



## **BACKFLOW PREVENTION ASSEMBLY INSTALLATION STANDARDS**

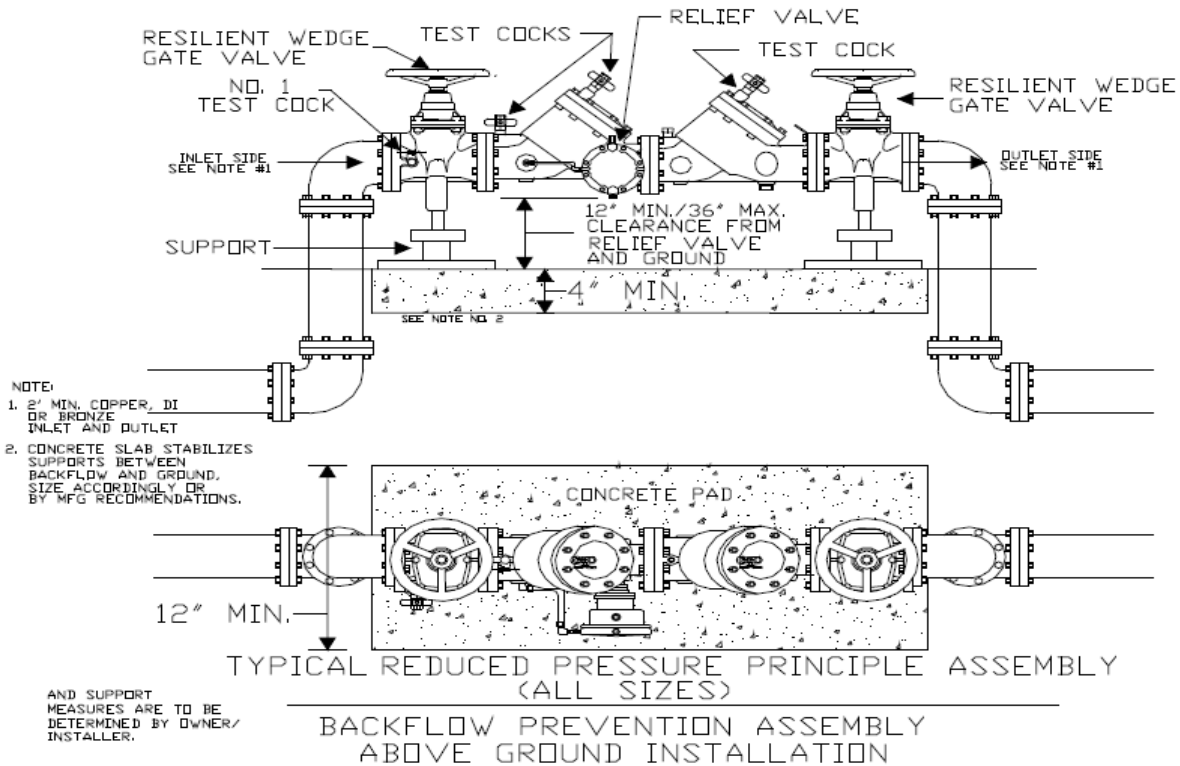
All backflow prevention assembly installation shall be in accordance with the following standards unless otherwise directed or approved by the Bexar Metropolitan Water District (BMWD). These instructions are general guidelines and are subject to change without notice. Any inquiries or requests should be directed to the Bexar Metropolitan Water District's Backflow Prevention Section, at (210) 354-6555.

