regulations, and together with the water division supervisors, will delegate responsibility for the organization and implementation of this program. As water purveyor, the director reserves the right to deny service or discontinue the supply of water to any consumer not in compliance with this and all other applicable regulations pertaining to public water systems. (Ord. 4-88: Ord. 06-04).

18.13.040 Conditions Requiring Installation of Backflow Prevention Assemblies

A premise isolation backflow assembly will be installed in all new commercial and/or industrial buildings and in existing buildings where:

A. There is auxiliary water supply on the premises which is of unacceptable or unknown quality and it is or can be connected to the potable water piping on the premises.
B. There is piping on the premises for conveying liquids other than potable water, and where that piping is under pressure and is installed and operated in a manner which could permit the entry of other liquids or substances into the potable water piping on the premises.
C. There are internal cross connections that cannot be eliminated.
D. There are intricate plumbing arrangements on the premises which make it impractical to ascertain whether or not cross connections exist.
E. There is reason to believe that there are cross connections on the premises but the water user does not permit an inspection to be made.
F. There is possibility of backflow from contained quantities of potable water that are subject to contamination from controlled or uncontrolled sources.

A backflow assembly will be installed on residential properties as required to comply with this chapter, the Washington Administrative Code and the Uniform Plumbing Code.

The type of backflow prevention assemblies required shall be commensurate with the degree of hazard and shall be a model included on the state's Department of Health list of approved assemblies or as approved assemblies. The water purveyor shall be the sole judge in determining the level of protection required under the following general guidelines:

A. An approved air gap or an approved reduced pressure principle backflow assembly (RP) shall be installed where the substance that could backflow is hazardous to health.

B. An approved double check valve assembly shall be installed where the substance which could backflow is of objectionable content but is not or does not pose an unreasonable risk to health.
C. An acceptable type vacuum breaker shall be installed in a low risk condition only. (Ord. 4-88: Ord. 06-04: Ord. 32-07).

18.13.050 Inspection and Testing
Authorized employees of the Public Works Department with proper identification shall be granted access, at reasonable hours of the day, to all parts of a premise or within buildings to which water is supplied for the purpose of inspection. These authorized employees shall identify the premises where the potential for backflow is present, shall evaluate the conditions at those premises, and when appropriate, shall require the installation of premise isolation backflow prevention assemblies. All assemblies shall be installed in accordance with regulations and standards acceptable to the Public Works Department.

The water user or owner of the premises, where one or more backflow assemblies have been installed to protect the public water system, shall have the assembly or assemblies tested at least once a year and any necessary corrective action taken. Where there are repeated failures, the testing shall be undertaken more frequently than once a year under the direction of the Public Works Department. Assemblies shall be tested immediately after installation, repair, or relocation. The test shall be performed by a state certified tester, recognized by the water purveyor, and a copy of the test results forwarded to the purveyor.

Any installation, corrective measure, testing or disconnection fees shall be the sole expense of the owner. (Ord. 4-88: Ord. 06-04: Ord. 32-07).

18.13.060 Civil Penalties
Any person who violates an order of the City, or who fails to comply with (a) any provision of this ordinance, or (b) any regulation, rule, or permit of the City, issued pursuant to this ordinance, shall be liable to the City for civil penalty. The amount of such civil penalty shall not be less than $250 per violation or not more than $1,000 per violation. Each day upon which a violation occurs or continues shall constitute a separate violation. Such penalties may be recovered by judicial actions and/or, to the extent permissible by state law, by administrative procedures. (Ord. 4-88: Ord. 06-04: Ord. 06-08).

18.13.070 Recovery of Costs Incurred by the City
Any water customer violating any of the provisions of this ordinance, who causes damage to or impairs the City's water system, shall be liable to the City for any expense, loss, or damage caused by such violation. The City shall by order bill the violator for the cost incurred by the City for any cleaning, repair, or replacement work caused by the violation. Refusal to pay the assessed costs shall constitute a violation of this ordinance, enforceable under Section 18.13.030 (Program Administration). (Ord. 4-88).

18.13.080 Falsifying Information
Any person who knowingly makes any false statement, representation, or certification in any application, record, report, and plan or other document filed or required to be maintained pursuant to this ordinance, or who falsifies, tampers with, or knowingly renders inaccurate any testing device or method required under this ordinance, shall (in addition to civil and/or criminal penalties provided by state law) be guilty of a misdemeanor subject to the general penalty clause of the Richland Municipal Code. (Ord 4-88).

CITY OF RICHLAND

CROSS CONNECTION CONTROL PROGRAM

NOVEMBER 2007

City of Richland Cross Connection Control Program

Table of contents

City of Richland Cross Connection Control Program

Policy and Program Description – November 2007

Note: **Bold** text references WAC 246-290-490. *City program elements are italicized.*

1. PURPOSE

To establish minimum program elements for implementation of a Cross Connection Control Program within the City of Richland water system service area meeting the intent of Washington Administrative Code (WAC) Cross Connection Control Provisions.

2. POLICY

The City's Cross Connection Control Program shall protect the public water system from contamination via cross connections.

3. PROGRAM DESCRIPTION

PUBLIC WATER SYSTEM

The City's responsibility for cross connection control shall begin at the water supply source, include all public water treatment, storage, and distribution facilities, and end at the point of delivery to the consumer's water system. The point of delivery is defined in the Richland Municipal Code and is typically the downstream side of the customer's water meter.

CONSUMER'S WATER SYSTEM

The City shall not be responsible for eliminating or controlling cross connections within the consumer's water system. Under Chapter 19.27 RCW, the responsibility for cross connection control within the consumer's water system, i.e., downstream of the customer's water meter, falls under the jurisdiction of the Local Administrative Authority. (LAA). The Local Administrative Authority for properties within the City limits is the City's Building Official.

<u>PROGRAM</u>

The City of Richland Cross Connection Control Program is a premise isolation program. All new commercial and/or industrial service connections will be premise isolated at the point of delivery as close to the service connection as practical. Any inside location will require a variance from the City and an annual facility inspection.

The City of Richland bases its authority, policy, and corrective actions on the ordinances relating to cross connection control as outlined in Element 1 below. At least one full time City of Richland Public Works staff is certified as a Cross Connection Specialist I (CCS I). Details are found in Element 4.

Evaluations are made of all new service connections by reviewing water service applications. On-site inspections of residential service connections are not normally conducted unless cross-connections are found as set forth in Elements 2 and 3 below, or are identified during plan review. Existing commercial / industrial service connections installed prior to November 1, 2007 that are not premise isolated are site surveyed according to priority with the highest degree of hazard set to the highest priority. Periodic evaluations are conducted at facilities with the highest degree of hazard and/or at those facilities where plumbing changes have been made, or have a high potential for changes. The City's Public Works Department will determine appropriate backflow prevention measures to protect the City of Richland Water Distribution System. The City's Building Department ensures compliance with Uniform Plumbing Code and State Regulations for all in-premise backflow prevention.

Whenever cross connections cannot be eliminated, the City Public Works Representative informs the customer verbally and in writing about the City's backflow prevention requirements according to the degree of hazard as found in Elements 2, 3, and 10.

Inspections are made to ensure proper installation of the appropriate backflow prevention assembly(s) (BFAs) or air gap(s) (A/Gs). Testing and maintenance of City of Richland owned BFAs are performed by the City of Richland. BFAs owned by City of Richland customers are the responsibility of the customer and must be tested by private BATs. Such tests and maintenance are to be performed as outlined in Element 5 below. Assurance of proper testing is detailed in Element 6 below.

Master records are kept of all service connections and vehicles requiring backflow prevention. All information pertaining to the backflow prevention methods used at any given site must be documented and stored in the master record file. Backflow device testing and inspection histories for all backflow devices must be maintained in the master record file. Annual summary reports are submitted to the Washington State Department of Health (DOH). Details are found in Element 9 below.

All backflow incidents shall be reported to the Public Works Director, Washington State Department of Health (DOH), and the Benton-Franklin Health District. Incident reports are recorded with copies sent to DOH. Details are found in Elements 7 and 9.

The City's Public Works Department conducts public education about backflow prevention by producing and distributing pamphlets which address this issue. These pamphlets are distributed to target audiences as selected by City staff. Further details are found in Element 8 below.

4. PROGRAM ELEMENTS

4.1 Element 1: Local Authority

The City shall adopt a local ordinance, resolution, code, bylaw, or other written legal instrument that:

(i) Establishes the City's legal authority to implement a Cross Connection Control Program:

(i) Describes the operating policies and technical provisions of the City's Cross Connection Control Program; and

(ii) Describes the corrective actions used to ensure that consumers comply with the City's Cross Connections Control requirements.

City of Richland Cross Connection Control Ordinances are to be found in the City of Richland Municipal Code, Section 18.13.

4.2 Element 2: Service Evaluation

The City shall develop and implement procedures and schedules for evaluating new and existing service connections to assess the degree of hazard posed by the consumer's premises to the City's distribution system and notifying the consumer within a reasonable timeframe of the hazard evaluation results. At a minimum, the programs shall meet the following:

(i) For new connections made on or after the effective date of these regulations, procedures shall ensure that an initial evaluation is conducted before service is provided:

A City Public Works Representative will review all permit pre-application documents, new construction plans, all water service applications, and requests for water/sewer estimates. Consultations prior to service installation will be conducted to help the customer meet State Regulations and the City of Richland Cross Connection Control Ordinance in order to minimize retrofits and revisions.

NOTE: Water service will not be provided to new construction until the cross connection control requirements are addressed satisfactorily. Backflow assembly test reports must be submitted to the City for any new assembly installation before water service is provided and test reports must be submitted annually thereafter.

(ii) For existing connections made prior to the effective date of these regulations, procedures shall ensure that an initial evaluation is conducted in accordance with a schedule acceptable to the department; and

A City Public Works Representative will survey the premise to determine whether the requirement for cross connection control exists.

Facilities not found in Table 9 (WAC 246-290-490) will be evaluated for appropriate premise or in-premise protection based upon potential or actual cross connections(s) found. If the need for in-premise protection is identified premise isolation will be required. The City Public Works Representative will coordinate with the LAA regarding in-premise protection.

(iii) For all service connections, once an initial evaluation has been conducted, procedures shall ensure that periodic reevaluations are conducted in accordance with a schedule acceptable to the department and whenever there is a change in the use of the premises.

The minimum criteria required for backflow prevention as stated below is used during the above mentioned evaluations.

Facilities found in Table 9 (WAC 246-290-490) must have an Air Gap (A/G) or a Reduced Pressure Backflow Assembly (RPBA), unless there is no immediate potential for a cross connection. In such case, documentation must be provided as to why the facility does not need backflow prevention and an exception will be granted. Such a facility will be kept on file for future inspections.

Facilities with fire services and complex piping must comply with the principles found in (WAC 246-290-490). Facilities not identified above are evaluated according to the guidelines set forth in the following manual.

The current edition of the manual, Accepted Procedure and Practice in Cross Connection Control, prepared by the Cross Connection Control Committee of the Pacific Northwest Section, American Water Works Association, shall be used as a guideline.

4.3 Element 3: Backflow Prevention Procedures

The City shall develop and implement procedures and schedules for ensuring that:

(i) Cross Connections are eliminated whenever possible;

(ii) When cross connections cannot be eliminated, they are controlled by installation of approved backflow preventers commensurate with the degree of hazard.

Selection of the type of backflow assembly for a cross connection is found in Table 8 (WAC 246-290-490).

The Criteria detailed in Element 2 are used to determine appropriate backflow prevention.

(iii) Approved backflow preventers will be selected and installed in accordance with the following requirements.

WAC 246-290-490 Subsection (6) is used as the basis for approved backflow preventers and installation procedures.

The Accepted Procedure and Practice in Cross Connection Control, Current Edition prepared by the Cross Connection Control Committee of the Pacific Northwest Section, American Water Works Association, shall be used as a guideline.

The current edition of the City of Richland's construction Specifications and Standard Detail.

4.4 Element 4: Cross Connection Specialist Requirement

The City shall ensure that personnel, including at least one person certified as a CCS, are provided to develop and implement the Cross Connection Control Program.

The City's Public Works has dedicated one full time equivalent position to implement the City of Richland Cross Connection Control Program. This employee, titled Water Quality Coordinator, is required to posses a current Washington State Department of Health Certificate of Competency as a Cross Connection Specialist I (CCS-I).

4.5 Element 5: Backflow Assembly Testing/Inspection

The City shall develop and implement procedures to ensure that approved backflow preventers are inspected and/or tested (as applicable) in accordance with Subsection (7) of this section.

WAC 246-290-490 Subsection (7) is used for the basis of ensuring that all A/Gs and BFAs are inspected or tested accordingly.

City of Richland water customers are responsible for testing of their own BFAs and must hire private BATs at their own expense. The City Cross Connection Specialist mails test notices after initial installation of the backflow prevention device and annually thereafter to remind customers of their responsibility to test and maintain their own BFAs.

The City tests and maintains City of Richland owned BFAs and A/Gs on vehicles withdrawing water from City of Richland fire hydrants.

4.6 Element 6: Backflow Assembly QA Program

The City shall develop and implement a Backflow Prevention Assembly Testing Quality Assurance Program including, but not limited to, documentation of tester certification and test kit calibration, test report contents, and timeframes for submitting completed test reports.

WAC 246-290-490 Subsection (7) is used for the basis of ensuring performance of all tests done.

The City Cross Connection Specialist ensures that all BATs providing test reports to the City are appropriately licensed. The City Cross Connection Specialist also ensures that all test reports contain the required information, such as test kit calibration dates, line pressure readings, and the presence of a pressure regulating valve upstream of the backflow preventer. A copy of the City's test report, which is to be used by all BATs submitting reports to the City, is provided as Attachment 1.

4.7 Element 7: Backflow Incident Response

The City shall develop and implement (when appropriate) procedures for responding to backflow incidents.

The City's Public Works Water Division will respond to a backflow incident. Upon discovery of a backflow incident the following procedures are followed:

1) *The Cross Connection Specialist shall organize an on-site inspection to determine the extent and degree of the incident. A Water Quality Complaint Form (see Attachment 2) is completed by the City personnel performing the inspection, with any substandard conditions or deficiencies noted.*
2) *Notice is made to the facility owner as to the finding of the inspection. Where health hazards are found to exist or the potential of a health hazard is found, immediate verbal notification and instruction for abatement of the health hazard shall be followed up with a certified letter (signed by The City of Richland Director of Public Works) to the property owner.*
3) *If the property owner fails to take immediate action to isolate the cross connection upon verbal notification from the Cross Connection Control Specialist, City staff may take actions, up to including discontinuing water service to the customer, until the hazard is abated or protected by an approved device.*
4) *The Benton-Franklin Health District and Washington State Department of Health shall be notified of the situation as soon as the inspection is complete.*
5) *Inspections revealing cross connections of a non-health hazard nature shall be cause for notification in writing to the property owner by certified mail to abate the cross connection within 60 days of the date of notification. Failure by the property owner to abate the cross connection or provide required protection within the prescribed time frame may be cause for discontinuance of water service. Re-inspection upon notification by the property owner that cross connection(s) has been eliminated or protected shall be made within 10 days.*

4.8 Element 8: Public Education

The City shall include information on cross connection control in the City's existing program for educating consumers about water system operation. Such a program may include periodic bill inserts, public service announcements, pamphlet distribution, and notification of new consumers and consumer confidence reports.

The City's Public Works Department has a program that distributes consumer confidence reports and educational materials regarding water quality and cross

connection control. Examples of the educational materials are provided as Attachment 3.

4.9 Element 9: Records/Reports

The City shall develop and maintain cross connection control records including, but not limited to, the following:

(i) A master list of service connections and/or consumer's premises where the City relies upon approved backflow preventers to protect the public water system from contamination, the assessed hazard level of each, and the required backflow preventer(s).

The City's Water Quality Coordinator maintains paper files and an extensive electronic database of service connections where backflow preventers are required.

Such records are kept as long as the premises pose a cross connection hazard to the City's distribution system. Facilities that are on Table 9 of (WAC 246-290-490 pp. 103-104) but have no cross connections at present are also kept in the master list files documenting why backflow prevention is waived at present.

The City's electronic database system also contains a tracking feature which allows the Water Quality Coordinator to easily identify which service connections are due for backflow assembly testing.

(ii) Inventory information on:

(A) Approved air gaps installed in lieu of approved assemblies including exact air gap location, assessed degree of hazard, installation date, history of inspections, inspection results, and person conducting inspections;

(B) Approved backflow assemblies including exact assembly location, assembly description (type, manufacturer, model, size, and serial number), assessed degree of hazard, installation date, history of inspections, tests and repairs, test results, and person performing tests; and

(C) Approved PVB's used for irrigation system applications including location, description (manufacturer, model, and size), installation date, history of inspection(s), and person performing inspection(s).

The City of Richland maintains records or data in paper and electronic format. The Water Quality Coordinator will complete the Cross Connection Control Program Summary Report annually on report forms available from the DOH. The City of Richland will make all records and reports required in WAC 246-290-490 Subsection (8) of this section available to the DOH or its representative upon request. The format of the data stored in the electronic database is such that development of the required summary reports will be easily made.

