

CITY OF SIOUX CITY

BACKFLOW PROGRAM

By

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Underground Utility Services Field
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OUTLINE

- Purpose
- Responsibility
- Types of Devices
- City of Sioux City Backflow Ordinance
 - Home Owner
 - Fire Suppression
 - Commercial
 - Lawn Sprinkler
 - Booster Pumps
 - Cross-Connection Hazard Survey

OUTLINE CON'T

- Bulk Water Fill Site
- Hydrant Meters
- Liquor License
- Testing Requirements
 - Annually
 - IDPH Registered Backflow Prevention Assembly Tester
- Examples
- Questions

PURPOSE

- To reduce the risk of contamination or pollution of the public water supply
- A cross-connection is any actual or potential connection between a potable water supply and any other environment

RESPONSIBILITY

- (SDWA) Safe Drinking Water Act
- State Department of Public Health
- Fire Department
 - Fire Protection Systems
- Plumbing Inspector
 - Liquor License
 - Restaurants

RESPONSIBILITY CONT

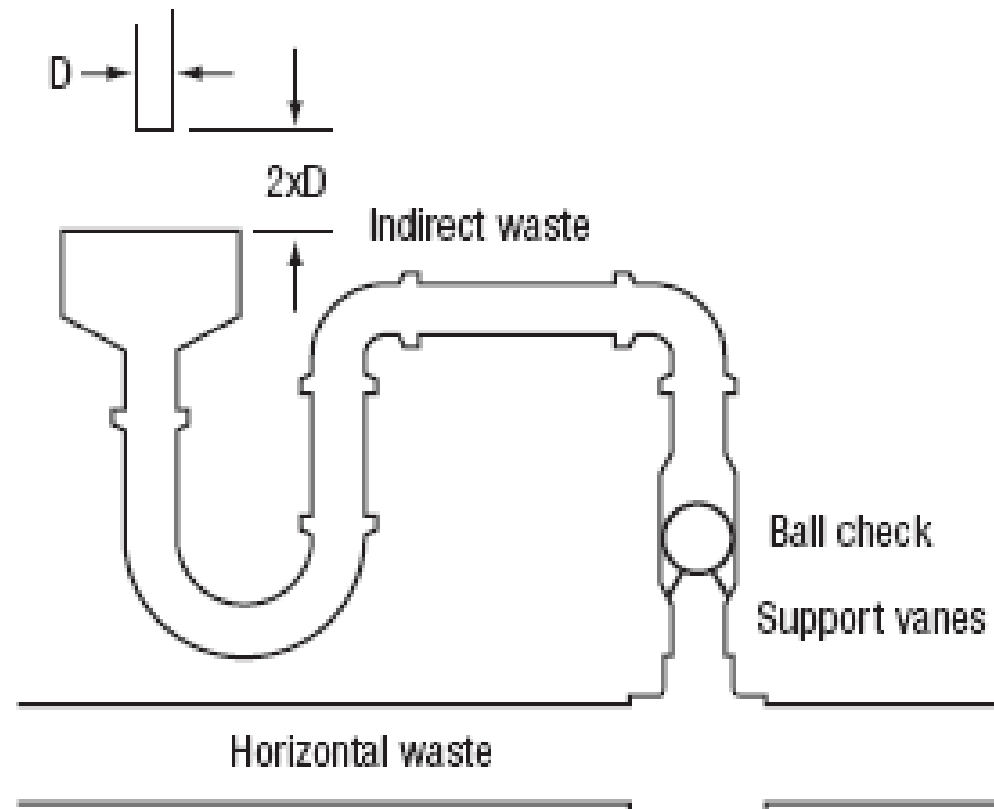
- Property Owner
 - Annual inspection by state licensed inspector
- (DNR) Department of Natural Resources
 - Inspection of potable water supply
- Water Utility
 - Cross-Connection Control Administration
 - Provide potable water to its customers

Types of Devices

- Approved Air Gap separation
- Atmospheric Vacuum Breaker (AVB)
- Double Check Valve Backflow-Prevention Assembly (DC)
- Pressure Vacuum-Breaker Assembly (PVB)
- Reduced Pressure Principle Backflow-Prevention Assembly (RPZ)