### **I. GENERAL INSTRUCTIONS**

1. Assemblies will be installed in an accessible location to facilitate maintenance, testing and repair, and should be located no more than five feet above the floor or grade level. The backflow preventer must be installed between the meter and the owner's first tap or tee (total containment) unless otherwise approved. Internal containment will be approved for car washes, schools, retail laundries, and multiple lease spaces by individual review. In no instances will the assembly be allowed in the same vault with the Bexar Metropolitan Water District's water meter. Containment assemblies on fire lines must be located within 100' (pipe length) of the property line.
2. Vault lids will be constructed in such a manner as to permit easy accessibility at all times by an individual. Vaults deeper than five feet shall be provided with a ladder permanently attached to a side wall. It is the contractor's and owner's obligation and responsibility to ensure OSHA regulations are adhered to in the construction of all vaults. Additionally, confined space regulations are to be consulted and followed in the testing and maintenance of the backflow prevention assemblies.
3. Before installing the assembly, pipelines should be thoroughly flushed to remove foreign material.
4. Test cocks must never be used as supply connections and must be plugged except when testing. Plugs must be non-ferris, e.g; brass, plastic, etc. Backflow preventers must be installed horizontally and in an upright position, unless full approval has been obtained from the University of Southern California or the American Water Works Association. Future testing and repair on the backflow prevention assemblies require the indicated clearances to be provided regardless of test cock locations except for 1" or smaller double check valve assemblies that are repairable from the top, have test cocks on top of the assembly and not installed in concrete or asphalt.
5. All hot water heating systems should be evaluated before the backflow prevention assembly is installed to ensure that a Thermal Expansion Tank has been properly installed and in working condition. Future backflow prevention assembly tests should also include the testing of pressure relief valves.
6. In order to ensure that backflow prevention assemblies continue to operate satisfactorily, it will be necessary that they be tested at the time of installation and on an annual basis thereafter. Such tests will be conducted in accordance with BMWD performance standards and field test procedures as prescribed by the American Water Works Association or the University of Southern California. The Backflow Prevention Section shall provide appropriate "Test and Maintenance" report forms.
7. The Backflow Prevention Section will inspect all containment installations, i.e., located between the water meter and the owner's first tap or tee.
8. All costs entailed in the subject program are to be borne by the customer. This includes the initial purchase of the backflow preventer, its proper installation, testing and maintenance. Both containment and internal isolation backflow preventers must be maintained in good working condition.

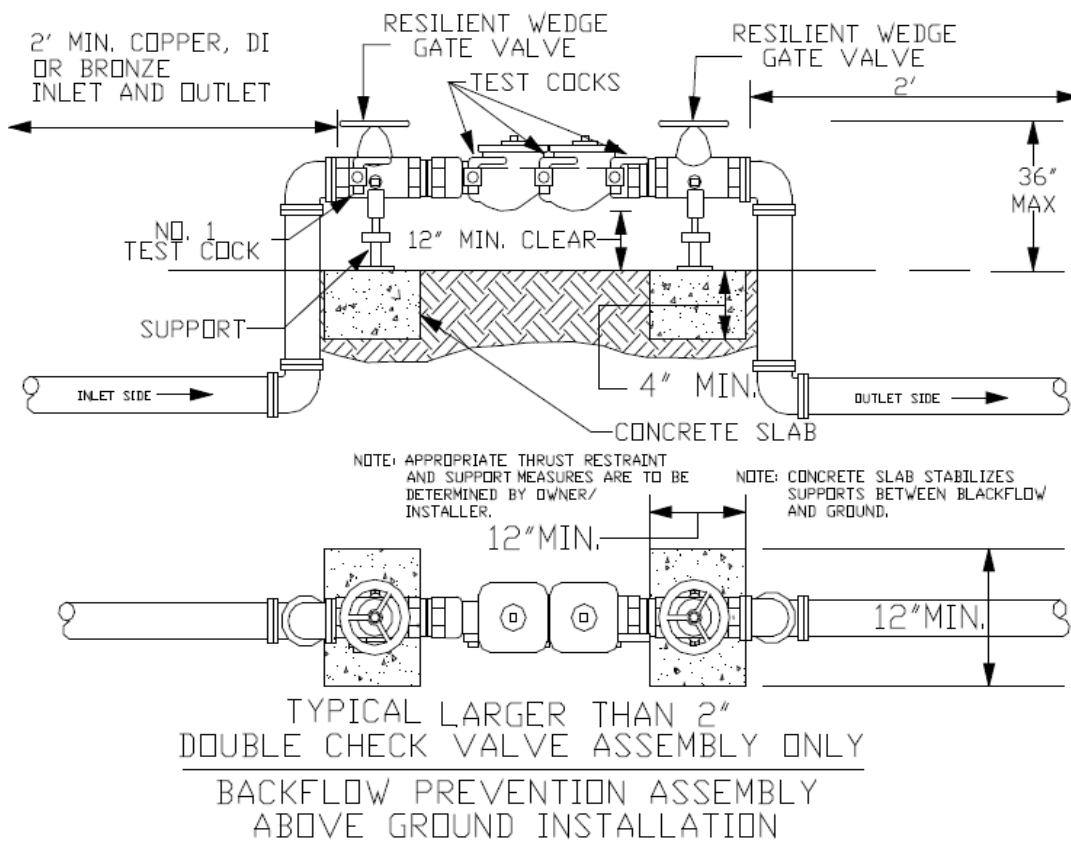
## II. INSTALLATION OF REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTERS

Reduce pressure principle backflow preventers will be installed above ground. (Fig. A) The unit should be placed at least 12 inches (12") plus diameter of pipe above the finish grade to allow clearance for repair work. A concrete slab at finish grade is recommended. Proper drainage should be provided for the relief valve and may be piped away from the location, provided it is readily visible from above grade and the relief valve is separated from the drain line by a minimum of double the diameter of the supply line. A modified vault installation may be used if constructed with ample side clearances. (Fig. B) Freezing can be a problem in this area and precautions should be taken to protect above ground installations. (See General Instructions, page 1).