(iii) Cross Connection Program Summary Reports and Backflow Incident Reports required under Subsection (8) of this section.

City of Richland Water Manager will notify the DOH, local administrative authority, and local health jurisdiction as soon as possible, but no later than the end of the next business day, when a backflow incident is known to have contaminated the public water system or occurred within the premises of a consumer served by the City.

City staff shall document all backflow incidents on a form acceptable to the DOH (see Attachment 2), and include all backflow incident report(s) in the annual Cross Connection Program Summary Report referenced in WAC 246-290-490 Subsection (8) pp. 109, unless otherwise requested by DOH.

4.10 Element 10: Reclaimed Water Requirements

Cities who distribute and/or have facilities that receive reclaimed water within their water service area shall meet any additional cross connection control requirements imposed by the department under a permit issued in accordance with Chapter 90.46 RCW.

Any facility that uses reclaimed water and which is also supplied by the City of Richland water supply, shall have an A/G or RPBA protecting the City's water distribution from that premise. As of this writing there are no facilities in the City of Richland using reclaimed water, other than the City's Wastewater Treatment Plant, whose non-potable water supply is separate and not connected to the City's potable water supply.

5. ORGANIZATIONS AFFECTED

City of Richland (The City)

City of Richland Public Works Department (COR Public Works)

City of Richland Building Department (COR Building Department)

Benton-Franklin Health District

All permanent or temporary (e.g., hydrant users) direct service water customers of COR Public Works which require backflow protection.

6. REFERENCES

City of Richland Cross Connection Control Ordinance, Municipal Code Section 18.13.

1977 Uniform Plumbing Code.

WAC 246-290-490, Cross Connection Control

Accepted Procedure and Practice in Cross Connection Control Manual, Sixth Edition.
Prepared by the Cross Connection Control Committee of the Pacific Northwest Section, American Water Works Association.

Cross Connection Control Program Administration First Edition, January 1998, Chapter 14. Cross Connection Control Committee-Pacific Northwest Section-American Water Works Association.

7. CROSS CONNECTION RELATED DEFINITIONS

Approved Backflow Prevention Assemblies: Specifically Reduced Pressure Backflow Assemblies (RPBA), Double Check Valve Assemblies (DCVA), Pressure Vacuum Breaker Assemblies (PVBA), Reduced Pressure Detector Backflow Assemblies (RPDBA) and Double Check Detector Backflow Assemblies (DCDBA). This applies to assemblies that, at the time of original installation, were approved by the State, appeared on their published approval list current at that time, and were approved for use in the Department's direct service area. (See the definitions and descriptions provided in the Manuel of Accepted Procedure and Practice in Cross Connection Control – PNWS, AWWA).

Backflow: The flow of any foreign liquids, gases or other substances from any source, back into the potable water supply within a facility and/or public water supply. Backflow may occur due to either back-siphonage or back-pressure.

Back-pressure: Backflow caused by positive pressure (above the supply pressure) in the piping system downstream of the supply piping connection to its service source.

Back-siphonage: Backflow caused by a negative pressure (vacuum) or reduced pressure in the supply piping.

City: City of Richland

Contamination: Any impairment of the quality of the water from any substance which may adversely affect the health of the consumer.

Controlled Cross Connection: A connection between the City of Richland's water system and any non-potable water system with an approved air gap separation or an approved backflow prevention assembly properly installed and maintained so that it will continuously afford the protection commensurate with the degree of hazard.

COR Public Works: City of Richland Public Works Department.

COR Building Department: City of Richland Building Department.

Cross Connection: Any physical arrangement whereby a public water supply is connected, or has the potential for being connected, directly or indirectly, with

anything that does not exclusively contain or convey potable water from a Washington State Department of Health-approved source.

Cross Connection Screen Inspection: An inspection of a direct service customer's premises, performed by COR Public Works, expressly for purposes of evaluating and locating cross connection potential inherent in supplying that customer's water system.

Cross Connection Compliance Inspection: A follow-up inspection of a direct service customer's premises performed by COR Public Works, to monitor the customer's activities toward achieving compliance subsequent to the cross connection screen inspection and any orders or recommendations concerning compliance.

Cross Connection Update Inspection: An inspection of a direct service customer's premises performed by COR Public Works for the continued evaluation and locating cross connection potential.

Degree of Hazard: The degree of hazard is derived from an evaluation of the potential risk to public health and the adverse effect of the hazard upon the potable water system. Hazards may include:

- *Health Hazard: Any condition, device, or practice in the water supply system and its operation which could create, or in the judgment of COR Public Works may create a danger to the health and well-being of the water customer.*
- *System Hazard: An actual or potential threat to the physical properties of, or to the potability of water in the City's water system or the customer's potable water system, which would constitute a nuisance or be aesthetically objectionable or could cause damage to the system or its appurtenances, but would not be dangerous to health.*

Direct Service Water Customer (or Water Customer): Those customers receiving water through a connection installed by COR Public Works for end uses directly from the City water distribution system and classed as direct service or retail for billing purposes.

Maximum Contaminant Level (MCL): The maximum amount of a contaminant allowed in a sample of water according to federal and state regulations. The importance of this to cross connection control is that the presence of a higher level than at the source may signify the occurrence of a cross connection incident.

Pollution: Any impairment of the quality of the water which may adversely affect the aesthetic characteristics of the water.

Potable Water Supply: Any water supply system intended or used for human consumption or other domestic uses and which must meet Washington State Department of Health Public Water System Rules and Regulations.

State: Washington State Department of Health, Water Supply Section

Temporary Usage Connections: Any vehicle to which a tank or container is affixed for containing water and/or chemicals or material, or any temporary use of water for construction, cooling, testing, or other non-domestic purposes, which are capable of imparting contamination or pollution to the public water supply through a cross connection between such points of usage and the water supply via a fire hydrant or other temporary connection.

Water Service Connection: The terminal end of a service connection from the City water system (i.e., where the City loses jurisdiction and sanitary control over the water at its point of delivery to the customer's water system). Service connection shall also include water service connections from a fire hydrant and all other temporary or emergency water service connections from the public potable water system.

Water System: For the purpose of this policy and procedure, the water system is considered to be made up of two parts: the City's system and the customer's system. The City's system shall consist of the source facilities and the distribution system; and shall include all those facilities of the water system under the complete control of the City up to the point where the customer's system begins. The customer's system shall include those parts of the facilities beyond the termination of COR Public Works distribution system which are utilized in conveying City delivered water to points of use.

CITY OF RICHLAND
P.O. BOX 190 MS-15
RICHLAND, WA 99352
Phone: 509 942-7474 Fax: 509 942-5660

Backflow Prevention Assembly Test Report

Name of Premises:	
Service Address:	
Assembly Location:	
Cross Connection/ Hazard:	
Manufacturer:	**Model:**
Size:	**Serial #** **Line Pressure:**

Reduced Pressure Principle Assembly

Double Check Valve Assembly

RP ☐ DCDA ☐
DC ☐ RPDA ☐
PVB ☐ Air Gap ☐
SVB ☐ AVB ☐

	Check Valve #1	Check Valve #2	Relief Valve	PVB/SVB
Initial Test	Leaked ☐ Closed Tight ☐ Held at_____PSID	Leaked ☐ Closed Tight ☐ Held at_____PSID	Did not Open ☐ Opened at_____PSID	AIR INLET Did not Open ☐ Opened at_____PSID
Repairs Details	Cleaned ☐ Replaced ☐	Cleaned ☐ Replaced ☐	Cleaned ☐ Replaced ☐	CHECK VALVE Leaked ☐ Held at_____PSID Cleaned ☐ Replaced ☐
Final Test	Closed Tight ☐ Held at_____PSID	Closed Tight ☐ Held at_____PSID	Opened at_____PSID	AIR INLET Opened at_____PSID CHECK VALVE Held at_____PSID

Comments

Line Pressure _____
Meter Reading _____
Held Backpressure _____
#2 Shutoff _____
Relief Valve Exercised _____

The above report is certified to be true.

	Date/Time	Tester	Signature	Tester #	Test Kit	Passed	Failed
Initial Test						☐	☐
Repairs						☐	☐
Final Test						☐	☐

Send Report to:

CITY OF RICHLAND
P.O. BOX 190 MS-15
Richland WA 99352

Phone (509) 942-7474 Fax (509) 942-5660

CITY OF RICHLAND
WATER OPERATIONS DIVISION
WATER QUALITY COMPLAINT

RECEIVED BY:_____. DATE:_____. TIME:_____

REGISTERED BY:_____. ADDRESS:_____

PHONE # WORK:_____. HOME:_____

COMPLAINT DESCRIPTION. _____

_____

_____

_____

RESPONSE

APPOINTMENT DATE:_____. TIME:_____

STEP A: 1. Problem tap location _____. Softener/Filter yes [ ] no [ ] FCL2/RES._____

2. Other tap location _____. Softener/Filter yes [ ] no [ ]. FCL2/RES._____

STEP B: 1. Draw 1000 ml sample from problem tap for analysis. [ ]

2. Microscopic examination:_____

_____

3. pH._____ Hardness as CaCO3:_____ gr/gal CaCO3:_____ mg/L

STEP C: 1. Pull chlorine residual from two fire hydrants one upstream one downstream.

2. Flush Hydrants: (10 minutes each @ 100 gpm)
(a). Address:_____ FCL2/RES:_____
(b). Address:_____ FCL2/RES:_____

STEP D: 1. Flow problem tap and one other tap for minimum of 5 minutes. [ ]

(a). Problem tap FCL2/RES._____ (b). Other tap FCL2/RES._____

2. Take Bac-t sample from each tap. [ ] Take Bac-t samples to Health Dep. [ ]

STEP E: 1. BAC-T SAMPLE RESULTS: Date:_____. Sampled By:_____.
Meets Drinking Water Standards:_____. Unsatisfactory:_____.

Note: FCL2 = free chlorine residual CaCO3 = Calcium Carbonate

****

CUSTOMER FEEDBACK

STEP F: 1. Follow up call: [ ][ ] 2. Ltr. sent [ ] [ ]

_____

_____

WQCFORM.94 3. Follow-up/Customer Feedback: Satisfactory [ ]. Unsatisfactory [ ]

C. PRESSURE VACUUM BREAKER ASSEMBLY

1. Installation Requirements

a. Required for objectionable, but not hazardous, applications (sprinkler systems, etc.).

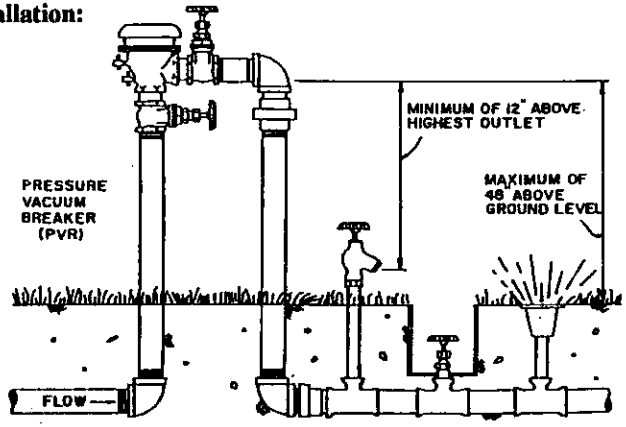
b. Protects against back siphonage only. Do not install where potential back pressure exists.

c. Must be protected from flooding and freezing.

d. AVB cannot have any downstream shut-off valve.

e. Assembly will discharge water and must be adequately drained.

2. Typical Installation:



D. ATMOSPHERIC VACUUM BREAKER DEVICE

1. Installation Requirements:

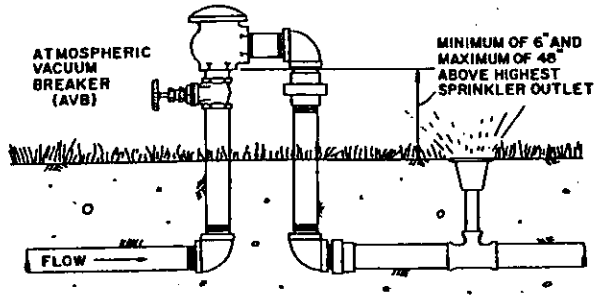
a. Installed for objectionable, but not hazardous applications (sprinkler systems, etc.).

b. Protects against back siphonage only. Do not install where potential back pressure exists.

c. Must be protected from freezing and flooding.

d. Assembly will discharge water and must be adequately drained.

2. Typical Installation:



CITY OF RICHLAND

ENGINEERING AND UTILITY SERVICES DEPARTMENT

C I T Y O F
RICHLAND

CROSS-CONNECTION CONTROL REGULATIONS AND REQUIREMENTS

STAN ARLT - DIRECTOR

PETE SQUIRES - PUBLIC WORKS SUPERINTENDENT

MICHAEL GILLUM - UTILITIES ENGINEER

KIM DUNCAN - WATER QUALITY INSPECTOR

JANUARY, 1997

PHONE 943-7460 or 943-7474

STATE AND LOCAL REGULATIONS
WASHINGTON ADMINISTRATIVE CODE
W.A.C. 246-290-490
UNIFORM PLUMBING CODE
SECTIONS 1002 AND 1003

CITY OF RICHLAND ORDINANCE: 4-88
SECTION 18.12.140 through 18.13.080

The above regulations are needed in order to protect the health of water consumers and the potability of the public water system from contamination due to water piping "cross connections."

The City of Richland Engineering and Utility Services Department (Department) requires the installation of backflow prevention assemblies where one or more of the following conditions exist:

A. Where there is an auxiliary water supply on the premises which is of unknown quality and is, or can be, connected to the potable water piping on the premises.

B. Where there is piping on the premises for conveying liquids other than potable water, and where that piping is under pressure and is installed and operated in a manner which could permit the entry of other liquids into the potable water supply piping on the premises.

C. Where there are internal "cross-connections" that are not correctable.

D. Where there are intricate plumbing arrangements on the premises which make it impractical to ascertain whether or not "cross-connections" exist.

E. Where there is reason to believe that there are "cross-connections" on the premises, but the user does not permit an inspection to be made.

F. Where there is the possibility of backflow from contained quantities of potable water that is subject to contamination from controlled or uncontrolled sources.

G. Where a recirculating pump exists on the owner's water piping system.

General Rules*

A. The type of protection shall depend on the degree of the hazard. The Department shall be the sole judge in determining protection required.

B. Customer's system must be open for inspection by the utility to determine if "cross-connections" exist.

C. Protective assemblies shall be of a model approved by the State Department of Health.

D. The owner of the property served must keep the assembly in good working order. All assemblies must be tested and inspected upon installation, and a test must be made at least once a year by a State-certified tester. A copy of the test report shall be sent to the Department. (The test shall be at the owner's expense.)

E. All assemblies must have tight-closing (resilient-seated) shut-off valves and brass test cocks with plugs.

F. Assemblies cannot have bypass lines. Parallel assemblies should be used if continuous service is required.

*This pamphlet serves as a general guideline only. Specific detailed information on regulations and installations is available from the Department.

RESIDENTIAL USES

A. REDUCED-PRESSURE BACKFLOW ASSEMBLY

1. Installation requirements

a. Required at any location where hazardous material could enter potable water (i.e. supplemental non-potable water source, fertilizer injection, etc.).

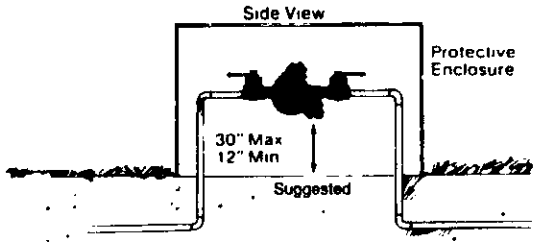
b. Cannot be installed below ground.

c. Must be adequately drained if installed inside building or enclosed vault above ground.

d. Vertical installation restricted to manufacturer's recommendations.

e. Property owner assumes responsibility for leaks and water damage from drainage.

2. Typical Installation:



B. DOUBLE-CHECK VALVE ASSEMBLY

1. Installation Requirements

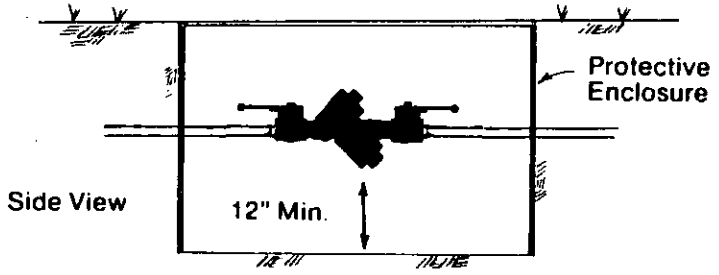
a. Required where substance is objectionable but not hazardous to health (i.e. fire systems, sprinkler systems, etc.).

b. Can be installed below grade providing vault is adequately drained and is not situated in a low drainage area.

c. Vertical installation restricted to manufacturer approval.

d. "Residential" assembly shall be installed within five-foot distance of water meter box or sprinkler control valves.