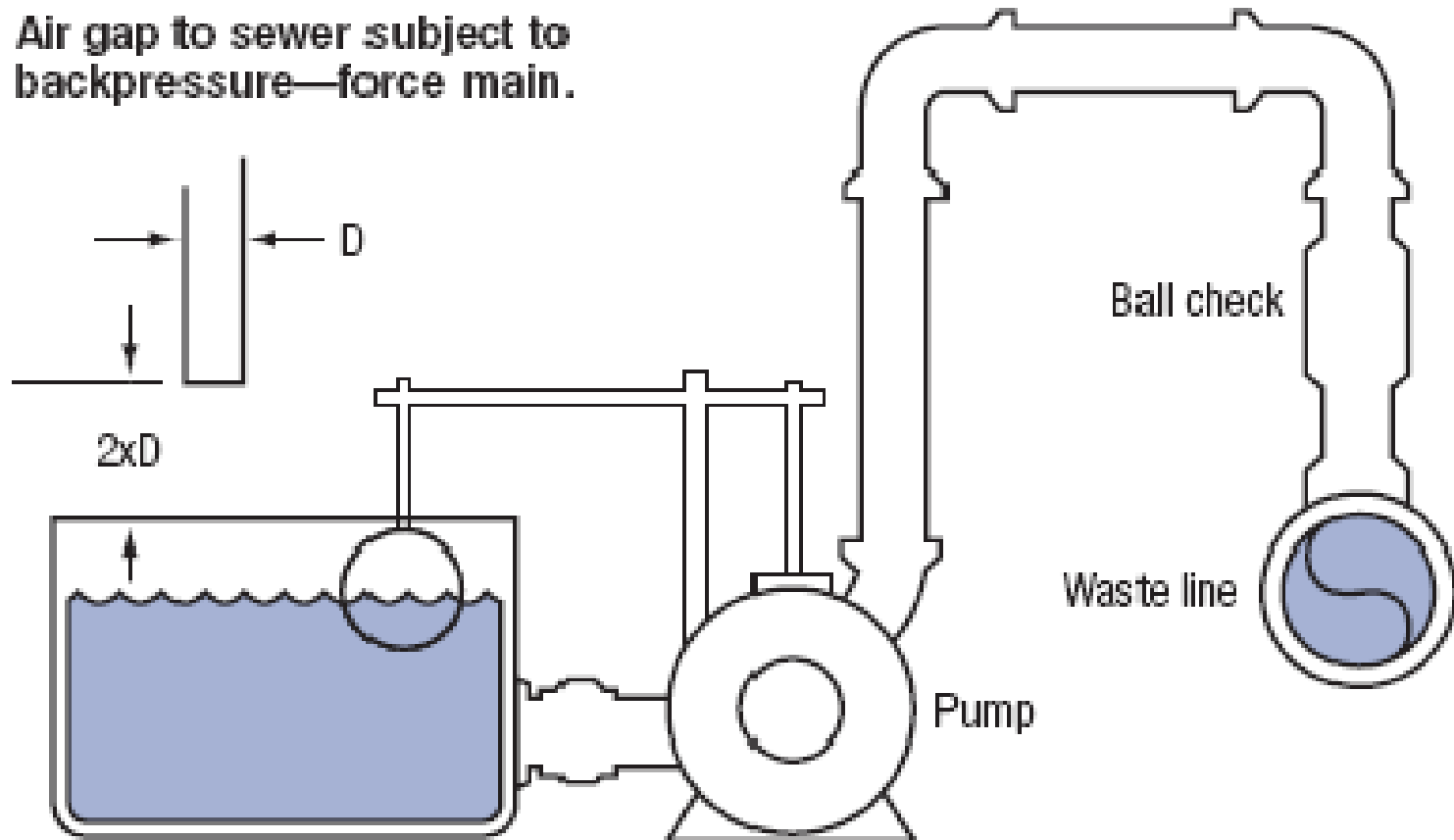
APPROVED AIR GAP SEPARATION

FIGURE 55.
Air gap to sewer subject to
backpressure—gravity drain.