### III. INSTALLATION OF DOUBLE CHECK VALVE ASSEMBLY BACKFLOW PREVENTER

Though double check valve assemblies can be installed above ground, these backflow preventers are also readily adaptable for vault installations. Special notice should be given to the side clearances for accessibility to properly test and repair the assembly. Test cocks must be plugged. Plugs must be non-ferrous, e.g., brass, plastic, etc. NOTE SIDE CLEARANCES, (Fig. C) (See General Instructions, page 1)



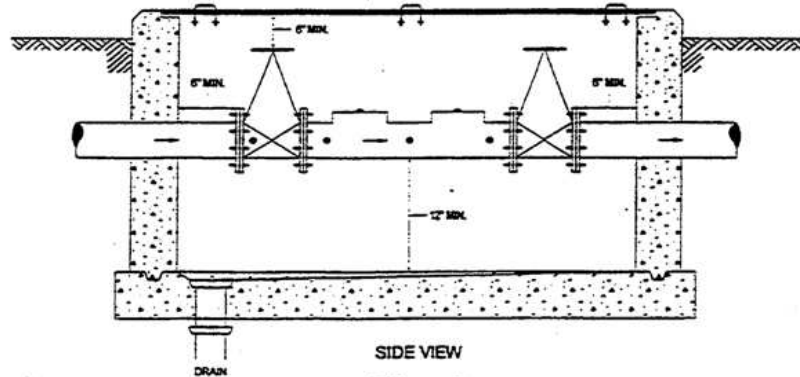


Fig. C

A. **BELOW GRADE VAULT INSTALLATION OF DOUBLE CHECK VALVE ASSEMBLY**

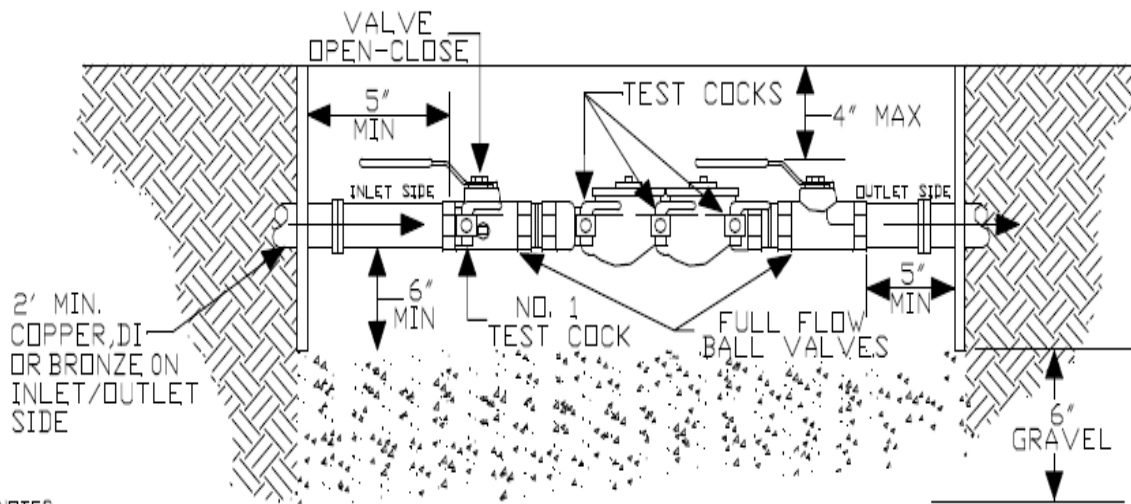
Double check valve assemblies should be installed above grade if possible, but may be installed in below grade vaults when these vaults are properly constructed in accordance with the following guidelines:

I. General – Double Check Valve Assemblies – All Sizes

Double check valve assembly backflow preventers, unlike reduced pressure principle assemblies, are designed and readily adaptable for below grade installations, provided they are installed in a vault which is well drained and of solid construction. Vaults within traffic areas should be constructed accordingly. Assemblies must be installed horizontally and in an upright position. Backflow preventers installed in a vertical position or on their side will be disapproved.