2. Typical Installation:



D. PRESSURE VACUUM BREAKER ASSEMBLY

1. Installation Requirements

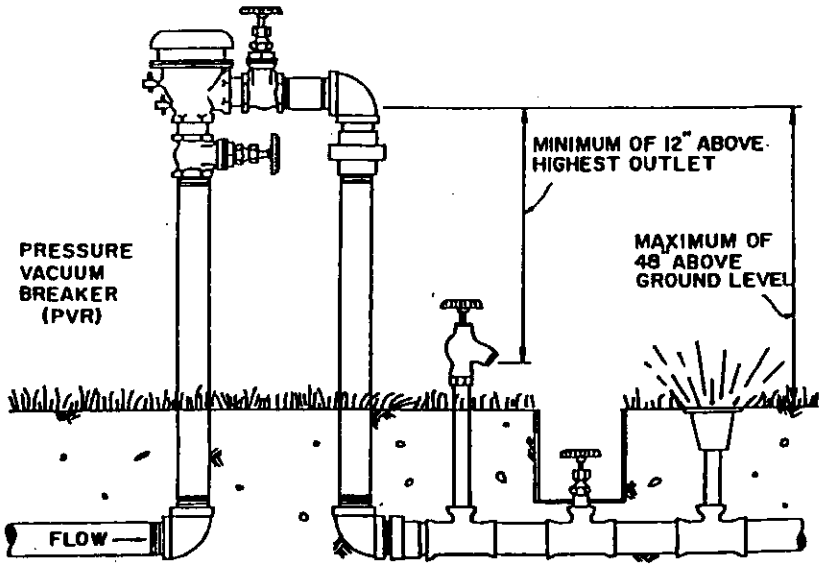
a. Required for objectionable, but not hazardous, applications (sprinkler systems, etc.).

b. Protect against back siphonage only. Do not install where potential back pressure exists.

c. Must be protected from flooding and freezing.

d. Assembly will discharge water and must be adequately drained.

2. Typical Installation:



METHODS OF CROSS-CONNECTION CONTROL

A. Air Gap Separation - Air gaps are non-mechanical backflow preventers that are very effective devices to be used where back-siphonage conditions may exist. In general, the air gap must be twice (2x) the supply pipe diameter.

B. Reduced-Pressure Principle Assembly - two check valves with an independent pressure relief valve located between the checks; assembly includes isolation valves and test cocks, an "air gap" must be maintained at vent port to drain line.

C. Double-Check Valve Assembly - two single, independently-acting approved check valves; assembly includes isolation valves and test cocks.

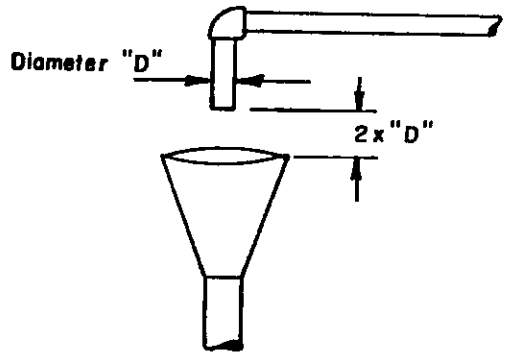
D. Pressure Vacuum Breaker Assembly - a loaded check valve and air inlet valve on the discharge side of the check valve between isolation valves and test cocks (protects against backsiphonage only).

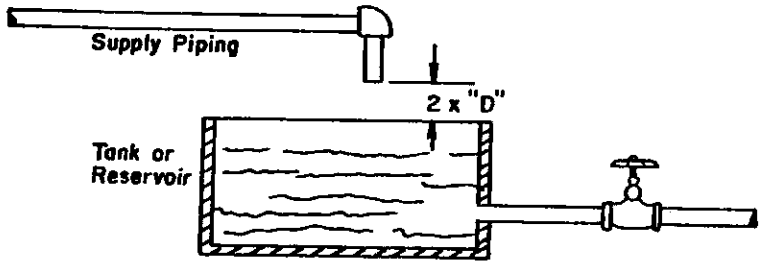
E. Atmospheric Vacuum Breaker - A float check (poppet), a check seat and an air inlet vent (protects against backsiphonage only).

COMMERCIAL USES

A. AIR GAP SEPARATION - used in processing plants

Typical Installation





B. REDUCED-PRESSURE PRINCIPLE ASSEMBLY

1. Installation requirements

a. Required at any location where hazardous material could enter potable water (medical facilities, boilers, etc.).

b. Cannot be installed below ground.

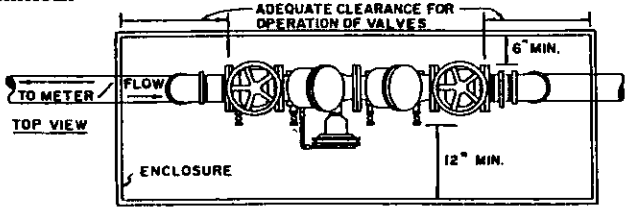
c. Must be adequately drained if installed inside building or enclosed vault above ground.

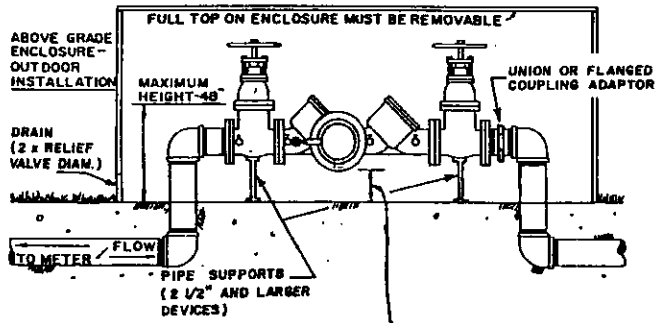
d. Vertical installation restricted to current State Department of Health's "Backflow Prevention Assemblies Approved for Installation in Washington State" list.

e. Property owner assumes responsibility for leaks and water damage from drainage.

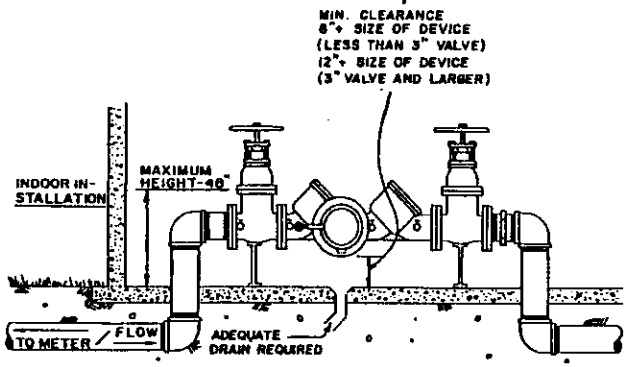
2. Typical Installation:

Outdoor





Indoor



C. DOUBLE-CHECK VALVE ASSEMBLY

1. Installation Requirements

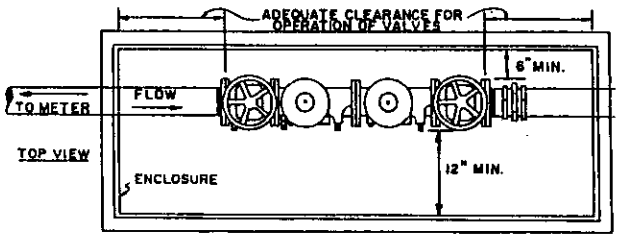
a. Required where substance is objectionable but not hazardous to health (commercial use, fire systems, sprinkler systems, etc.).

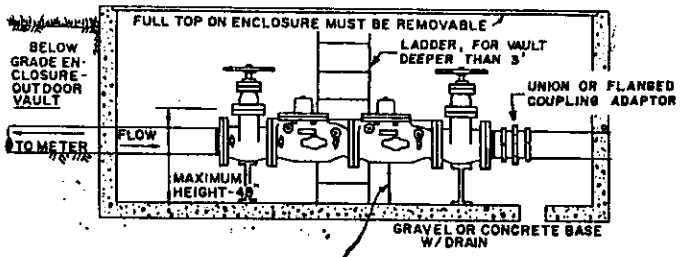
b. Can be installed below grade providing vault is adequately drained and is not situated in a low drainage area.

c. Vertical installation restricted to current State Department of Health's "Backflow Prevention Assemblies Approved for Installation in Washington State" list.

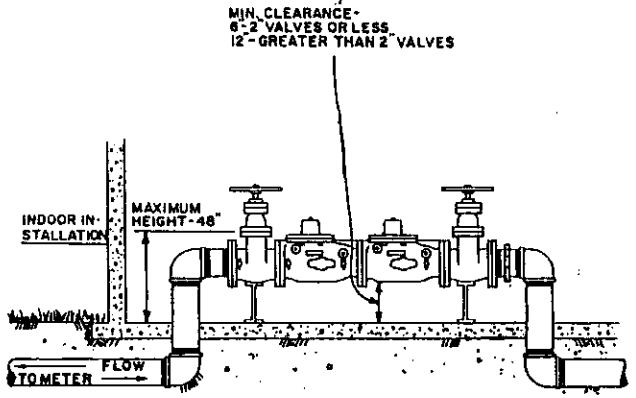
2. Typical Installation:

Outdoor





Indoor



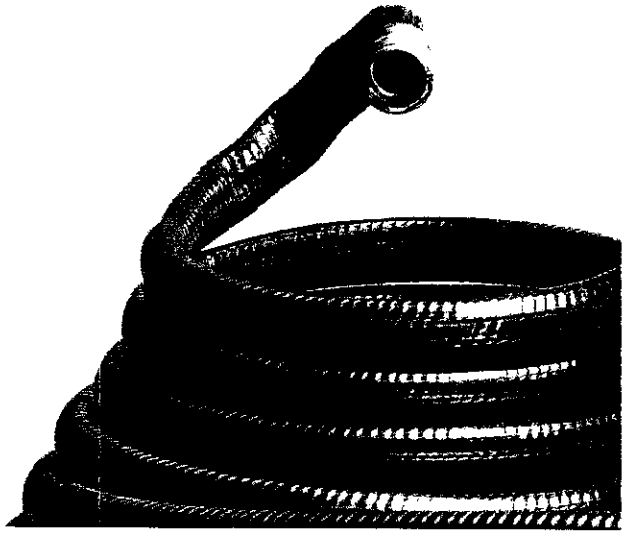
A man sprays commercial weed killer containing an arsenic compound on his lawn using a hose attachment. After he finishes, he disconnects the applicator. It is a hot day so he takes a refreshing drink of water from the hose. A short time later he dies from arsenic poisoning.

What happened?

At some time while the man was spraying weed killer, water pressure dropped, which resulted in the poison being sucked back into the hose. Later, when he drank from the hose, the poison inside was released with the water. He unknowingly poisoned himself.

Caution!

Your Hose May Be Hazardous To Your Health!



When water flows backward through the water supply system, it is called backsiphonage or backflow. When that water is accidently mixed with hazardous chemicals or bacteria, it is called dangerous!

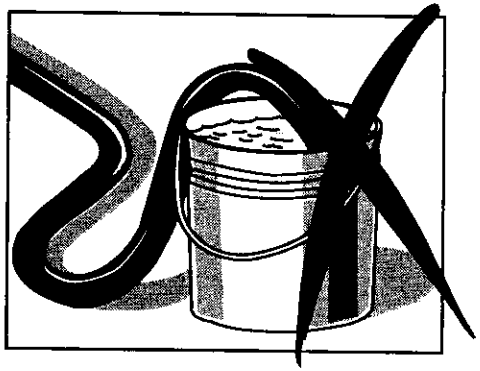
The danger comes when the hose — any hose — is connected to a harmful substance. If the pressure in a water main drops while your hose is submerged in polluted or contaminated water, then the water (and whatever is in it) could be sucked back into your pipes and your drinking water supply. Water pressure drops are not uncommon. They can happen when firefighters battle a nearby blaze or before a city crew repairs a broken water main.

Some harmful substances you should be wary of are the chemicals used to fertilize your grass or the weed killer used on your lawn. The cleanser used on your kitchen sink could be hazardous if swallowed, as could the bacteria in the water from your wading pool or waterbed.

Fortunately, keeping your water safe from these contaminants is easy. Take the following precautions to protect your drinking water:

☐ ***Never***

submerge hoses in buckets, pools, tubs, or sinks.

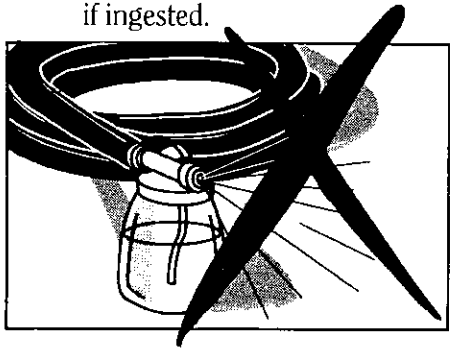


☐ ***Always***

keep the end of the hose clear of possible contaminants.

☐ ***Do not***

use spray attachments without a backflow prevention device. The chemicals used on your lawn are toxic and can be fatal if ingested.



☐ ***Do***

buy and install inexpensive backflow prevention devices for all threaded faucets around your home. They are available at hardware stores and home-improvement centers.

Common Household Hazards

Chemical Spray Applicators

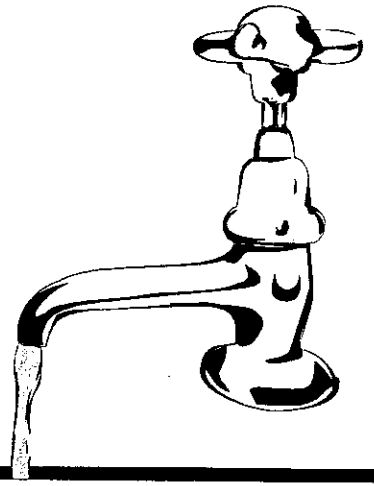
The chemicals used on your lawn and garden can be toxic or fatal if ingested. These chemicals include pesticides, herbicides, and fertilizers. Even strong cleaning chemicals sprayed on cars, house siding, etc., may cause health problems if ingested.

Submerged Hoses

Water held in pools, ponds or other vats open to the air and exposed to humans or animals may contain microbiological contaminants. Hoses submerged in buckets or containers can act as a conduit for contaminants under backflow conditions.

Underground Lawn Irrigation Systems

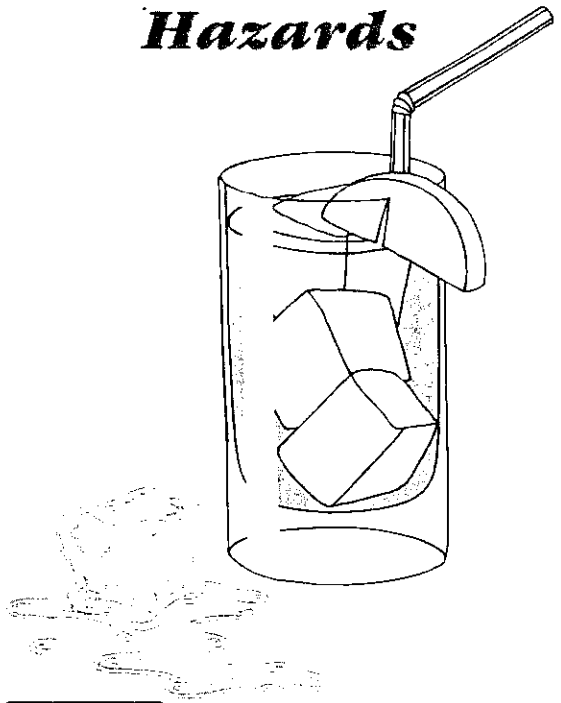
Underground irrigation systems often have puddles of standing water around the ground-level sprinkler heads. The sprinkler heads **are not** designed to be drip-tight under backflow conditions. The puddles of water may contain microbiological contaminants, such as excrement from animals or chemical residue from fertilizer and herbicides sprayed on the lawn.



For further information contact your local water purveyor or the PNWS/AWWA Cross-Connection Control Committee through the PNWS office at (877) 767-2992 or on the web at www.pnws-awwa.org

Help protect your
Drinking Water
from
Contamination

Household Hazards



American Water Works Association
Pacific Northwest Section

How Contamination Occurs

Water normally flows in one direction, from the public water system through the customer's cold or hot water plumbing to a sink tap or other plumbing fixture. The plumbing fixture is the end of the potable water system and the start of the waste disposal system.

Under certain conditions water can flow in the reverse direction. This is known as ***backflow***. Backflow occurs when a backsiphonage or backpressure condition is created in a water line.

Backsiphonage may occur due to a loss of pressure in the water distribution system during a high withdrawal of water for fire protection, a water main or plumbing system break, or a shutdown of a water main or plumbing system for repair. A reduction of pressure below atmospheric pressure creates a vacuum in the piping. If a hose bib was open and the hose was submerged in a wading pool during these conditions, the non-potable water in the pool would be siphoned into the house's plumbing and back into the public water system.

Backpressure may be created when a source of pressure, such as a pump, creates a pressure greater than that supplied from the distribution system. If a pump supplied from a non-potable source, such as a landscape pond, was accidentally connected to the plumbing system, the non-potable water could be pumped into the potable water supply.