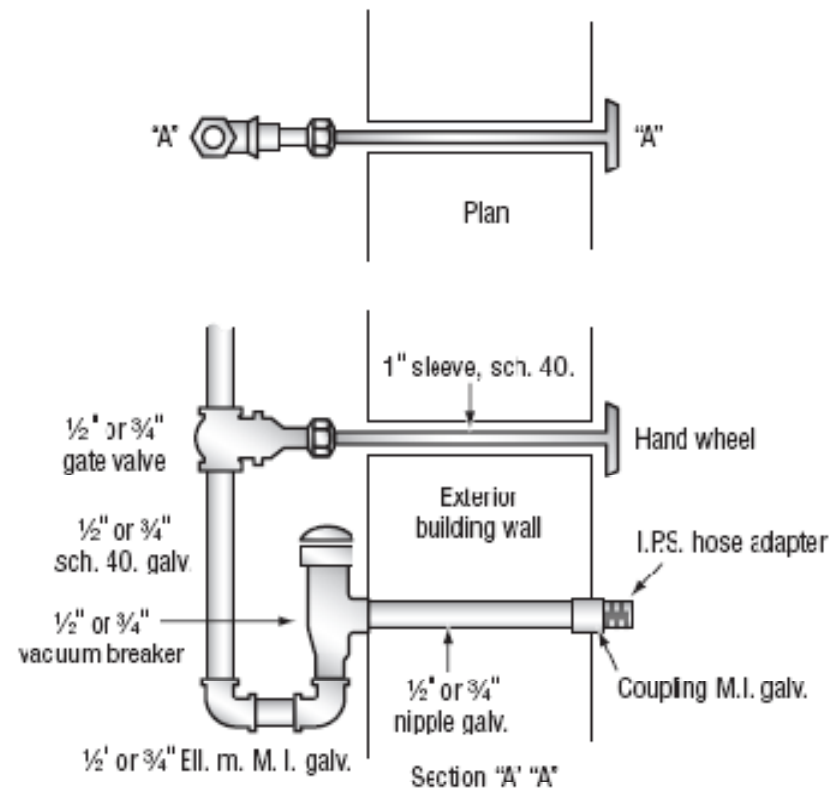
APPROVED AIR GAP

FIGURE 54.
Air gap to sewer subject to
backpressure—force main.



ATMOSPHERIC VACUUM BREAKER (AVB)

FIGURE 58
Vacuum breaker arrangement for
an outside hose hydrant.



(By permission of Mr. Gustave J. Angele
Sr., PE. formerly Plant Sanitary
Engineer, Union Carbide Nuclear
Division, Oak Ridge, Tenn.)

(AVB)

FIGURE 15.
Atmospheric vacuum breaker.

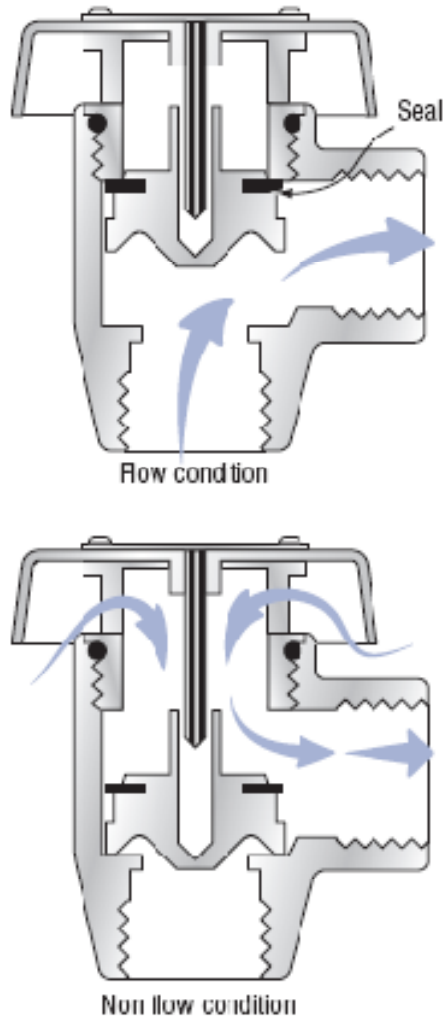
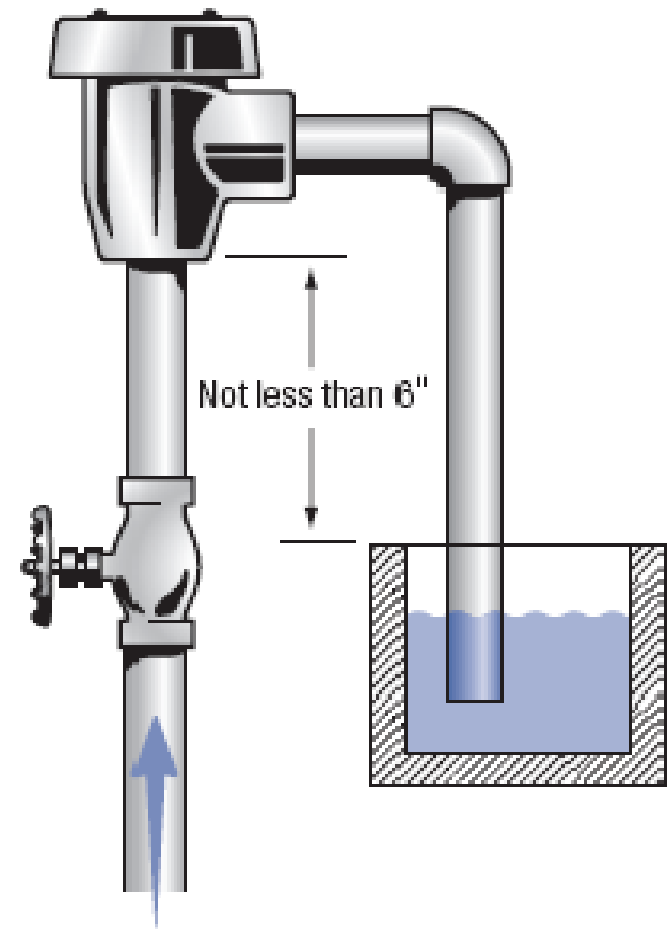


FIGURE 17.
Atmospheric vacuum breaker in
plumbing supply system.