II. Double Check Valve Assemblies Sizes ¾" through 2"

Backflow preventers of sizes two inches and less should not be installed more than 12" below grade for accessibility during testing and repair. To accommodate the installation of most double check valve assemblies up to and including two inch sizes, a vault constructed of concrete, steel, cast iron or other durable material conforming to the dimensions described below is acceptable provided a twelve inch (12") clearance is maintained on the test cock side of the assembly (see General Instructions No. 4), a four inch (4") clearance on the non-test cock side and a four inch (4") clearance between the two gate valves and the ends of the vault. Exception: On 1" or smaller double check valve assemblies that are repairable from the top, have test cocks on the top of the assembly and not installed in cement or asphalt, the side clearance can be reduced to 4", see General Instructions No. 4. The floor of the vault shall be either of solid construction with a drain or bottomless to facilitate drainage. In order to facilitate repair of Y-pattern assemblies, a twelve inch (12") clearance must be provided below the assembly. Rigid construction must extend to the floor of the vault.

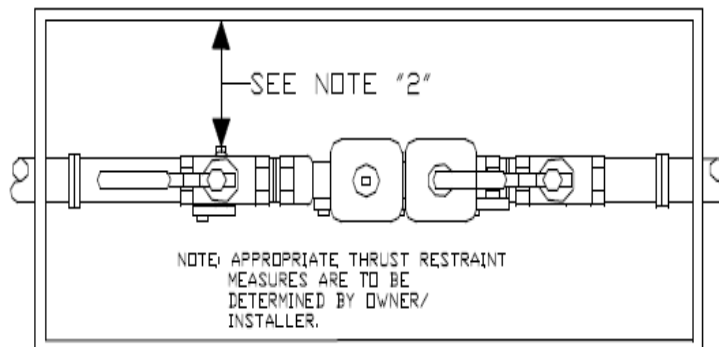


NOTES:

1. 2" AND SMALLER DOUBLE CHECKS MAYBE INSTALLED IN A BOX AS SHOWN. ALL REDUCED PRESSURE PRINCIPLE ASSEMBLIES OR DOUBLE CHECK VALVE ASSEMBLIES LARGER THAN 2" MUST BE INSTALLED ABOVE GROUND.
2. BOX MUST BE SIZED TO ALLOW ADEQUATE ROOM FOR TESTING AND MAINTENANCE.

TYPICALLY THIS DIMENSION SHOULD BE A MIN. OF 6" ALL AROUND, (SIDES AND BOTTOM).

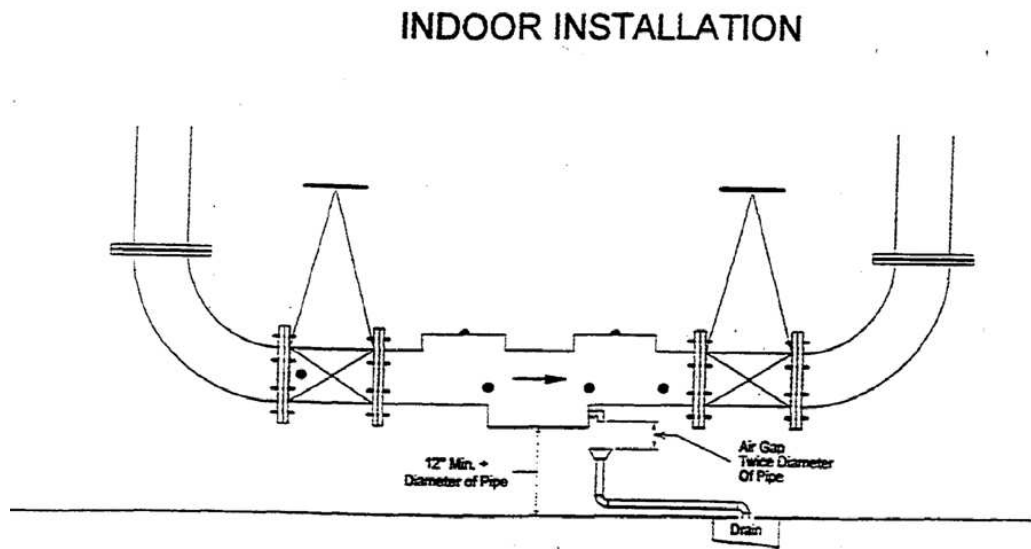
BELOW GROUND INSTALLATION 2" AND SMALLER (NOT FOR REDUCED PRESSURE PRINCIPLE ASSEMBLIES).