How to Prevent Contamination of Your Drinking Water

Protect your drinking water by taking the following precautions:

Don't:

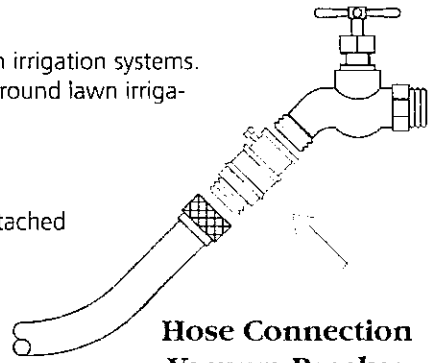
- Submerge hoses in buckets, pools, tubs, sinks, ponds, etc.
- Use spray attachments without a backflow prevention device.
- Connect waste pipes from water softeners or other treatment systems to the sewer, submerged drain pipe, etc.
- Use a hose to unplug blocked toilets, sewers, etc.

Do:

- ✔ Keep the ends of hoses clear of all possible contaminants.
- ✔ If not already equipped with an integral (built-in) vacuum breaker, buy and install hose bib type vacuum breakers on all threaded faucets around your home. These devices are inexpensive and are available at hardware stores and home improvement centers.
- ✔ Install an approved backflow prevention assembly on all underground lawn irrigation systems. Remember, a plumbing permit is required for the connection of an underground lawn irrigation system to your plumbing system.

Hose Connection Vacuum Breaker

Hose connection vacuum breakers are specifically made for portable hoses attached to threaded faucets. Their purpose is to prevent the flow of contaminated water back into the drinking water. These devices screw directly to the faucet outlet. They can be used on a wide variety of installations, such as service sinks, hose faucets near a wading pool, laundry tub faucets, etc.



Hose Connection Vacuum Breaker

Some units are designed for manual draining for freezing conditions. Some are furnished with breakaway set screws as a tamper proof feature.

These device are not intended for operation under continuous pressure.

Protection of the Water Purveyor's Distribution System

In general, the installation of plumbing in compliance with the plumbing code will provide adequate protection for your plumbing system from contamination.

However, the water purveyor may require (as a condition of service) the installation of a backflow prevention assembly on the water service to provide additional protection for the public water system. A backflow prevention assembly will normally be required where a single-family residence has special plumbing that increases the hazard above the normal level found in residential homes, or where a hazard survey cannot be completed.

To help determine if a backflow prevention assembly is required, the water purveyor may send residential customers a Cross Connection Control Survey Questionnaire. The water purveyor will evaluate the returned questionnaires to assess the risk of contamination to the public water system. Based on the results of the evaluation, the installation of backflow prevention assemblies may be required on services to some customers.

What is a Cross Connection?

A cross connection is a point in a plumbing system where the potable water supply is connected to a non-potable source. Briefly, a cross connection exists whenever the drinking water system is or could be connected to any non-potable source (plumbing fixture, equipment used in any plumbing system). Pollutants or contaminants can enter the safe drinking water system through uncontrolled cross connections when backflow occurs.

Backflow is the unwanted flow of non-potable substances back into the consumer's plumbing system and/or public water system (i.e., drinking water).

There are two types of backflow: ***backsiphonage*** and ***backpressure***. ***Backsiphonage*** is caused by a negative pressure in the supply line to a facility or plumbing fixture. Backsiphonage may occur during waterline breaks, when repairs are made to the waterlines, when shutting off the water supply, etc.

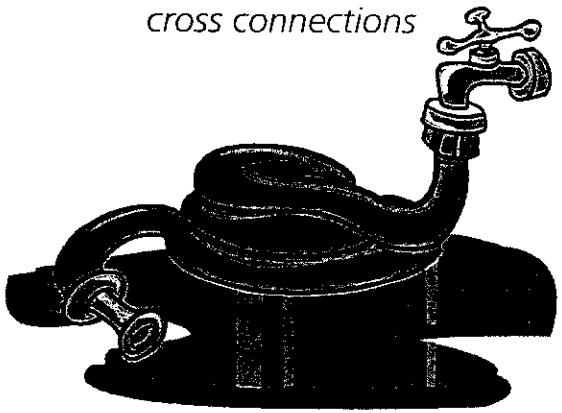
Backpressure can occur when the potable water supply is connected to another system operated at a higher pressure or has the ability to create pressure. Principal causes are booster pumps, pressure vessels and elevated plumbing.

Backflow preventers are mechanical devices designed to prevent backflow through cross connections. However, for backflow preventers to protect as designed, they must meet stringent installation requirements.

For further information contact your local water purveyor or the PNWS/AWWA Cross-Connection Control Committee through the PNWS office at (877) 767-2992 or on the web at www.pnws-awwa.org

Cross Connections *can create* Health Hazards

Drinking water systems may become **Polluted** **or** **Contaminated** *through uncontrolled cross connections*



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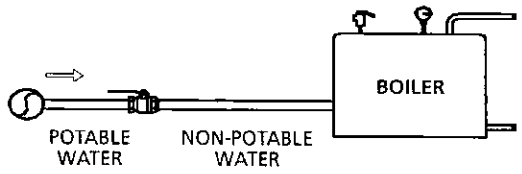
Why Be Concerned?

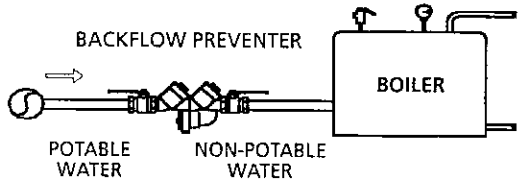
Most water systems in the United States and Canada have good sources of water and/or sophisticated treatment plants to convert impure water to meet drinking water standards. Millions of dollars are spent to make the water potable before it enters the distribution system so most water purveyors think that their supplies are not in jeopardy from this point on. Studies have proven this to be wrong. Drinking water systems may become polluted or contaminated in the distribution system through uncontrolled cross connections.

Cross connections are installed each day in the United States because people are unaware of the problems they can create. Death, illness, contaminated food products, industrial and chemical products rendered useless are some of the consequences of such connections. As a result, many hours and dollars are lost due to ***cross connections***.

Wrong:
Uncontrolled Cross Connection



Right:
Controlled Cross Connection



Where are Cross Connections Found?

Cross connections are found in all plumbing systems. It is important that each cross connection be identified and evaluated as to the type of backflow protection required to protect the drinking water supply. Some plumbing fixtures have built-in backflow protection in the form of a physical air gap. However, most cross connections will need to be controlled through the installation of an approved mechanical backflow prevention device or assembly. Some common cross connections found in plumbing and water systems include:

1. Wash basins and service sinks.
2. Hose bibs.
3. Irrigation sprinkler systems.
4. Auxiliary water supplies.
5. Laboratory and aspirator equipment.
6. Photo developing equipment.
7. Processing tanks.
8. Boilers.
9. Water recirculating systems.
10. Swimming pools.
11. Solar heat systems.
12. Fire sprinkler systems.

Every water system has cross connections. Plumbing codes and State drinking water regulations require cross connections to be controlled by approved methods (physical air gap) or approved mechanical backflow prevention devices or assemblies. The various types of mechanical backflow preventers include: reduced pressure backflow assembly (RPBA), reduced pressure detector assembly (RPDA), double check valve assembly (DCVA), double check detector assembly (DCDA), pressure vacuum breaker assembly (PVBA), spill resistant vacuum breaker assembly (SVBA) and atmospheric vacuum breaker (AVB).

For a backflow preventer to provide proper protection, it must be approved for backflow protection, designed for the degree of hazard and backflow it is controlling, installed correctly, tested annually by a State certified tester, and repaired as necessary. Some states require mandatory backflow protection on certain facilities where high health-hazard-type cross connections are normally found. The following is a partial list of those facilities:

1. Hospitals, mortuaries, clinics.
2. Laboratories.
3. Food and beverage processing centers.
4. Metal plating and chemical plants.
5. Car washes.
6. Petroleum processing and storage plants.
7. Piers and docks.
8. Sewage treatment plants.

What to Do?

It is impossible to cover all of the information pertaining to cross connections in a pamphlet. We hope the preceding information will inspire you to further educate yourself on the hazards of unprotected cross connections. Cross connection control manuals and training schools are offered throughout the Northwest. Information on manuals, schools and cross connection control can be obtained from:

Washington
Department of Health
Airdustrial Way, Bldg. 3
P.O. Box 47822
Olympia WA 98504-7822
(360) 236-3133

Oregon
Oregon Health Division
3420 Cherry Av NE, #110
Keizer OR 97303
(503) 373-7201

British Columbia, Canada
BC Water & Waste Association
Ste. 342 – 17 Fawcett Road
Coquitlam B.C. V3K 6V2
(604) 540-0111

Idaho
Idaho Division of Environment
1410 N Hilton
Boise ID 83706
(208) 373-0275

Additional sources of information may be found on the PNWS-AWWA web site:
www.pnws-awwa.org

Protection from Thermal Expansion

Protection from thermal expansion is provided in a plumbing system by the installation of a ***thermal expansion tank*** in the hot water system piping downstream of the hot water tank and a ***temperature and pressure relief valve*** (T & P Valve) at the top of the tank.

The thermal expansion tank controls the increased pressure generated within the normal operating temperature range of the water heater. The small tank with a sealed compressible air cushion provides a space to store and hold the additional expanded water volume.

The T & P Valve is the primary safety feature for the water heater. The ***temperature*** portion of the T & P Valve is designed to open and vent water to the atmosphere whenever the water temperature within the tank reaches approximately 210° F (99° C). Venting allows cold water to enter the tank.

The ***pressure*** portion of a T & P Valve is designed to open and vent to the atmosphere whenever water pressure within the tank exceeds the pressure setting on the valve. The T & P Valve is normally pre-set at 125 psi or 150 psi.

Water heaters installed in compliance with the current plumbing code will have the required T & P Valve and thermal expansion tank. For public health protection, the water purveyor may require the installation of a check valve or backflow preventer downstream of the water meter. In these situations, it is essential that a T & P Valve and thermal expansion tank be properly installed and maintained in the plumbing system.

For further information contact your local water purveyor, City or County building department, licensed plumber or the PNWS/AWWA Cross-Connection Control Committee through the PNWS office at (877) 767-2992 or on the web at www.pnws-awwa.org

Protect Your ***Water Heater*** *from* Thermal Expansion

Without a functioning Temperature & Pressure Relief Valve your water heater can

Explode *with the force of* ***Dynamite***

American Water Works Association
Pacific Northwest Section

Thermal Expansion Danger

Most homes are supplied with hot water from an electric or gas heated tank. Until the heating element stops working, and one is faced with a cold shower, the water heater is usually taken for granted. However, if not properly maintained, a water heater may become a safety hazard.

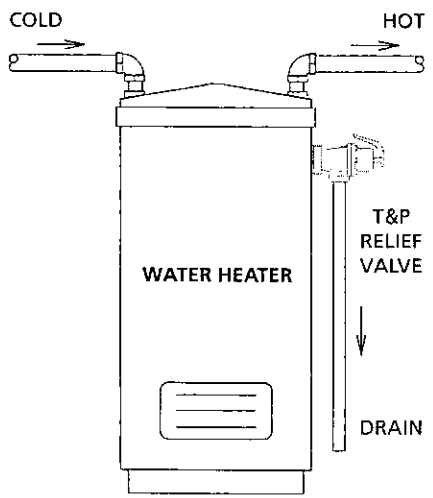
Water expands in volume as its temperature rises. The extra volume caused by thermal expansion must go somewhere. If not, the heated water creates an increase in pressure. This is the principle of a steam engine.

The temperature and pressure in the water heater is reduced when hot water is withdrawn from a faucet and cold water enters the tank. The increase in pressure from thermal expansion can also be reduced by water flowing back into the public water system. However, when a check valve, pressure-reducing valve or backflow preventer is installed in the service pipe a "closed system" is created. Provisions must be made for thermal expansion in these cases.

The thermostat of the water heater normally maintains the water temperature at about 130° F (54° C). However, if the thermostat fails to shut off the heater, the temperature of the water will continue to increase.

If the water temperature increases to more than 212° F (100° C), the water within the tank becomes "super heated". When this super heated water is suddenly exposed to the atmosphere when a faucet is opened, it instantly turns to steam. As the pressure within the tank continues to build up under super heated conditions, the tank may explode.

T&P Valve Location



Why the Installation of a Backflow Preventer is Required on a Water Service

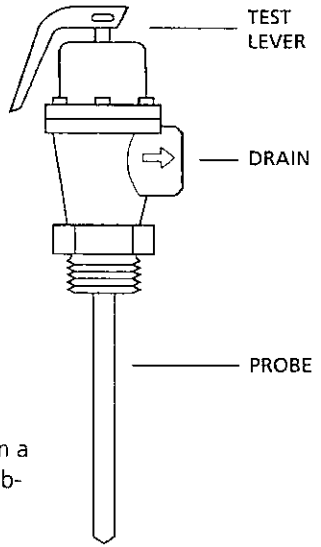
Water normally flows in one direction, from the public water system through the customer's cold or hot water plumbing to a sink tap or other plumbing fixture. The plumbing fixture is the end of the potable water system and the start of the waste disposal system.

Under certain conditions water can flow in the reverse direction. This is known as ***backflow***. Backflow occurs when a backsiphonage or backpressure condition is created in a water line.

Backsiphonage may occur due to a loss of pressure in the water distribution system during a high withdrawal of water for fire protection, a water main or plumbing system break, or a shutdown of a main or plumbing system for repair. A reduction of pressure below atmospheric pressure creates a vacuum in the piping. If a hose bib was open and a flowing hose was submerged in a wading pool during these conditions, the non-potable water in the pool would be siphoned into the house plumbing then back into the public water system.

Backpressure may be created when a source of pressure, such as a pump, creates a pressure greater than that supplied from the distribution system. If a pump supplied from a non-potable source, such as a landscape pond, were accidentally connected to the plumbing system, the non-potable water could be pumped into the potable water supply.

Typical T&P Valve



What the Homeowner Should Do to Ensure Protection from Thermal Expansion

- The homeowner should check to see that an expansion tank and T & P Valve are in place. If there is any doubt, the homeowner should contact a licensed plumber.
- The T & P Valve should be periodically inspected to ensure that is properly operating. Some T & P Valves are equipped with a test lever. Manually lifting the lever unseats the valve, allowing water to discharge. If water continues to leak from the T & P Valve after closing, the valve may need to be replaced. A drain line must be installed to avoid water damage and scalding injury when the valve operates.
- The T & P Valve should be periodically removed and visually inspected for corrosion deposits and to insure it has not been improperly altered or repaired.
- The above work can best be done by a licensed plumber.

Approved Backflow Assemblies

The water purveyor relies on approved backflow prevention assemblies to protect the public water system. Approved assemblies are manufactured with isolation valves and test cocks to permit field-testing to demonstrate that the assemblies are properly functioning to prevent backflow.

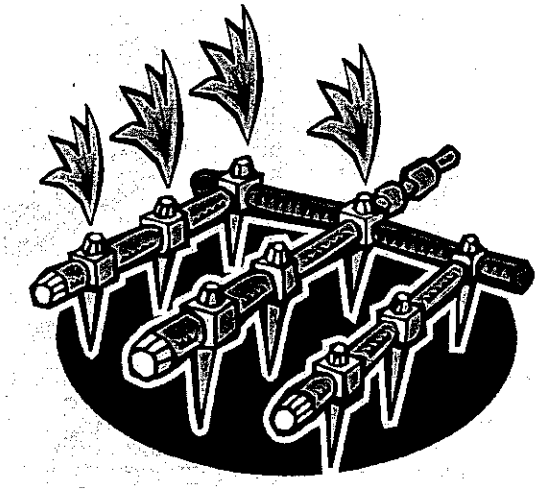
In addition to the above assemblies, plumbing codes also allow the use of atmospheric vacuum breakers (AVB) on lawn irrigation systems without chemical addition. Because an atmospheric vacuum breaker is not designed to be tested, some water purveyors require the installation of approved, testable assemblies. Contact your water purveyor regarding the requirements for isolation of your lawn irrigation system.

Note:

All irrigation piping should be considered a non-potable water system due to an actual or potential health hazard.

For further information contact your local water purveyor or the PNWS/AWWA Cross-Connection Control Committee through the PNWS office at (877) 767-2992 or on the web at www.pnws-awwa.org

Lawn Irrigation Systems and ***Backflow Prevention***



American Water Works Association
Pacific Northwest Section

Lawn (Turf) Irrigation Systems

For the protection of the water purveyor's distribution system, all irrigation systems must have an approved backflow prevention assembly that is compatible with the degree of hazard. Irrigation systems are categorized as high health hazard or moderate health hazard as defined below.

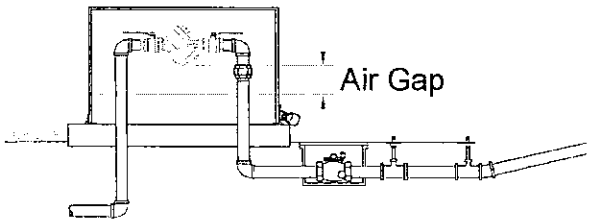
Any irrigation system that contains pumps or injectors for the addition of chemicals and/or fertilizers is considered a high hazard. This risk assessment is also based on the additional hazard posed by bacterial contaminants found on lawns, and on the possibility of changes being made to the irrigation system by the customer. An approved reduced pressure backflow assembly (RPBA), or an approved air gap separation, should be required in all cases where chemicals or herbicides may be injected into the irrigation system, or where an auxiliary water supply is also provided for irrigation water.