FIGURE 16.
Atmospheric vacuum breaker
typical installation.



DOUBLE CHECK VALVE BACKFLOW PREVENTION ASSEMBLY

FIGURE 24.
Double check valve.

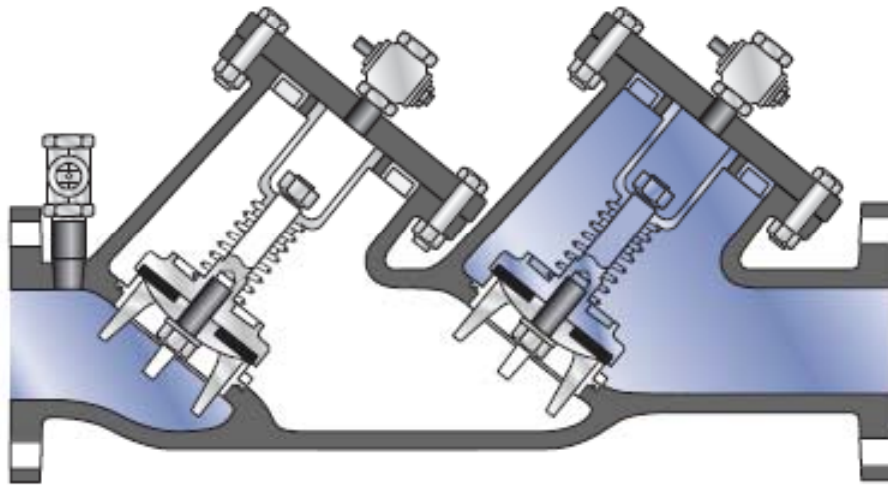
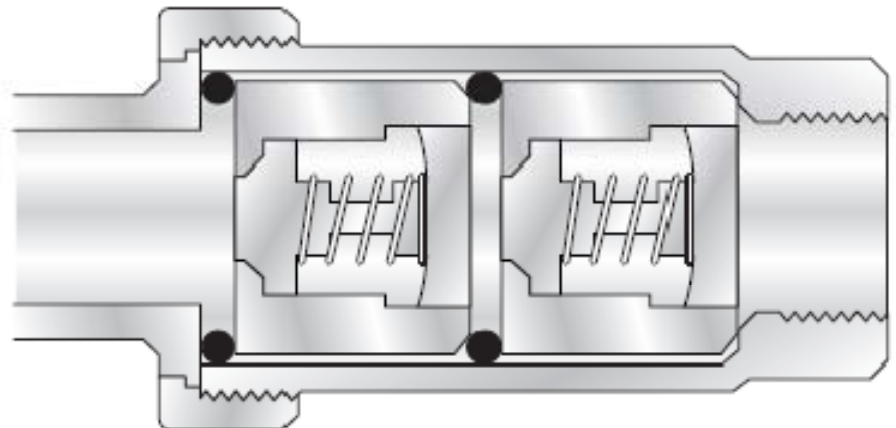


FIGURE 26.
Residential dual check.



DOUBLE CHECK VALVE

FIGURE 36.
Typical installation double check valve horizontal and vertical installation.