TYPICAL 2" AND SMALLER  
 DOUBLE CHECK VALVE ASSEMBLY ONLY  
 BACKFLOW PREVENTION ASSEMBLY  
 BELOW GROUND INSTALLATION

### III. Indoor Installation – Reduced Pressure and Double Check Valve Assembly Backflow Preventers.

Where it is impractical to install the backflow preventer above ground, the installation may be made in an easily accessible location inside a building. The unit should be placed above the floor and away from the wall, at a distance great enough to allow clearance for repair work. If the backflow preventer is positioned against the wall, care should be taken that the test cocks are easily accessible for testing, and the assembly can be repaired. An air gap should be used between the relief valve outlet and the drain line if drainage is to be piped away. The drain should be of adequate size to carry the volume of water the relief valve is capable of discharging. The air gap should be no less than double the diameter of the discharge pipe. (Fig. D) (See General Instructions, Page 1)



#### IV. BY-PASS POLICY

Backflow prevention assemblies must be tested upon installation and on an annual basis thereafter. The testing procedure requires the water to be turned off. If continuous water service is a necessity, provisions should be made for a by-pass around the mainline backflow preventer. A by-pass installed around an approved backflow prevention assembly must be protected from backflow through this bypass, i.e., it also will include a backflow preventer of the same type as the main service line backflow preventer. Though it need not be of the same size, it must be installed in a similar fashion to the service line device.

## V. AIR GAP SEPARATION (A/G)

An air gap separation means the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture or other device and the flood level or overflow rim of the receptacle. An “approved air gap separation” shall be at least double the diameter of the supply pipe measured vertically above the overflow rim of the vessel and in no case shall the gap be less than 1.” The tank should be installed as close to the property line as practical. The piping between the water meter and the air gap separation should be entirely visible to ensure that no connections or tees are made in that area. To eliminate possible entrance of vermin, screened protections over the entire (A/G) set up are encouraged. (See General Instructions, Page 1)

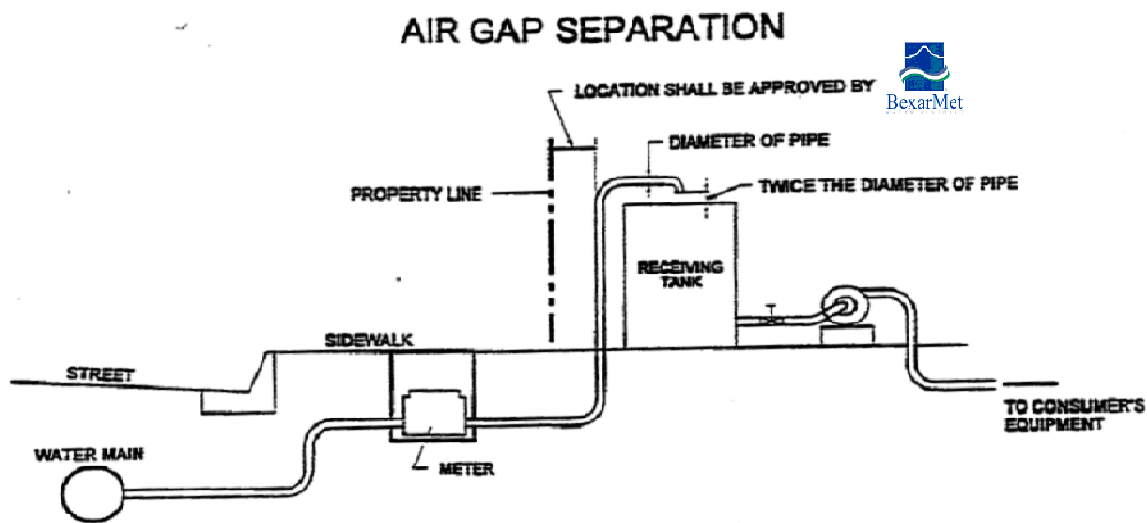


FIG E.

## VI. LAWN SPRINKLER INSTALLATION USING A PRESSURE TYPE VACUUM BREAKER AS A BACKFLOW PREVENTER

Pressure type vacuum breakers may be installed without regard to a down stream valve, making it possible to isolate an entire lawn sprinkler system with a single unit when properly located. This assembly must not be installed where it will be subject to backpressure and should be installed at least twelve inches (12") above the highest outlet. The vacuum breaker should be installed where it will be accessible for periodic testing and where, if slight spillage should occur, it would not be objectionable. (Fig. F) (See General Instructions, Page 1). If chemical additives are to be used, an air gap separation or reduced pressure principle assembly will be required.