All irrigation systems that are not classified as a high health hazard are considered to be moderate health hazards. This risk assessment is based on the hazard posed by bacterial and chemical contaminants found on lawns, and on the possibility of changes being made to the irrigation system by the customer. An approved double check valve assembly (DCVA), or pressure vacuum breaker assembly (PVBA), should be required.

However, an approved PVBA does not provide adequate protection if it is subjected to flooding, backpressure, elevated piping, or if compressed air is used to winterize the irrigation system. In these situations, an approved DCVA should be required as a minimum level of protection.

Reduced Pressure Backflow Assembly for Isolation of Lawn Irrigation System

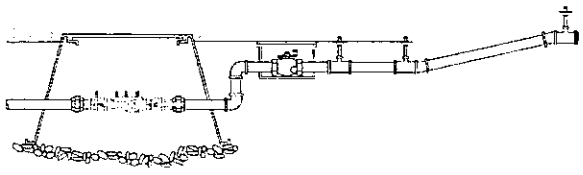
- The reduced pressure backflow assembly (RPBA) should be installed to isolate irrigation systems using injectors or pumps to apply fertilizer and other agricultural chemicals.
- The RPBA must be installed above ground to prevent the relief valve opening from becoming submerged.
- The RPBA should be installed in an insulated enclosure to provide freeze protection.
- The RPBA should be tested by a certified backflow assembly tester upon installation, after repair of relocation, and at least annually.



Reduced Pressure Backflow Assembly in Above-Ground Enclosure

Double Check Valve Assembly for Isolation of Lawn Irrigation System

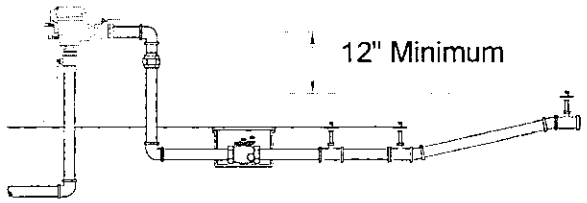
- The double check valve assembly (DCVA) may be installed to isolate all irrigation systems that do not use injectors or pumps to apply fertilizer and other agricultural chemicals.
- The DCVA may be installed in a below-ground enclosure provided the assembly test cocks are plugged; the test cocks are pointed up; adequate space is provided for maintenance and testing; and any compressed air connections are installed only downstream of the DCVA.
- The DCVA shall be tested by a certified backflow assembly tester upon installation, after repair of relocation, and at least annually.



Double Check Valve Assembly in Below-Ground Box

Pressure Vacuum Breaker Assembly for Isolation of Lawn Irrigation Systems

- The pressure vacuum breaker assembly (PVBA) may be installed to isolate all irrigation systems that do not use injectors or pumps to apply fertilizer and other agricultural chemicals.
- The PVBA shall be installed at least 12 inches above the highest point in the irrigation piping.
- The PVBA shall be tested by a certified backflow assembly tester upon installation, after repair of relocation, and at least annually.



Pressure Vacuum Breaker Assembly

Flow-through protection systems are those systems that do not have fire department pumper connections. They are constructed of approved potable water piping and materials to which sprinkler heads are attached. The system terminates at a connection to a toilet or other plumbing fixture to prevent the water from becoming stagnant.

Combination protection systems also do not have fire department pumper connections and are constructed of approved potable water piping and materials that serve both the fire sprinkler system and the consumer's potable water system.

Both of the above two systems do not require backflow preventers because they are connected directly to the potable water and inherently designed to potable water standards.

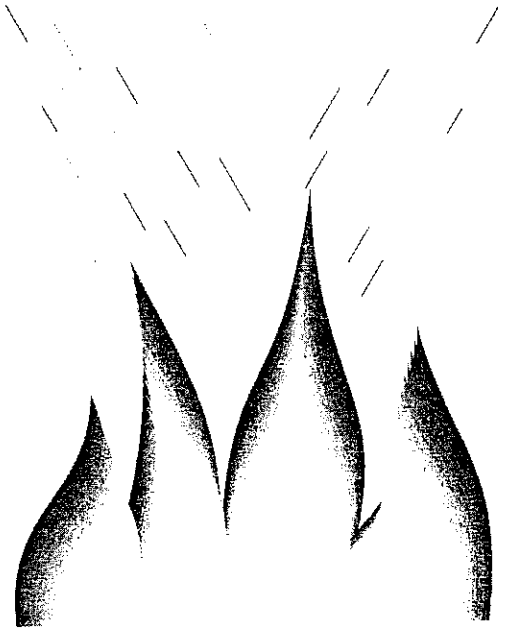
Closed fire protection systems are separated from the potable water system by the minimum use of a Double Check Valve Assembly (DCVA) as long as no chemicals are used and a Reduced Pressure Backflow Assembly (RPBA) if chemicals are used. Closed systems may have a fire department pumper connection.

Note:

1. The water purveyor must be consulted for proper backflow prevention requirements.
2. It is important to have the system engineered hydraulically. The NFPA standards 13 and/or 13D must be considered when designing the fire system.
3. Flow and pressure may not be adequate for fire protection.
4. A plumbing and/or fire permit may be required prior to starting the project.
5. A system is less expensive to install at initial house construction.
6. Some water purveyor's requirements may be more stringent than others – consult you local purveyor for requirements.

For further information contact your local water purveyor or the PNWS/AWWA Cross-Connection Control Committee through the PNWS office at (877) 767-2992 or on the web at www.pnws-awwa.org

Residential Fire Sprinkler Systems and Backflow Prevention



American Water Works Association
Pacific Northwest Section

Residential Fire Sprinkler Systems

Residential fire sprinklers are in greater demand today than ever before. Personal fire safety is such a trend that in many areas ordinances or resolutions require fire sprinklers on all new residential construction.

Residential fire sprinkler systems help save lives and reduce property damage. However, from the water purveyor's point of view, the residential fire sprinkler system presents a potential pollutant and/or contaminant source to the potable water system from cross-connections. Both homeowners and the public may be exposed to health hazards from residential fire sprinkler systems. Such hazards include stagnant water, non-potable piping, heterotrophic bacteria, and chemicals. Therefore these systems must be evaluated for health and system hazards.

The following minimal information should be considered in the selection of backflow protection on residential fire sprinkler systems.

Residential fire sprinkler systems are categorized as ***flow-through***, ***combination***, and ***closed*** fire protection systems. Each of these systems has their advantages and disadvantages. It should also be noted that what the local fire departments, local administrative authorities and water purveyors will determine which of these systems can be found in any particular jurisdiction. It is imperative that the water purveyor, local administrative authority, fire department, and other agencies coordinate their efforts in the design and operation of these systems.

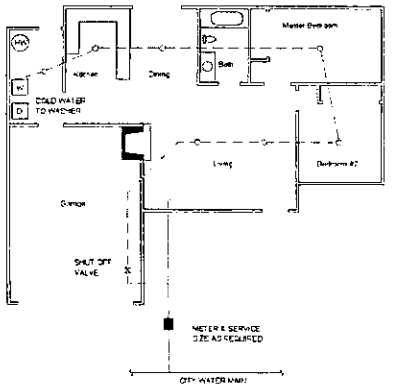
Flow-Through Fire Protection Systems

Advantages

1. Contains no standing or stagnant water.
2. No backflow protection is required.
3. Usually requires a single meter.

Disadvantages

1. Service line, meter and plumbing system must be designed hydraulically to supply both domestic and fire flow requirements.
2. Sprinkler system must have connection at the end to a clothes washer, dishwasher, toilet or other fixture to prevent water from becoming stagnant.



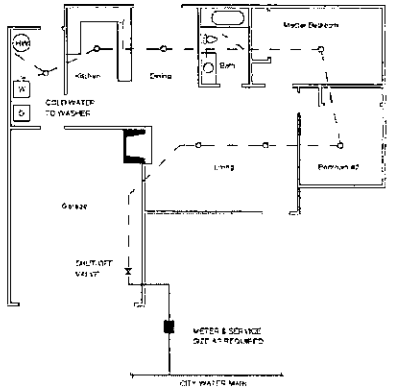
Combination Protection Systems

Advantages

1. Contains no standing or stagnant water.
2. No backflow protection is required.
3. Usually requires a single meter.
4. Water use throughout the potable water system eliminates need for water use at the end of the system.

Disadvantages

1. The service line, meter and plumbing system must be designed hydraulically to supply both domestic and fire flow requirements.



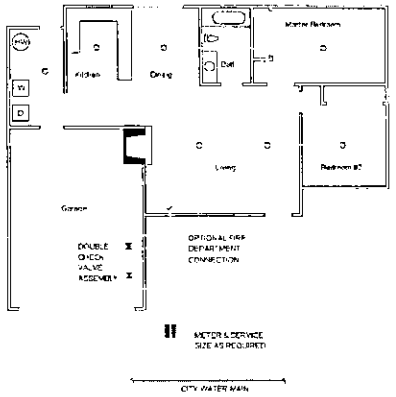
Closed Fire Protection Systems

Advantages

1. Installing a separately metered service line may be cheaper than upgrading an existing service.
2. A fire service rate is usually cheaper than a residential service rate.

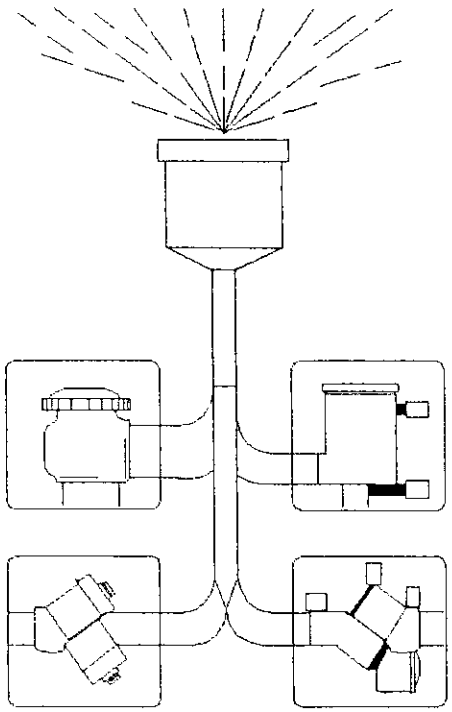
Disadvantages

1. Approved backflow preventers must be installed, thereby increasing the homeowner's cost by its initial installation, and thereafter for annual testing and maintenance.
2. When chemicals are added to the fire sprinkler system to prevent freezing, a high health hazard exists. This requires a higher, more expensive, level of protection, i.e., a Reduced Pressure Backflow Assembly (RPBA).
3. If the fire service and domestic service are combined, the fire service may not be turned off because of safety reasons.



IMPORTANT INFORMATION FOR ALL IRRIGATION SYSTEM INSTALLERS

Home Irrigation Safety



DO NOT LET YOUR IRRIGATION SYSTEM CONTAMINATE THE WATER YOU DRINK

BACKFLOW PREVENTION ALTERNATIVES

FOR HOME IRRIGATION SYSTEMS

Irrigation systems make watering lawns and gardens easier and save time, BUT, water that may be contaminated by weed killers and/or fertilizers can be back-siphoned (backflow) into your drinking water. Irrigation systems not protected by approved backflow prevention assemblies could endanger the health of a household, neighborhood or community.

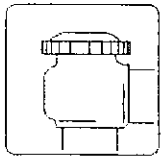
ALL IRRIGATION SYSTEMS...new or existing...MUST BE EQUIPPED with an approved backflow prevention assembly. Only properly installed, state-approved backflow prevention assemblies meet the plumbing code and provide health protection for your family and neighbors. Contact your water supplier for a list of state-approved assemblies and certified testers.

FREEZE PROTECTION:

It is recommended that all Backflow Prevention Assembly installations have a union on each side of the assembly, so it can be stored in a warm place during periods of freezing temperatures.
It is recommended that a high quality stop and drain valve (Mueller Orseal II, Ford Ball Valve or Hays) be installed below ground level (5' depth if within 20' of the water meter) before the backflow assembly. This is to allow the water to drain down to the same level as the service line and to help protect it from freezing. Backflow devices may be hooked up to "frostfree" hose bibbs coming off of the house (no stop and waste is required) if flow and inside noise is not a problem.

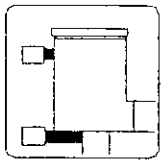
PLEASE NOTE:
ALL IRRIGATION SYSTEMS supplied by public water systems REQUIRE A PLUMBING PERMIT before installation. All piping and materials upstream (before) the backflow prevention assembly must be of a type which is approved by the International Association of Plumbing and Mechanical Officials.

FOUR TYPES of Backflow Prevention Assemblies



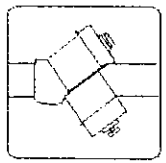
ATMOSPHERIC VACUUM BREAKER (AVB)

...often the easiest to install
...no valves downstream



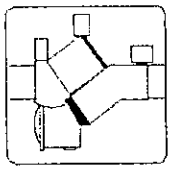
PRESSURE VACUUM BREAKER (PVB)

...more sophisticated
...more versatile
...requires annual testing by certified tester



DOUBLE CHECK VALVE ASSEMBLY (DCVA)

...highly versatile
...requires annual testing by certified tester



REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA)

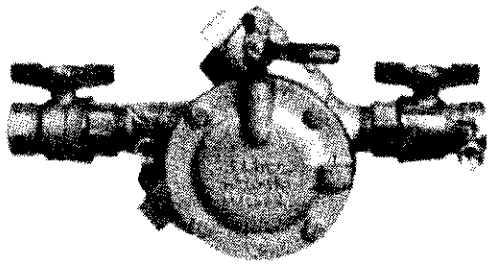
...usually most expensive
...offers most protection
...requires annual testing by certified tester

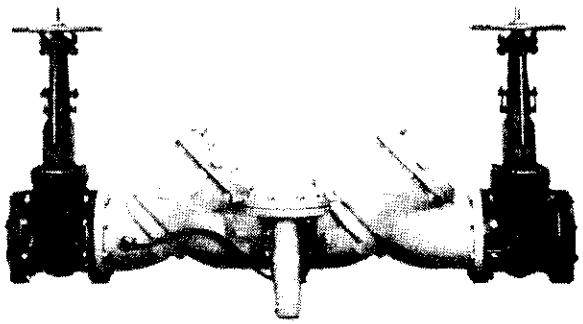
Installation requirements for each type of backflow prevention assembly

REDUCED PRESSURE BACKFLOW

PREVENTION ASSEMBLY (RP)

INSTALLATION INSTRUCTIONS





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SPOKANE REGIONAL
CROSS CONNECTION CONTROL
COMMITTEE (SRC4)

General Installation Instructions

The following are installation instructions that are applicable to all backflow assemblies. Additional instructions for this type of assembly are listed later in this brochure. These installation requirements must be adhered to in order for this type of backflow preventer to operate as designed and so it can be safely tested and maintained as required.

All assembly installations must be approved by the local water purveyor per State regulations. ANY VARIANCE from the enclosed installation requirements will result in the installation of the assembly being rejected.

1) All assemblies must be listed on the approved assembly list issued by Washington State.

2) Must NOT be installed higher than 5' 0'' above the surrounding floor or ground.

3) Install in an area where spillage of water will not be objectionable.

4) The assemblies require annual testing and periodic maintenance, which requires turning the water off. If the assembly is installed on the water service to a facility or equipment that cannot be without water during regular business hours, two assemblies should be installed in parallel. These installations should be sized hydraulically rather than by size. Unprotected bypasses around assemblies are NOT allowed.

5) Assemblies shall be installed in a horizontal position. NO VERTICAL installations allowed.

6) Care should be taken to insure the assembly is not installed where the water pressure can be maintained above the assembly's rated capacity (150 psi).

7) If hot water conditions are anticipated, inquire as to the manufacturer's recommendations.

8) Must be protected from freezing, flooding and mechanical damage.

9) Size the assembly hydraulically to avoid excessive pressure loss. If water pressure is a concern, consult flow curves of assemblies.

10) A strainer may be required ahead of the assembly in some localities.

11) THOROUGHLY FLUSH THE LINES PRIOR TO INSTALLING AN ASSEMBLY. Newly installed assemblies will fail due to debris.

12) Thermal water expansion and/or water hammer downstream of the assembly can cause excessive pressure. This type of situation can be eliminated through the use of water hammer arrestors or surge protectors to avoid possible damage to the system and assembly.

13) Notify local Water Purveyor for inspection when installation of assembly is completed.

stalling assembly.