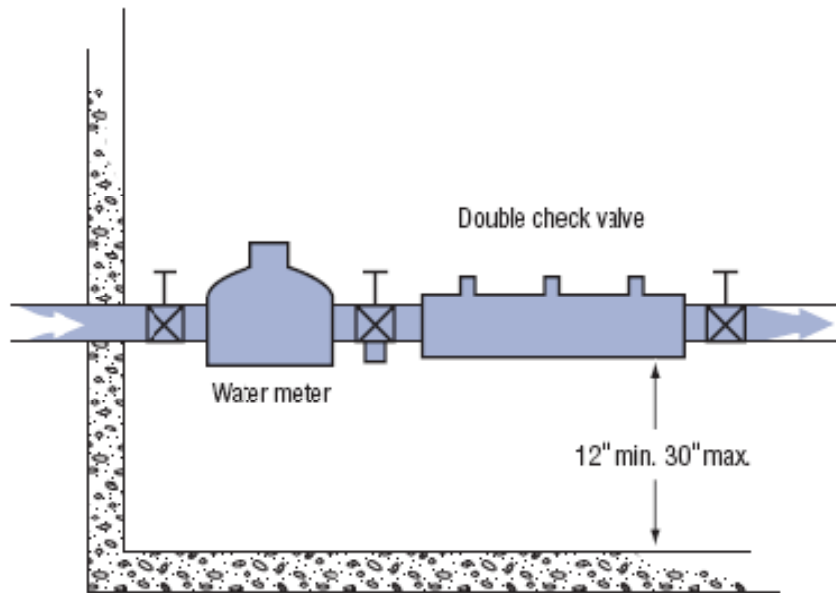
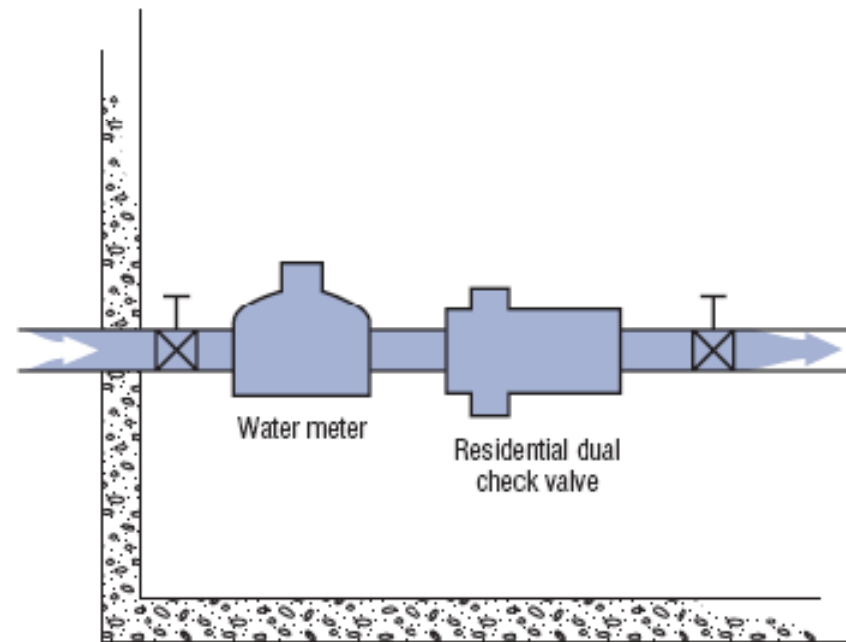
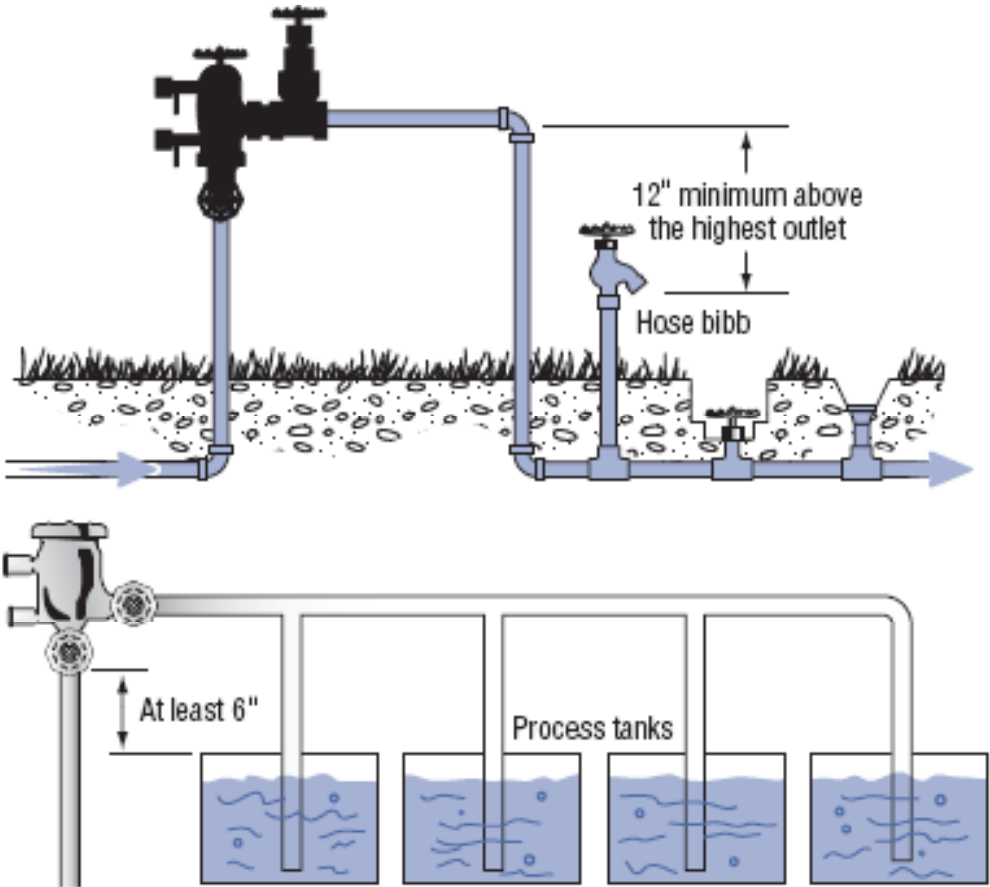