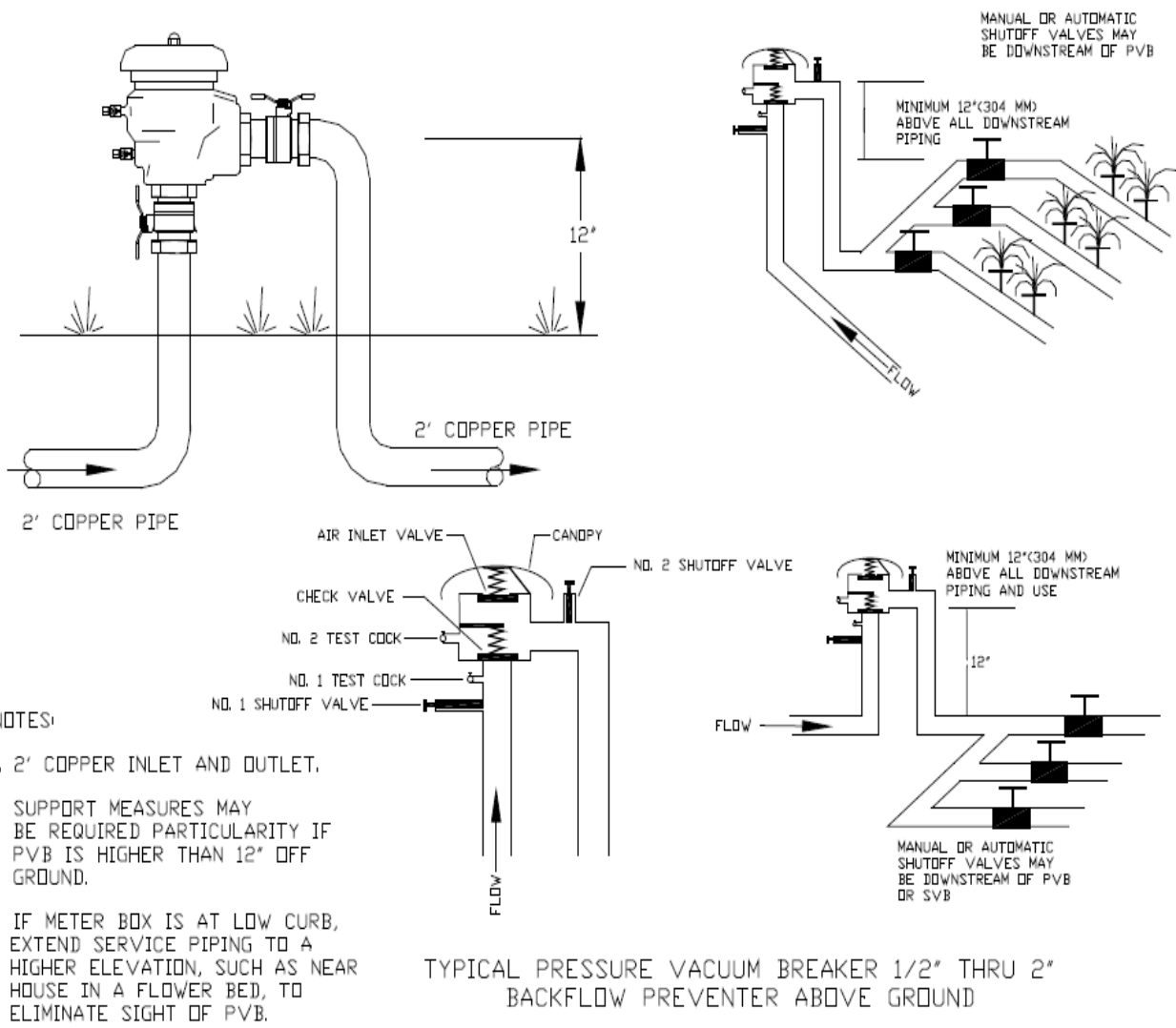


Figure F

## BACKFLOW PROTECTION FOR WATER HAULING EQUIPMENT AND/OR MIXING TANKS

### 1. PURPOSE

The following information is provided in the interest of protecting the potable water system from actual or potential contamination through cross connections and backflow situations. A cross-connection is any connection between the potable water supply and another water supply of unknown quality or any source, which may contain contaminating or polluting substances. All water hauling equipment and/or potable water mixing tanks using water from fire hydrants or any other type outlet must use one of the backflow prevention methods described herein to adequately protect the potable water system.

### 2. GENERAL REQUIRMENTS

- a. The customer must contact the BexarMet Water Districts Cross Connection Control / Backflow Department of the Regulatory Compliance Department at (210) 354-6555 prior to water usage to request an inspection of the on-site or vehicular backflow protection installed. Requests made between 8:00 am and 11:00 am, should normally result in same day inspections, otherwise the inspections will be made the following business day, consistent with operational requirements.
- b. Customers electing to permanently install an air gap separation on water transporting vehicle(s) must have the air gap separation inspected and approved by the Inspections Division.
- c. Customers electing to install a reduced pressure principle backflow assembly will be required to have the assembly tested by a licensed backflow prevention assembly tester upon installation and minimum of annually thereafter.

