CROSS CONNECTION CONTROL

Presenters:

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Federal & State Regulations

- Clean Water Act (CWA)
- Safe Drinking Water Act (SDWA)
- Colorado Department of Public Health and Environment (CDPHE)

CROSS CONNECTION CONTROL PROGRAM GOAL.

The purpose of a cross-connection control program is to reduce the potential contamination of the public water system by identifying actual and potential cross-connections and taking action to protect the system from these hazards.

THE 5 ELEMENTS OF A CROSS-CONNECTION CONTROL PROGRAM.

- Authority
- Backflow Prevention Assemblies
- Certified Testers and Specialists
- Defensible and Detailed Records
- Education and Training

ELEMENTS OF A CROSS-CONNECTION CONTROL PROGRAM.

Authority

Authority is essential to carry out a cross-connection control program. The administrative authority must have the legal authority in place to implement policies, conduct site surveys and require backflow protection. This authority is usually in the form of a local ordinance or law.

ELEMENTS OF A CROSS-CONNECTION CONTROL PROGRAM.

Backflow Prevention Assemblies

For any cross-connection control program to be effective the administrative authority need to have the appropriate means to prevent backflow, which include backflow assemblies.

ELEMENTS OF A CROSS-CONNECTION CONTROL PROGRAM.

Certified Testers and Specialists

Once backflow prevention assemblies are properly installed, they must be annually field-tested and properly maintained.

Testers are required to go through training every 3 years. This includes a written test and a practical exam.

ELEMENTS OF A CROSS-CONNECTION CONTROL PROGRAM.

Defensible and Detailed Records

Another important element of a cross-connection control program is record keeping. Records should be retained for a specific period of time. (AW keeps backflow test reports for a minimum of 3 years). The records must also be “defensible.” This means the records should be sufficient to show that the administrative authority is meeting all of the requirements necessary to carry out their cross-connection control program.

ELEMENTS OF A CROSS-CONNECTION CONTROL PROGRAM.

Education and Training

The cross-connection control staff must be educated in the specifics of cross-connection control, including concepts of backflow and how to control a cross connection. Staff must also be trained in backflow testing.

The cross-connection control staff is also responsible for educating and training our water users and backflow testing companies.

BACKFLOW AND CROSS CONNECTION DEFINITIONS, PROTECTION AND DEGREE OF HAZARDS

- Backflow - The undesirable reversal of flow of water or other substances in the potable water distribution system.

- Cross-Connection - Any actual or potential connection between a potable water supply and a non-potable substance or source.

  - A *direct cross-connection* is a cross-connection which is subject to both backsiphonage and backpressure.
  - An *indirect cross-connection* is a cross-connection which is subject to backsiphonage only.

BACKFLOW AND CROSS CONNECTION DEFINITIONS, PROTECTION AND DEGREE OF HAZARDS

A *direct cross-connection* is a cross-connection which is subject to both backsiphonage and backpressure.

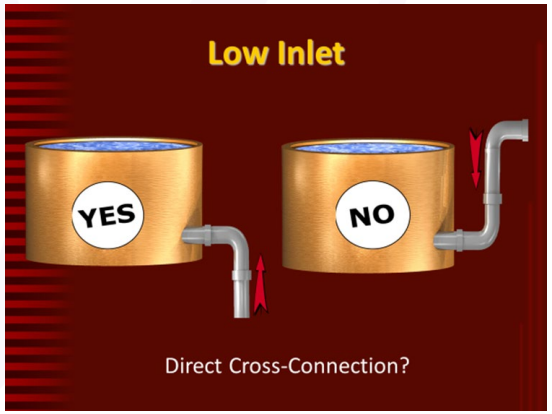
In this example the pressure created by the pump may be greater than the pressure in the make-up line. Thus, the make-up line is subject to backpressure. This is a direct cross-connection.

BACKFLOW AND CROSS CONNECTION DEFINITIONS, PROTECTION AND DEGREE OF HAZARDS

A *indirect cross-connection* is subject to backsiphonage only.

An example of an indirect cross-connection. There is no means of creating backpressure into the supply line.

A **low inlet** is a direct cross-connection if the supply line is subject to backpressure. If the incoming line can not be subjected to backpressure it is not a direct cross-connection, but an indirect cross-connection.



BACKFLOW AND CROSS CONNECTION DEFINITIONS, PROTECTION AND DEGREE OF HAZARDS

- Backflow Prevention Assembly – Any effective assembly used to prevent backflow. The type of assembly used shall be based on the existing or potential degree of hazard and backflow condition.

- Degree of Hazard – Either a pollutant (non-health hazard) or contaminant (health hazard); derived from the assessment of the materials, which may come in contact with the distribution system through a cross-connection.

BACKFLOW AND CROSS CONNECTION DEFINITIONS, PROTECTION AND DEGREE OF HAZARDS

Pollution Hazard

- **(Non-Health Hazard)**
- **(Low Hazard)**
  - Looks bad
  - Taste bad
  - Smell bad
  - Little risk to health

Health Hazard

- **(High Hazard)**
- **(Contaminant Hazard)**
  - Poses a risk to health
  - Could result in death

BACKFLOW AND CROSS CONNECTION DEFINITIONS, PROTECTION AND DEGREE OF HAZARDS

The type of backflow prevention we are most concerned about are Domestic, Irrigation and Fire Sprinkler systems “Fire lines”.