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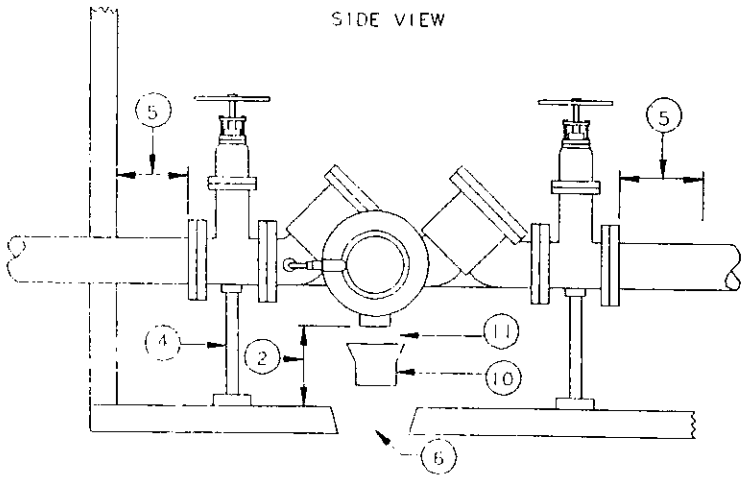
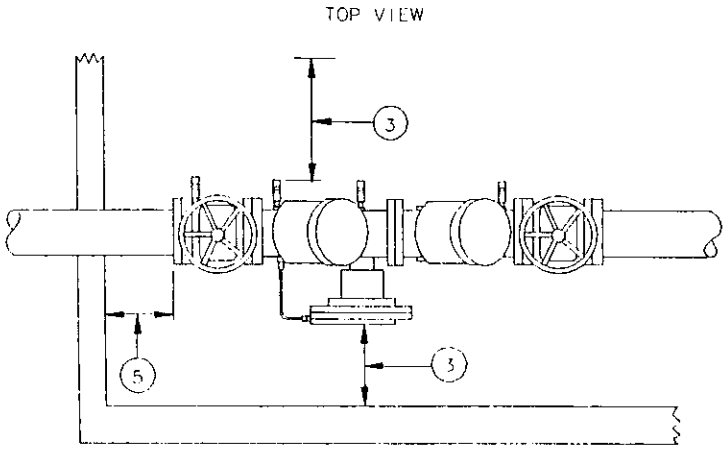
INDOOR INSTALLATION





ABOVE GROUND VAULT INSTALLATION

12) Minimum 3" when valve is fully opened.

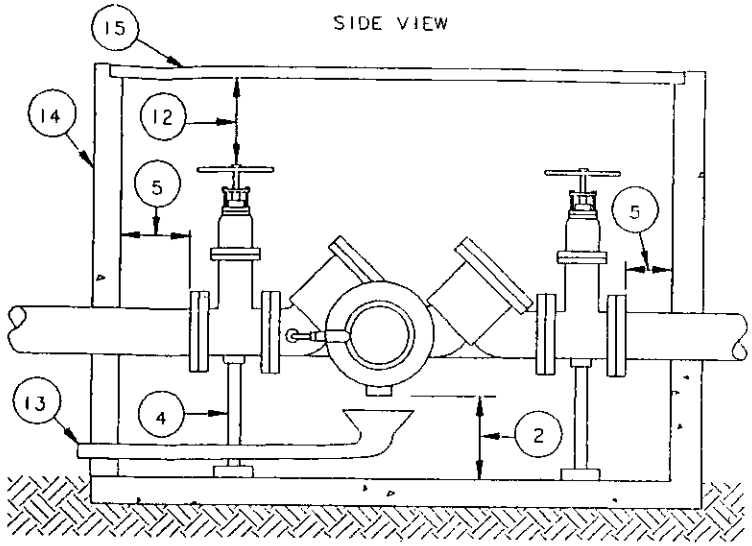
13) The vault must be provided with an ADEQUATE drain above the ground and maximum flood level so the relief valve cannot become flooded. If a drain line is provided for the relief valve, air gap requirements listed in Item #11 must be met. In addition, the drain line MUST be over-sized to handle the potential volume of the relief valve discharge; installed above ground and maximum flood level; and must be able to be bore sighted.

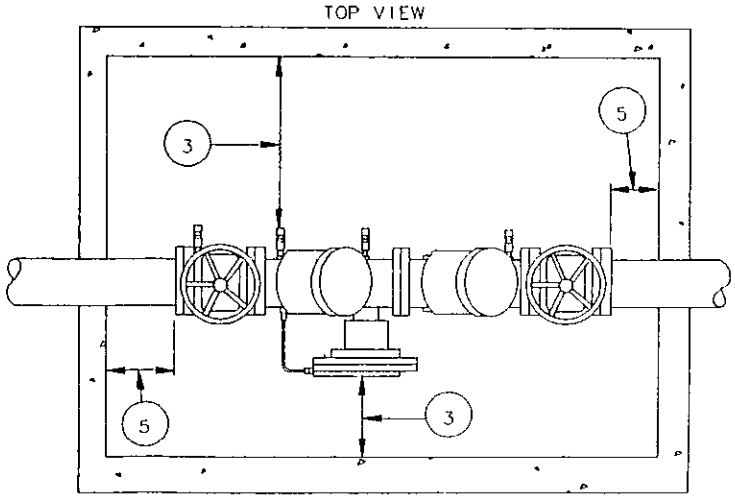
14) NO BELOW GROUND installations are allowed. Vault shall be installed above ground level and approved by water purveyor.

15) Access cover MUST be approved by water purveyor.

16) If required, wall mounted ladder shall be located under center of access cover.

ABOVE GROUND VAULT





Reduced Pressure Backflow Assembly
Installation Requirements

1) CONSULT local water purveyor before installing assembly.

2) MINIMUM 12" plus pipe size of assembly and maximum of 5' 0" above finished floor or surrounding ground.

3) MINIMUM of 12" plus pipe size of assembly away from any walls, piping or other equipment. Sizes 2½" and larger require additional space on one side of assembly. This distance shall be 2' 0" plus pipe size of assembly.

4) Sizes 2½" and larger require supports to prevent flange damage.

5) Minimum 6" from walls, other piping and other equipment.

6) PROVIDE ADEQUATE DRAINAGE as relief is capable of discharging large volumes of water. (i.e. 2" RP capable of discharging 100+ GPM).

7) DO NOT INSTALL above or near electrical equipment.

8) Upstream pressure fluctuations greater than 3 psi may cause relief valve to discharge. To eliminate problem, install single, soft seated, internally loaded check valve upstream of the assembly.

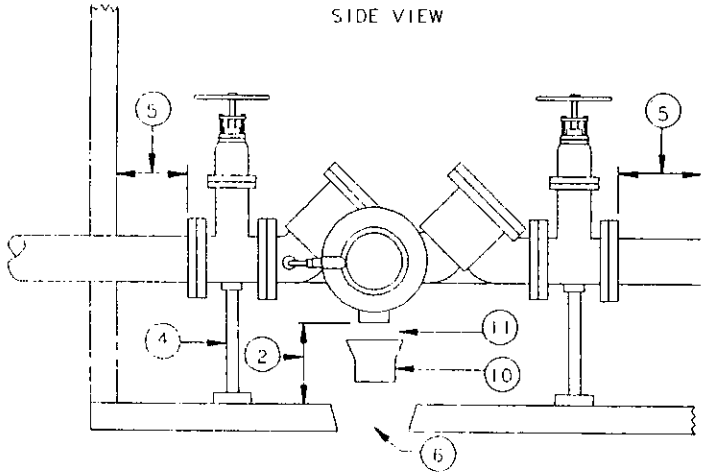
9) NO VERTICAL INSTALLATIONS WILL BE ALLOWED.

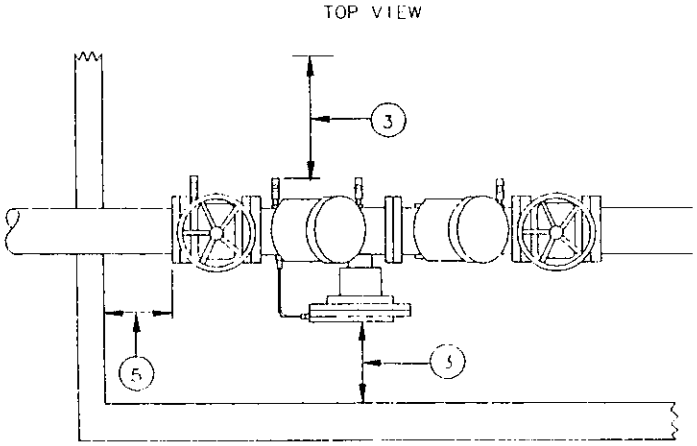
INDOOR INSTALLATION

10) It is "highly" recommended a drain line be provided for relief valve discharge.

11) If a drain line is provided, an approved air gap is required between relief valve vent and drain line. This distance shall be 2 times the I.D. of the relief valve vent. The drain line shall be at LEAST the same I.D. as relief valve vent. Increasing the size of the drain line is recommended.

INDOOR INSTALLATION





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Keep Your Water Supply Safe

Important information for do-it-yourself irrigation system installers

Some laws and regulations regarding backflow protection and approval of type of pipe used may vary depending upon local requirements.

For more specific information we advise you to contact your local water supplier at:

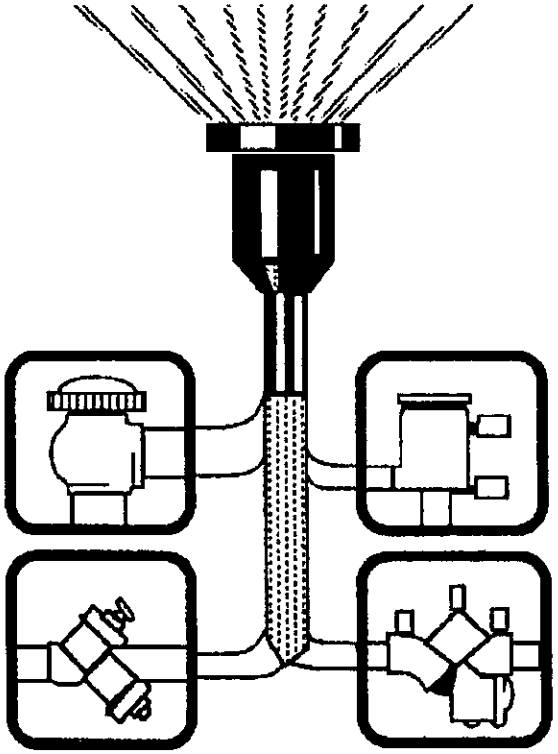
This pamphlet has been prepared and edited by:

Pacific Northwest Section
American Water Works Association
Cross Connection Control Committee

Important information for do-it-yourself irrigation system installers

HOME

Irrigation Safety



DON'T LET YOUR IRRIGATION SYSTEM CONTAMINATE THE WATER YOU DRINK

BACKFLO PREVENTI ALTERNA

FOR HOME IRRIGATION

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ALL IRRIGATION SY existing...MUST BE E backflow prevention a installed, state-approv assemblies meet the health protection for Your local water utility state-approved assen

Freeze Protection
All backflow preventio above ground need to Recommendations ar off valve (ball valve) b side of the assembly. drain (stop and waste level so piping ahead drained. Open all tes on the backflow preve and leave open. A lo installed on your irriga

Please Note:
ALL IRRIGATION SY water systems REQU before installation. Al upstream of (before) t assembly must be of the International Assc Mechanical Officials.

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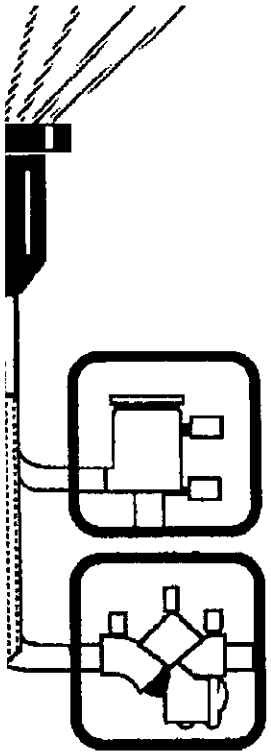

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FOR HOME IRRIGATION SYSTEMS

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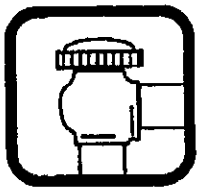
ALL IRRIGATION SYSTEMS...new or existing...MUST BE EQUIPPED with an approved backflow prevention assembly. Only properly installed, state-approved backflow prevention assemblies meet the plumbing code and provide health protection for your family and neighbors. Your local water utility can give you a free list of state-approved assemblies and certified testers.

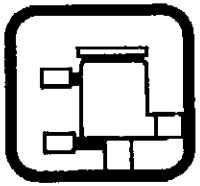
Freeze Protection
All backflow prevention assemblies installed above ground need to be protected from freezing. Recommendations are to install a drip tight shut-off valve (ball valve) below ground on the inlet side of the assembly. Install a shut-off valve with drain (stop and waste valve) just above ground level so piping ahead of the assembly can be drained. Open all testcocks , and shut off valves on the backflow prevention assembly half way and leave open. A low point drain should also be installed on your irrigation system.

Please Note:
ALL IRRIGATION SYSTEMS supplied by public water systems REQUIRE A PLUMBING PERMIT before installation. All piping and materials upstream of (before) the backflow prevention assembly must be of a type which is approved by the International Association of Plumbing and Mechanical Officials.

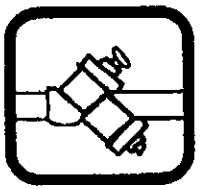
FOUR TYPES of Backflow Prevention Assemblies



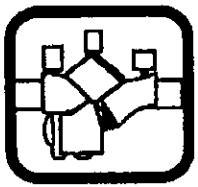
ATMOSPHERIC VACUUM BREAKER (AVB)
...the least expensive
...often the easiest to install



PRESSURE VACUUM BREAKER (PVB)
...more sophisticated
...more versatile
...requires annual testing by certified tester



DOUBLE CHECK VALVE ASSEMBLY (DCVA)
...highly versatile
...requires annual testing by certified tester

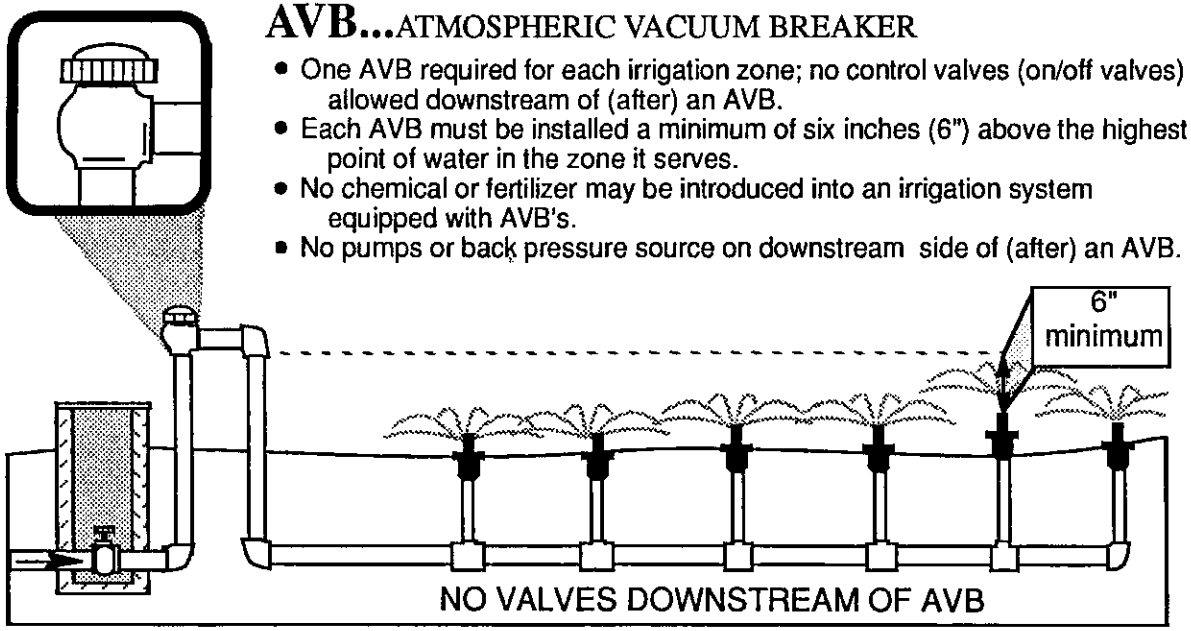


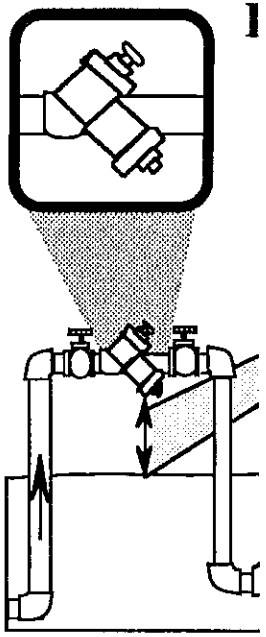
REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA)
...usually most expensive
...most complex
...allows for application of fertilizer or other chemicals into irrigation system (No other type has this approval).
...requires annual testing by certified tester.

Installation requirements for each type of backflow prevention assembly

AVB...ATMOSPHERIC VACUUM BREAKER

- One AVB required for each irrigation zone; no control valves (on/off valves) allowed downstream of (after) an AVB.
- Each AVB must be installed a minimum of six inches (6") above the highest point of water in the zone it serves.
- No chemical or fertilizer may be introduced into an irrigation system equipped with AVB's.
- No pumps or back pressure source on downstream side of (after) an AVB.