### 2. BACKFLOW PREVENTION METHODS

The customer shall provide one of the approved methods for backflow protection described below and as further illustrated in the attached drawings marked as Figures A through E. The customer shall also consult the BexarMet Water District's list of approved assemblies and installation guidelines.

- a. Air gap separation provided by a metallic pipe permanently installed on the water transporting vehicle which will serve as a fill line and also include a hose connection to the potable water outlet. Note Figure A.
- b. Air gap separation installed on the outlet side of the fire hydrant meter. Note Figure B.
- c. Reduced Pressure Principle (R/P) backflow prevention assembly installed at the fire hydrant meter. Note Figure C.
- d. Reduced Pressure Principle (R/P) backflow prevention assembly permanently installed on the water-transporting vehicle. Note Figure D.

- e. Pickup with tank installed in back of bed with pipe permanently attached to serve as fill line with air gap. Note Figure E.

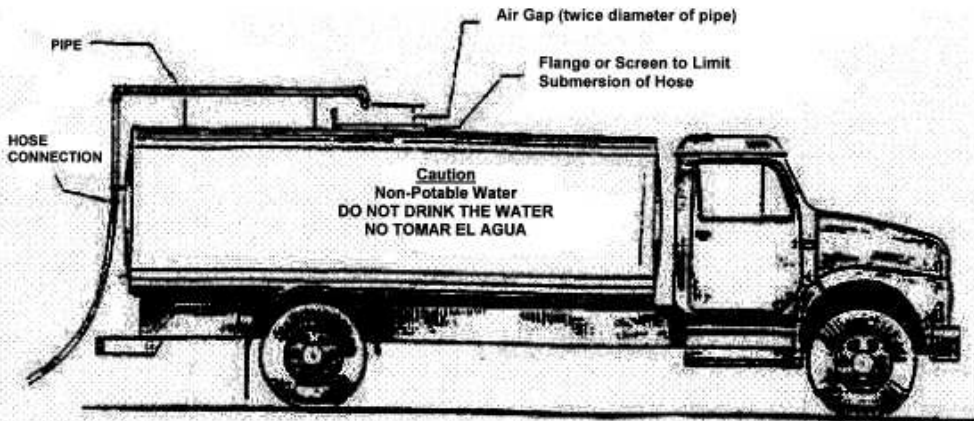


Figure A

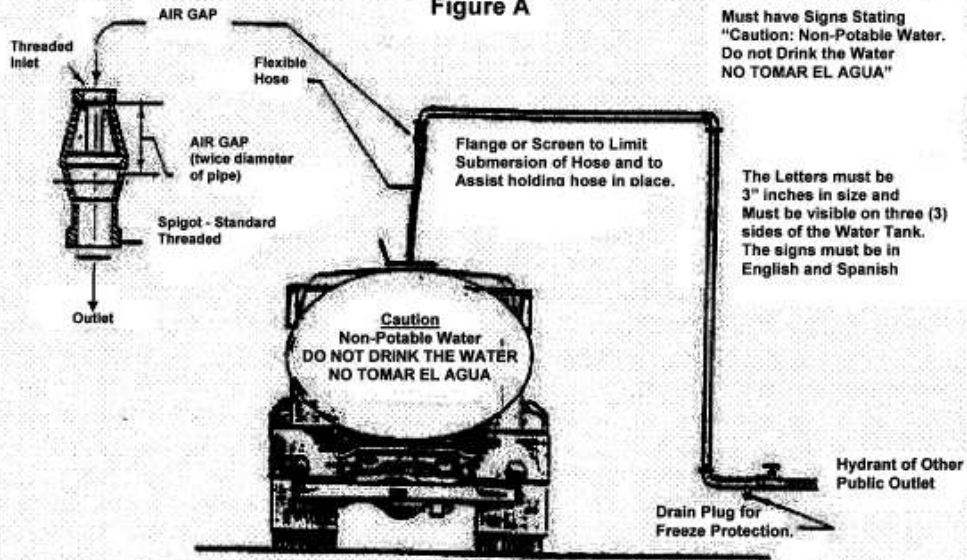
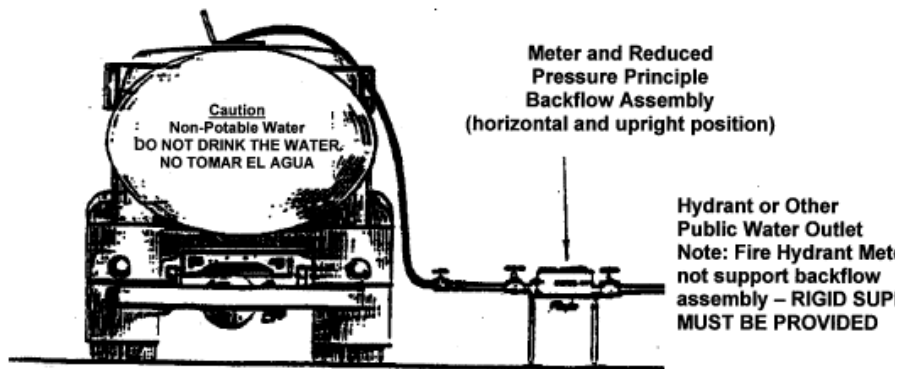
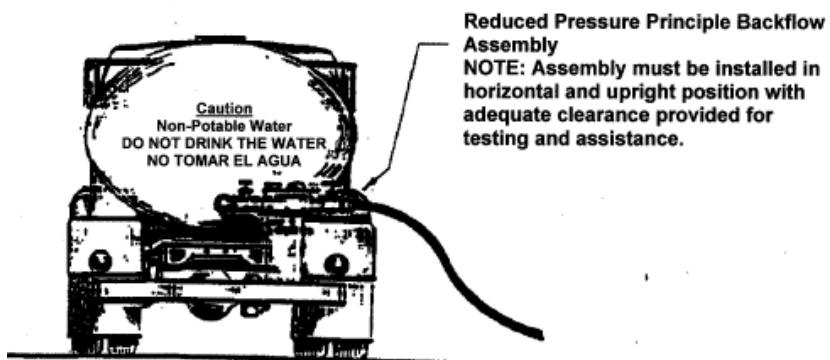