FIGURE 37.
Typical installation residential dual check with straight set and copperhorn.



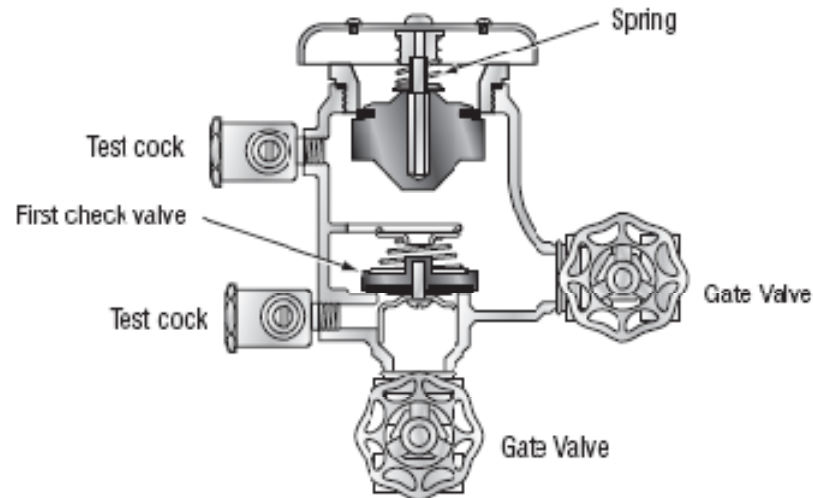
PRESSURE VACUUM BREAKER ASSEMBLY (PVB)

FIGURE 21.
Typical agricultural and
industrial application of
pressure vacuum breaker.

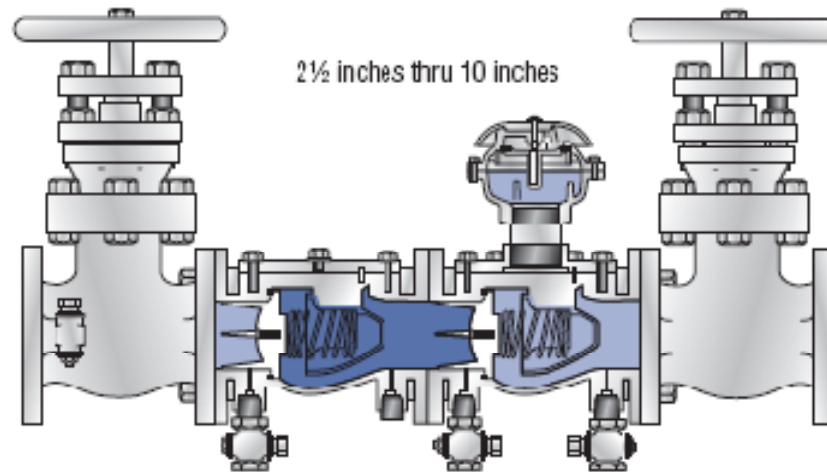


(PVB)

FIGURE 20.
Pressure vacuum breaker



¾ inch thru 2 inches



2½ inches thru 10 inches

REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY (RPZ)

FIGURE 30.
Reduced pressure zone backflow
preventer — principle of operation.

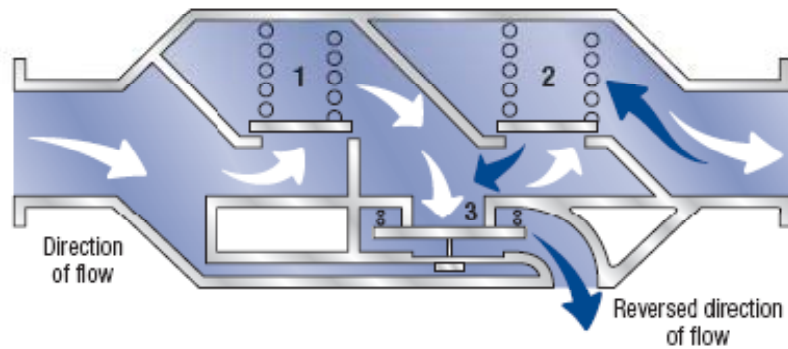


FIGURE 31.
Plating plant installation.