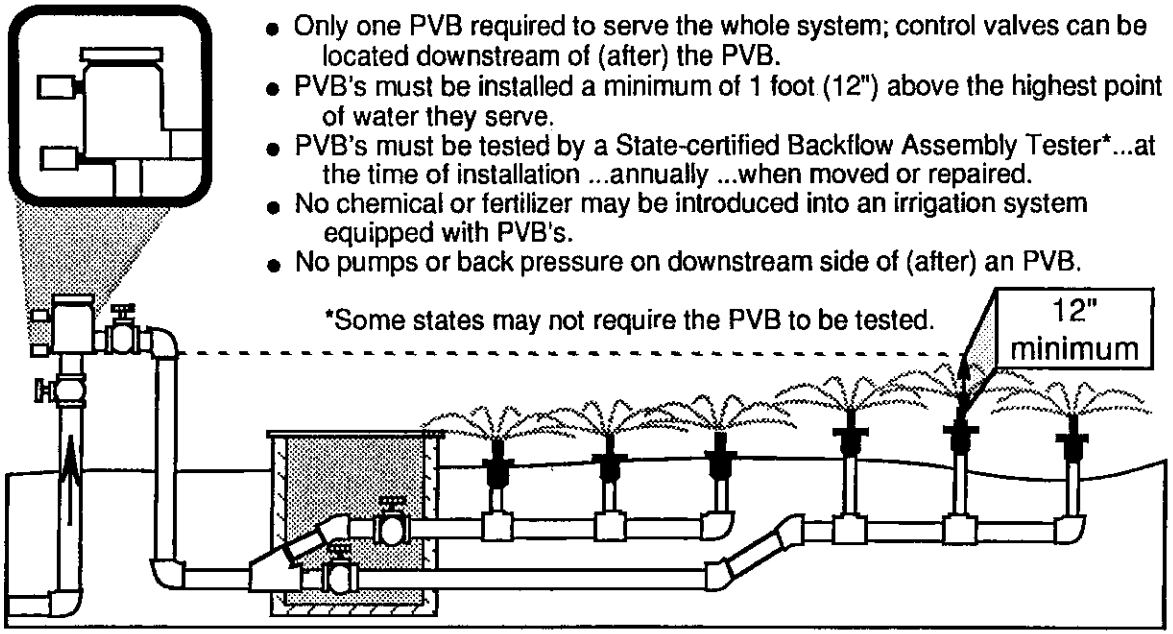


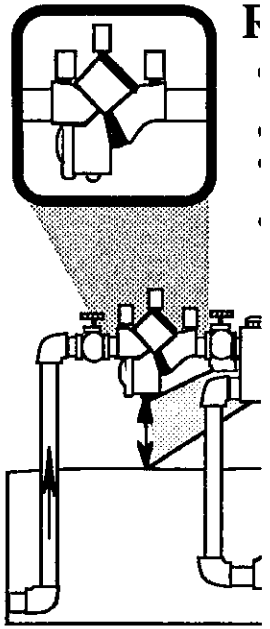


PVB...PRESSURE VACUUM BREAKER ASSEMBLY

- Only one PVB required to serve the whole system; control valves can be located downstream of (after) the PVB.
- PVB's must be installed a minimum of 1 foot (12") above the highest point of water they serve.
- PVB's must be tested by a State-certified Backflow Assembly Tester*...at the time of installation ...annually ...when moved or repaired.
- No chemical or fertilizer may be introduced into an irrigation system equipped with PVB's.
- No pumps or back pressure on downstream side of (after) an PVB.

*Some states may not require the PVB to be tested.





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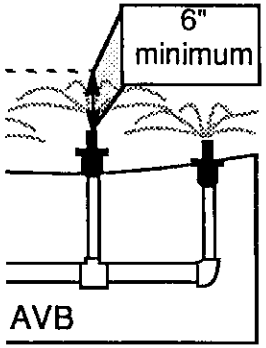
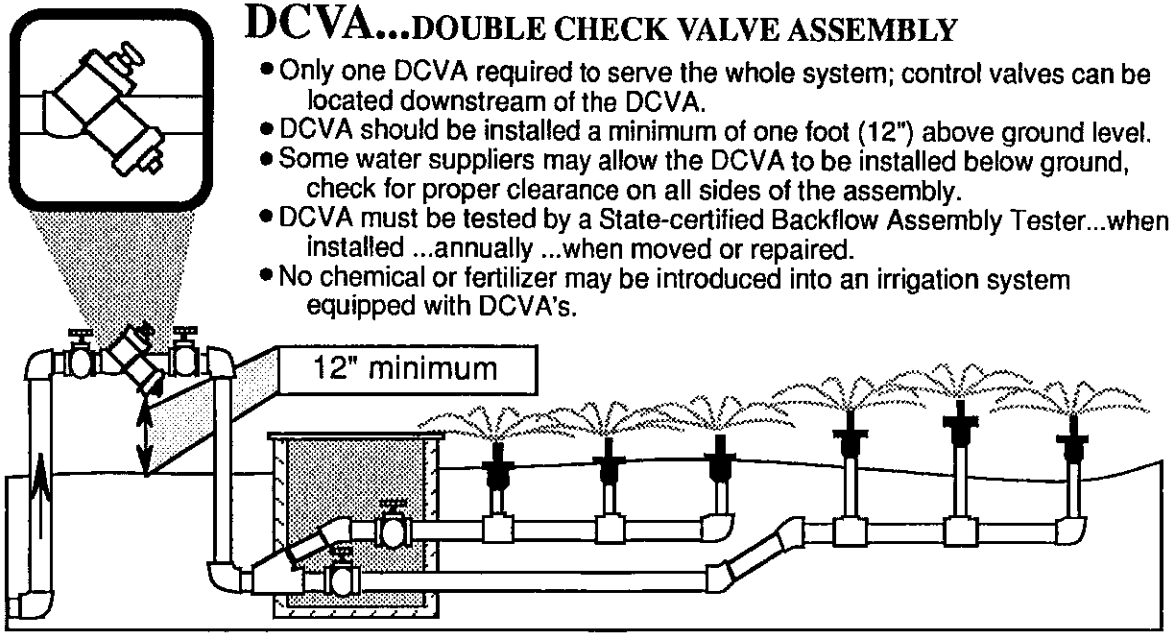


DCVA...DOUBLE CHECK VALVE ASSEMBLY

- Only one DCVA required to serve the whole system; control valves can be located downstream of the DCVA.
- DCVA should be installed a minimum of one foot (12") above ground level.
- Some water suppliers may allow the DCVA to be installed below ground, check for proper clearance on all sides of the assembly.
- DCVA must be tested by a State-certified Backflow Assembly Tester...when installed ...annually ...when moved or repaired.
- No chemical or fertilizer may be introduced into an irrigation system equipped with DCVA's.



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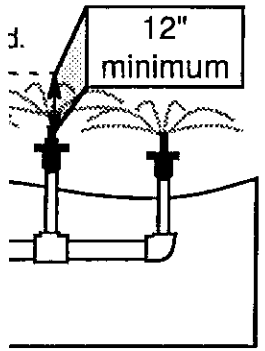
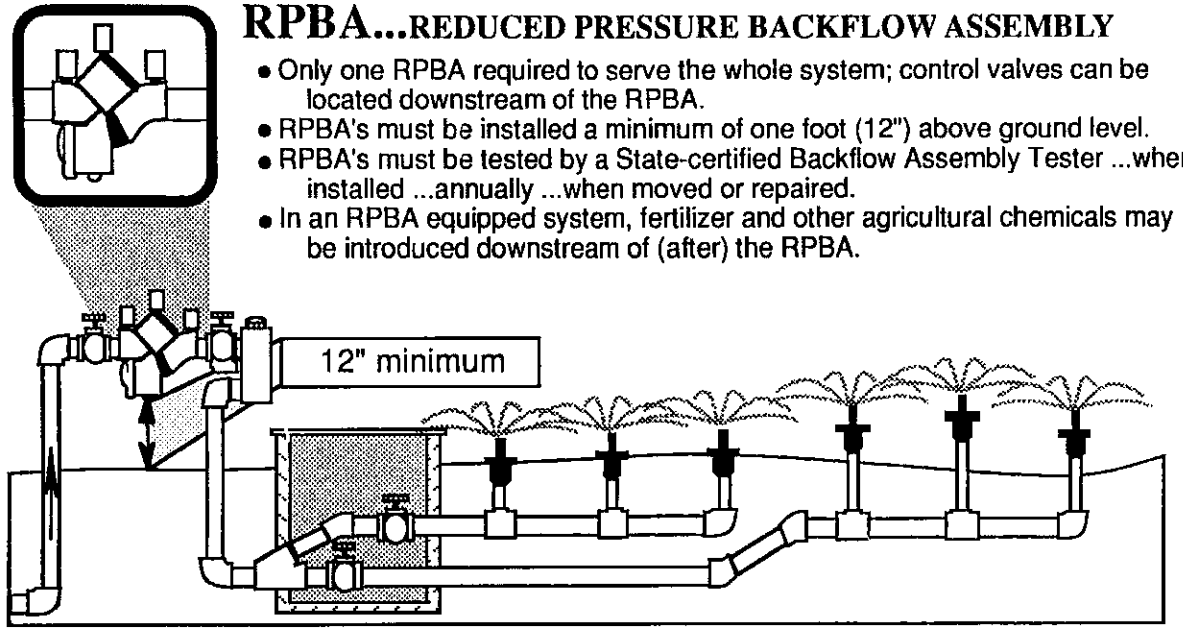
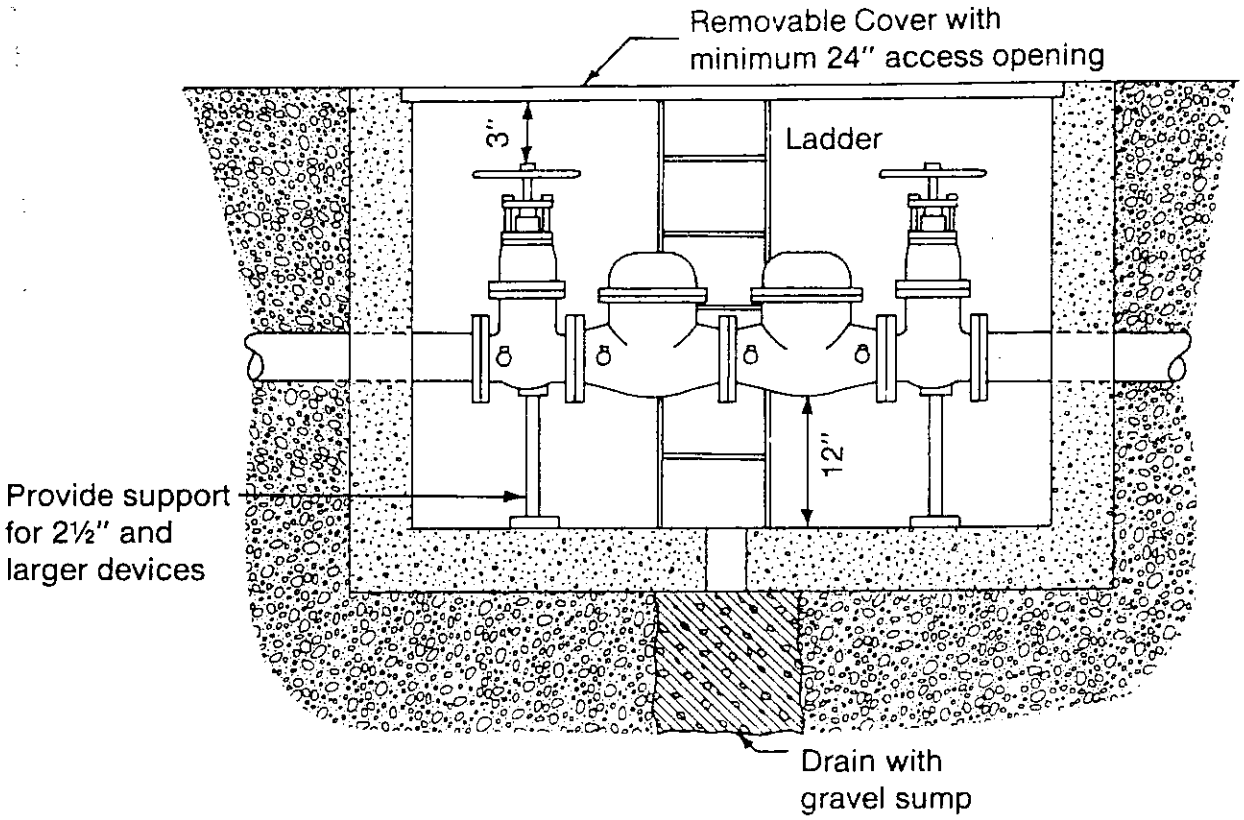


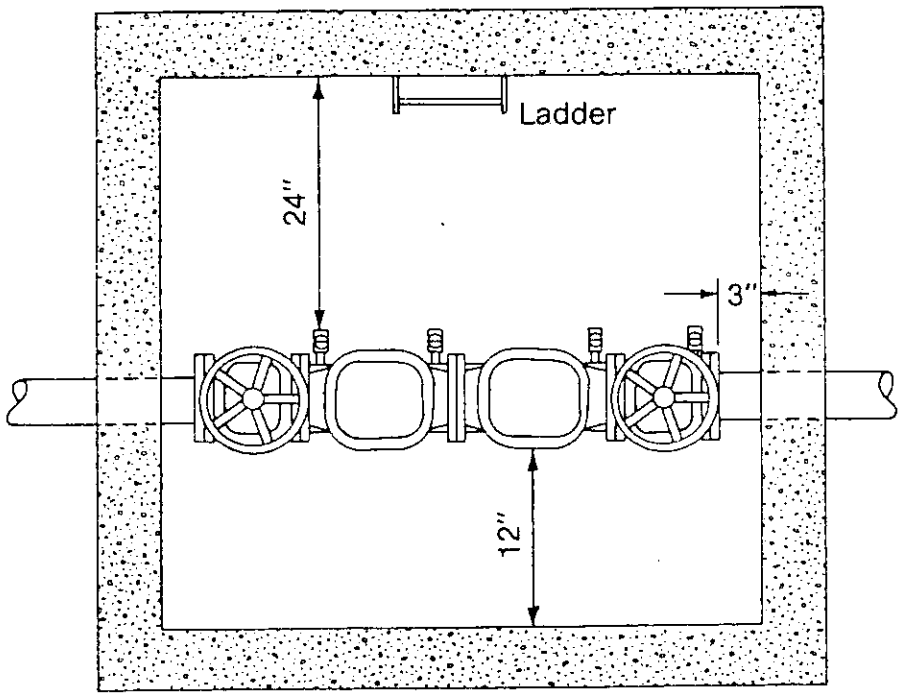
RPBA...REDUCED PRESSURE BACKFLOW ASSEMBLY

- Only one RPBA required to serve the whole system; control valves can be located downstream of the RPBA.
- RPBA's must be installed a minimum of one foot (12") above ground level.
- RPBA's must be tested by a State-certified Backflow Assembly Tester ...when installed ...annually ...when moved or repaired.
- In an RPBA equipped system, fertilizer and other agricultural chemicals may be introduced downstream of (after) the RPBA.