Figure B

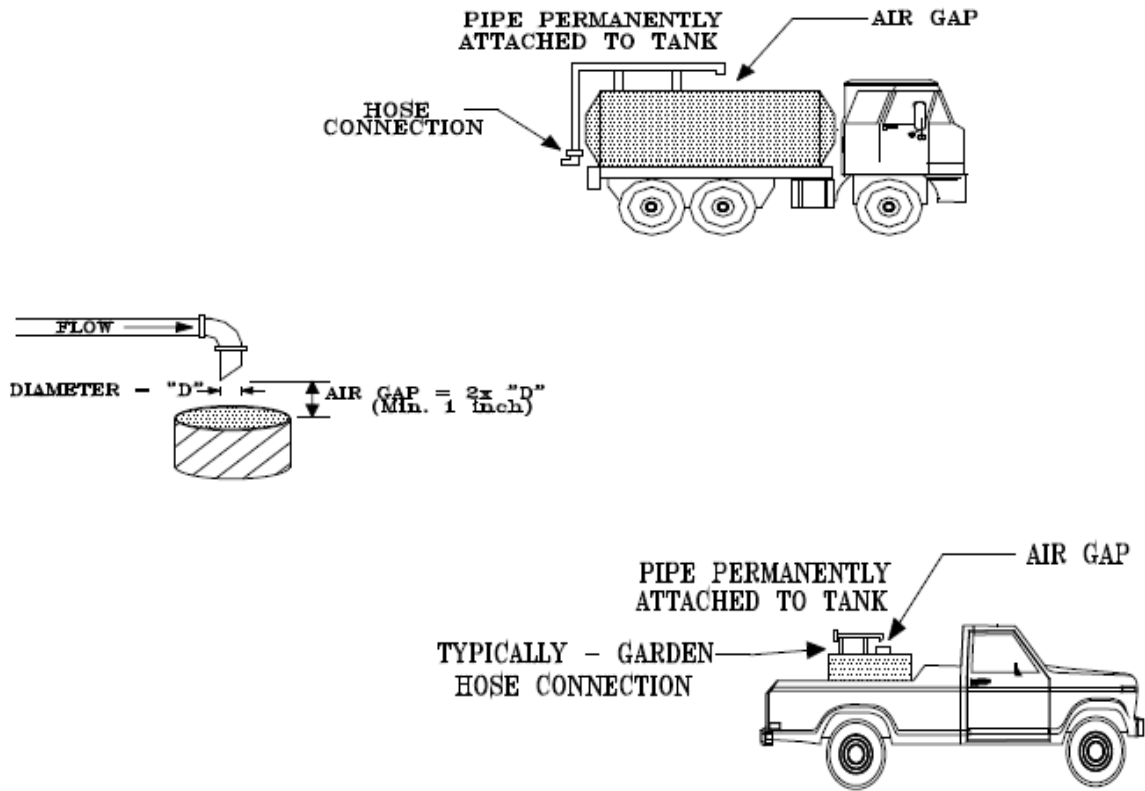


**Figure C**



**Figure D**

Backflow Prevention Method-Reduced Pressure Principle Assembly



**Figure E**