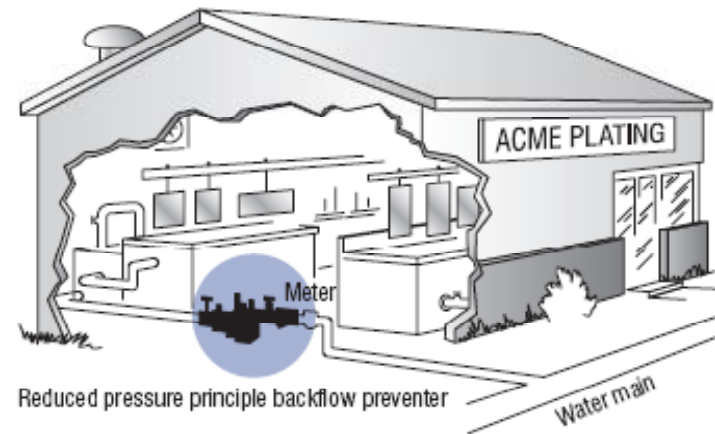
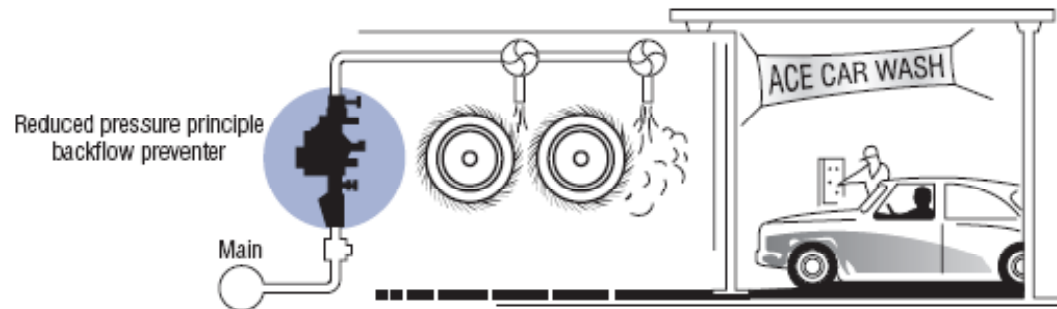
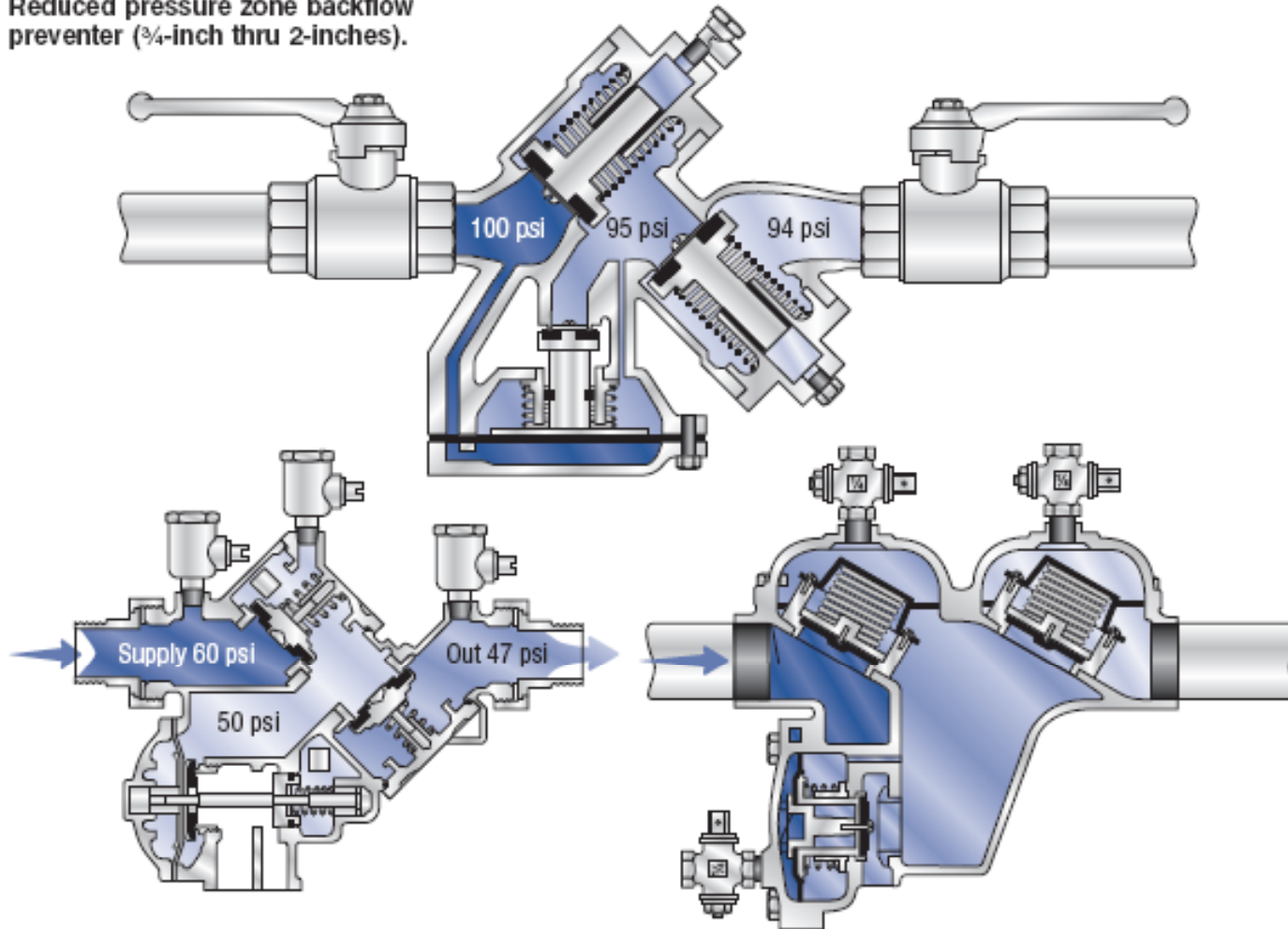