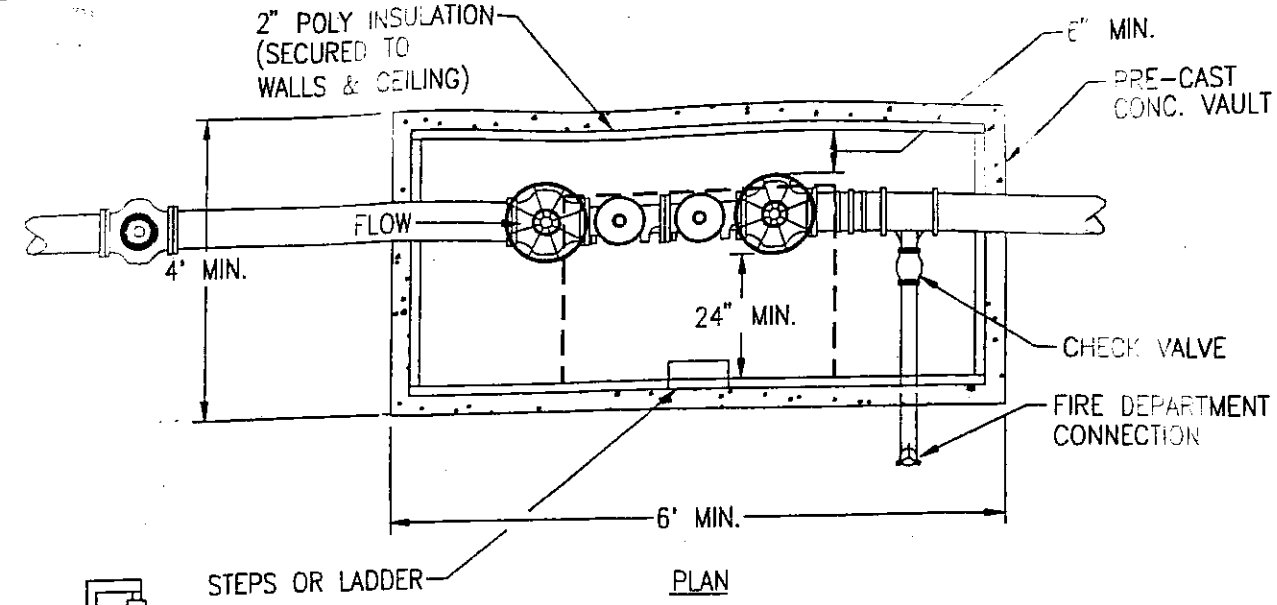


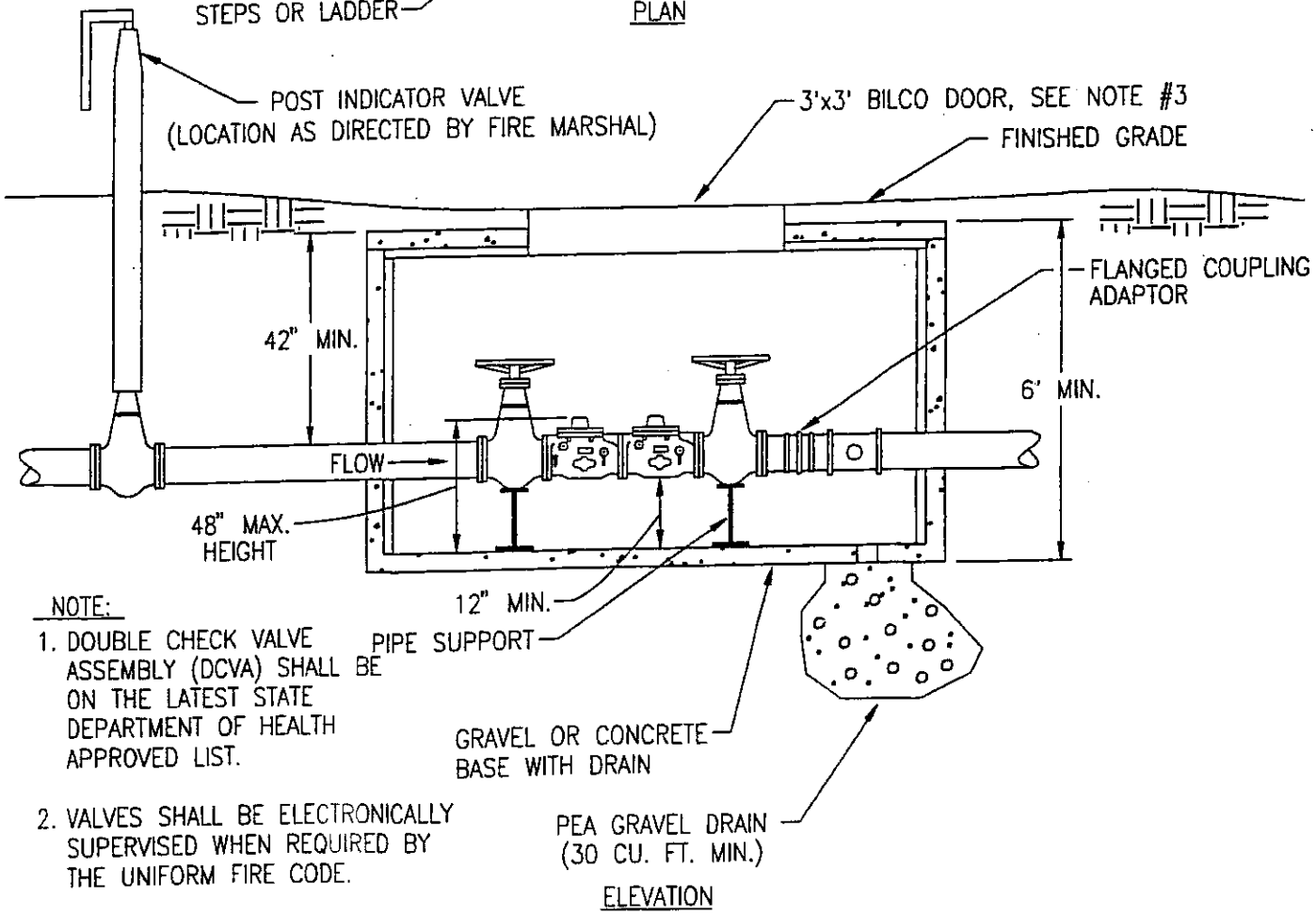
MINIMUM CLEARANCES FOR DCVA INSTALLATION





NOTE: Bottom and side clearances apply when devices are installed inside building.





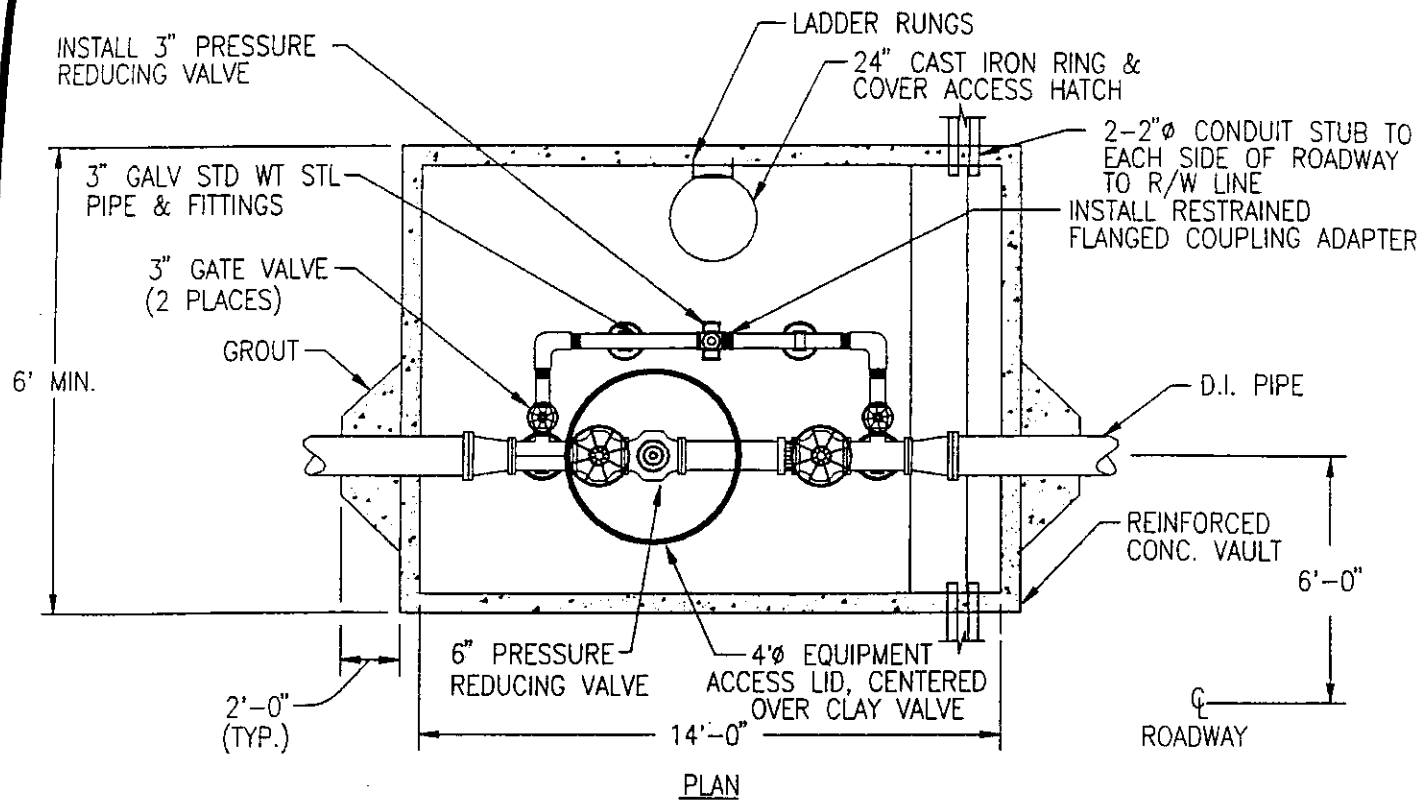
NOTE:

1. DOUBLE CHECK VALVE ASSEMBLY (DCVA) SHALL BE ON THE LATEST STATE DEPARTMENT OF HEALTH APPROVED LIST.
2. VALVES SHALL BE ELECTRONICALLY SUPERVISED WHEN REQUIRED BY THE UNIFORM FIRE CODE.
3. BILCO K-4 SINGLE LEAF DOOR OR APPROVED EQUAL. VAULTS LOCATED IN TRAFFIC AREAS SHALL HAVE TRAFFIC RATED DOORS.

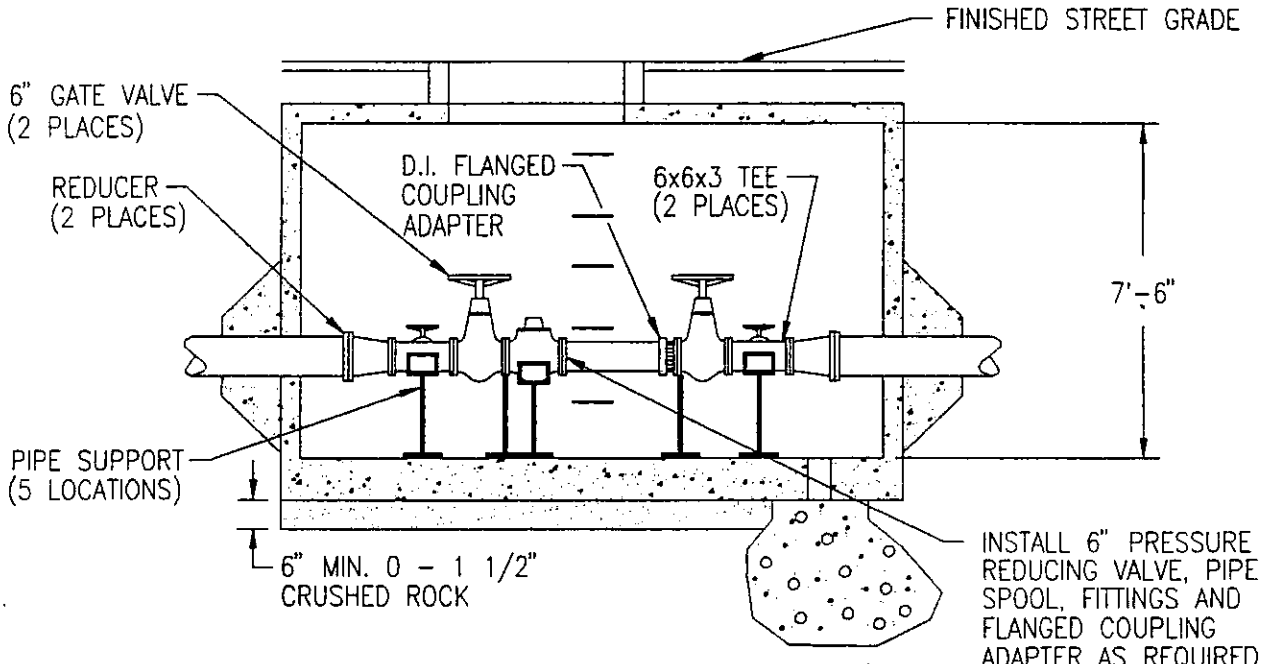
FIRE-LINE BACKFLOW ASSEMBLY OUTSIDE INSTALLATION

RICHLAND
ENGINEERING & UTILITY SERVICES DEPT.
CIVIL & ENVIRONMENTAL ENGINEERING

CIVIL & ENVIRONMENTAL ENGINEERING	
APPR. BY: R.G.W.	DATE: 2/25/97
DRAWN BY: E.A.B.	PAGE: W7
CAD FILE: FIRELINE	REV # 3



PLAN



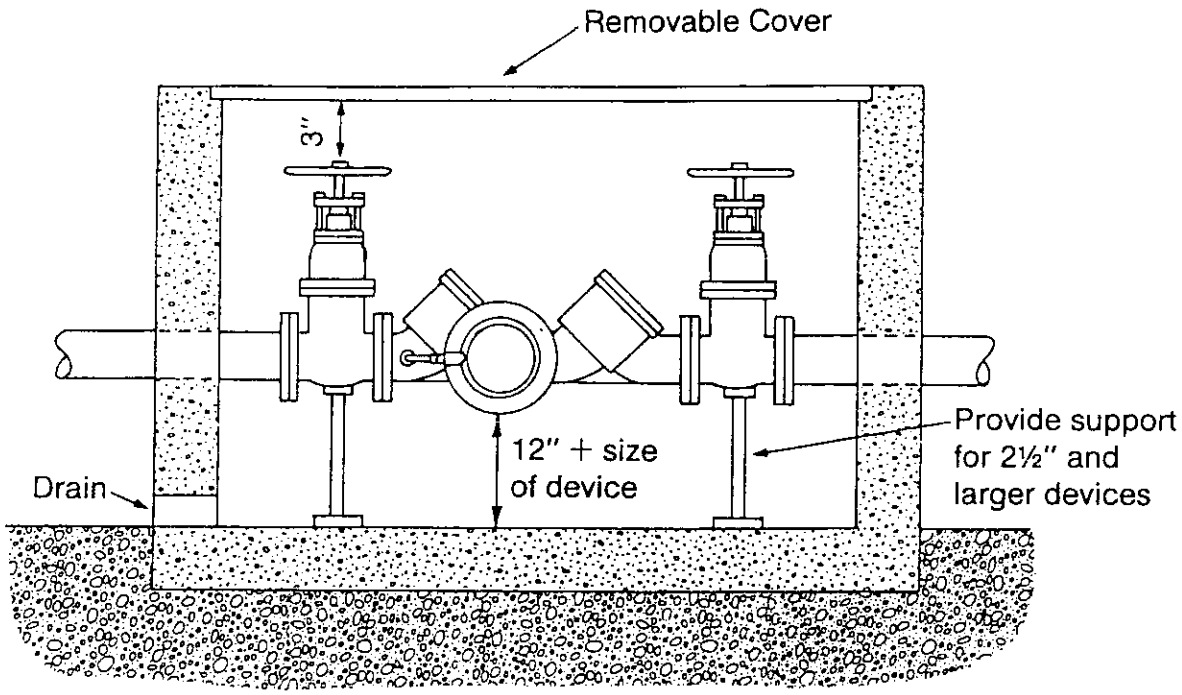
ELEVATION

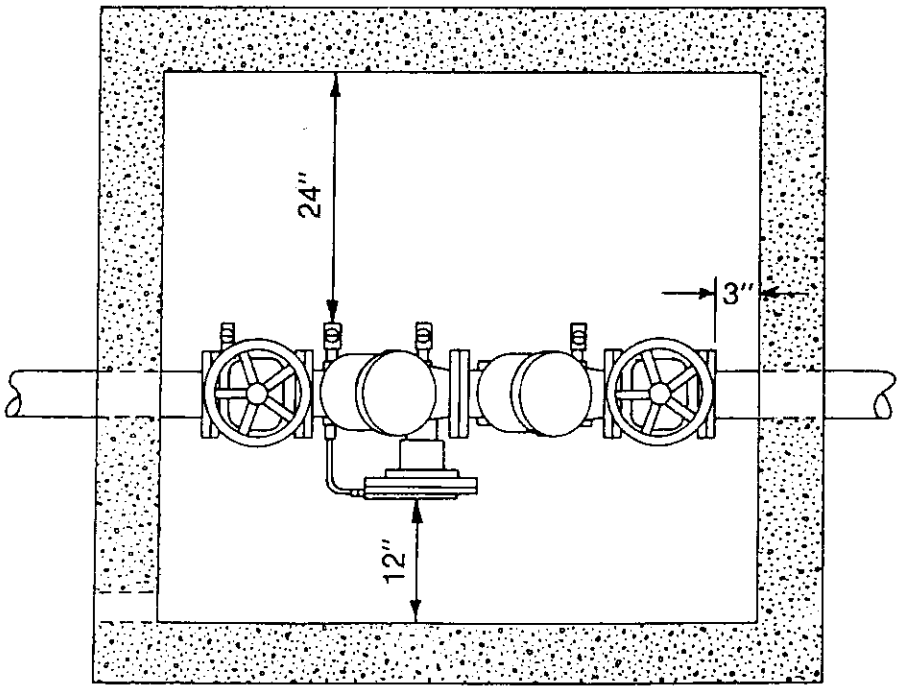
WATER PRESSURE REDUCING ASSEMBLY

RICHLAND W.W.U./C.A.D.

WATER & WASTE UTILITIES	
APPR. BY:	DATE: 8/7/95
DRAWN BY: E.A.B.	PAGE: W6
CAD FILE: PRES_VAL	REV # 1

MINIMUM CLEARANCES FOR RPBD INSTALLATION





NOTE: Bottom and side clearances apply when devices are installed inside building. Access doors may be provided on side of above-ground vault.