FIGURE 32.
Car wash installation.



(RPZ)

FIGURE 29A.
Reduced pressure zone backflow
preventer (3/4-inch thru 2-inches).



CITY OF SIOUX CITY BACKFLOW ORDINANCE

- Homeowner requirements
 - Alternate water supply, such as a well or second service
 - Premises having a repeated history of a cross-connection, such as softener silica in the water supply
 - Lawn irrigation systems or direct connect to swimming pool
 - Water recirculation systems, boilers or cooling

CITY OF SIOUX CITY BACKFLOW ORDINANCE

- Fire Suppression
 - All fire suppression systems require backflow device

CITY OF SIOUX CITY BACKFLOW ORDINANCE

- Commercial
 - Facilities that pose a health, pollution, or system hazard to public water supply
 - Medical facilities
 - Laboratories
 - Sewage & storm pumping or treatment
 - Processing & chemical plants
 - Car washes

CITY OF SIOUX CITY BACKFLOW ORDINANCE

- Lawn sprinkler systems
 - Must be 12” above the highest outlet and above ground if PVB
- Booster pumps
 - Must have a low pressure cut-off installed on suction side

CITY OF SIOUX CITY BACKFLOW ORDINANCE

- Cross-Connection Hazard Survey
 - [commercial backflowsurvey.doc](#)
 - [residential backflowsurvey-8-13-01.doc](#)

BULK FILL SITE

- City bulk fill site located at 1921 18th St
- Must contact field staff before filling
- \$6.00 per load
- Must have Air-Gap installed on fill tank or other approved backflow device

HYDRANT METERS

- Hydrant meters are available for rental from the Customer Service Division
- Currently backflow not installed on meters
- Backflow devices are being installed on our hydrant leads as they are replaced

LIQUOR LICENSE

- All facilities with a liquor license required to have backflow device
- Must be inspected to allow for renewal of license
- Enforced by the Inspection Services Division

TESTING REQUIREMENTS

- Annual Requirement
 - All testable backflow devices
 - Test results turned to Utilities Field Office
 - [Backflow Prevention Report.pdf](#)
- IDPH Registered Backflow Prevention Assembly Tester
 - Iowa Department of Public Health Manages the Tester Certification Program
 - Total Backflow Resources Inc., training

EXAMPLES

Backsiphonage

- 1991 water main break caused parasitic worms to be backsiphoned from a lawn sprinkling system

Backpressure

- Tank cleaning activities by a gas company caused propane to backflow into the distribution system because the tank pressure was greater than system pressure

EXAMPLES

Backpressure

- An air purging system at West Way in Sioux City caused compressed air to backflow into the distribution system when someone failed to close a water valve before purging system and the backflow device that was installed was not appropriate and failed

EXAMPLES

Maintenance Activities

- South Carolina 1978 backsiphonage of chlordane from and exterminator truck during meter repair
- Bancroft, Michigan shut down main to replace valve; pressure loss caused backflow of malathion from a hose end applicator
- Gridley, Kansas 1987 herbicide Lexon DF backsiphoned from tanker when a main broke