- Containment – Service Protection . “Domestic Containment” backflow protection is at the entry of the water service line before any taps or tees occur.

- Fireline – Fire Sprinkler Systems. Commercial and some buildings may be required to have fire service lines. Fire lines are not metered and are separate from a domestic service line.

- Irrigation. Irrigation back flow prevention is on a lawn irrigation system. It could be on a service line or be a dedicated irrigation line.

- Method - Any method and / or non-testable device installed in a potable water system to prevent backflow. (Includes Air Gaps)

DEFINITIONS AND IMPORTANCE

The type of backflow prevention we are most concerned about are Domestic, Irrigation and Fire Sprinkler systems “Fire lines”.

- Domestic Containment backflow protection is at the entry of the water service line before any taps or tees occur.
- Irrigation backflow prevention is on a lawn irrigation system. It could be on a service line or be a dedicated irrigation line.
- Commercial buildings may be required to have fire service lines. Fire lines are not metered and are separate from a domestic service line.

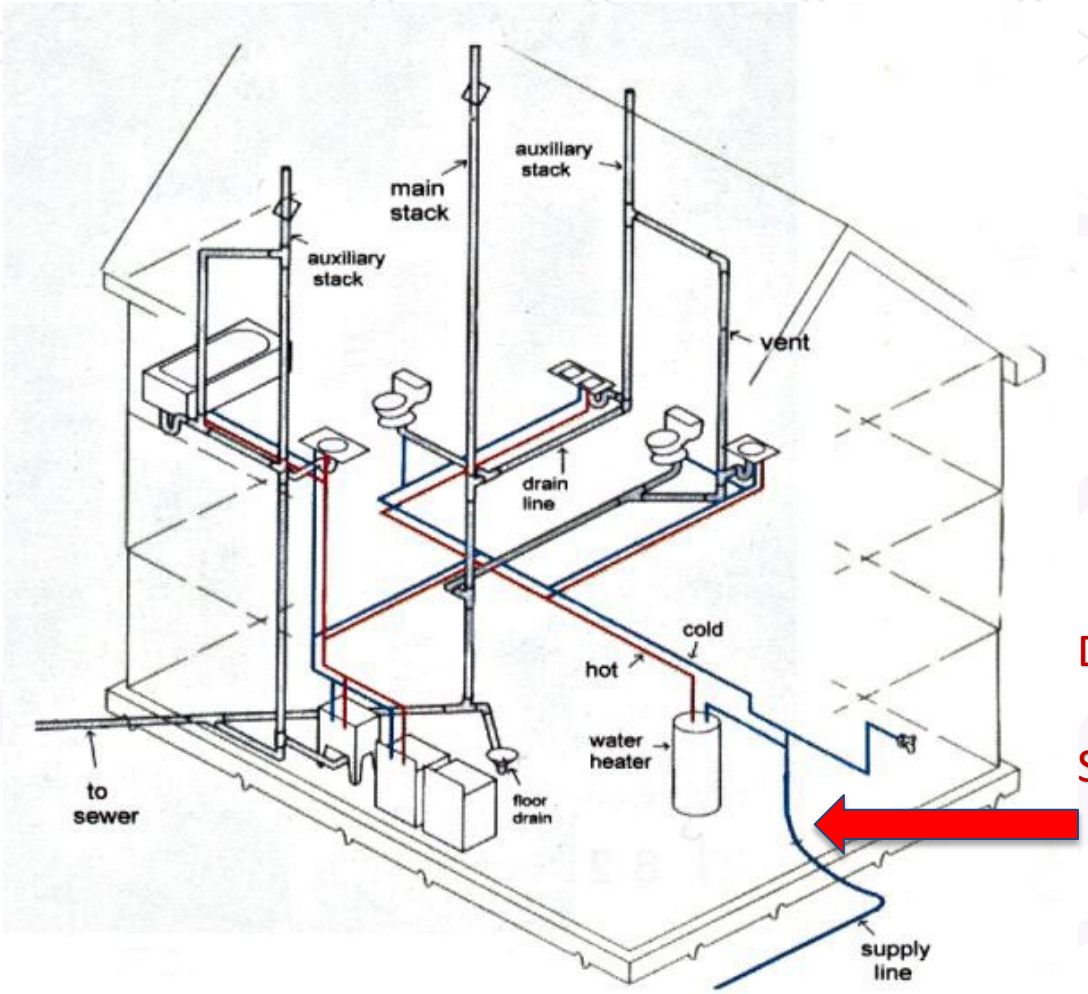
THE BEST PRACTICES TO PREVENT BACKFLOW AND CROSS CONNECTION

- The best way to stop a cross connection is not to have a connection.
- The use of an Air Gap. An Air Gap is the best method for protecting against backflow.
- Require installation of an approved Backflow Prevention Assembly rated for that degree of hazard.

AURORA WATER'S CURRENT CROSS-CONNECTION PROGRAM

- Perform field surveys to assess potential hazards
- Recommend and ensure proper installation of backflow assemblies based on hazard
- Program Administration, annual testing requirement of new and existing backflow assemblies

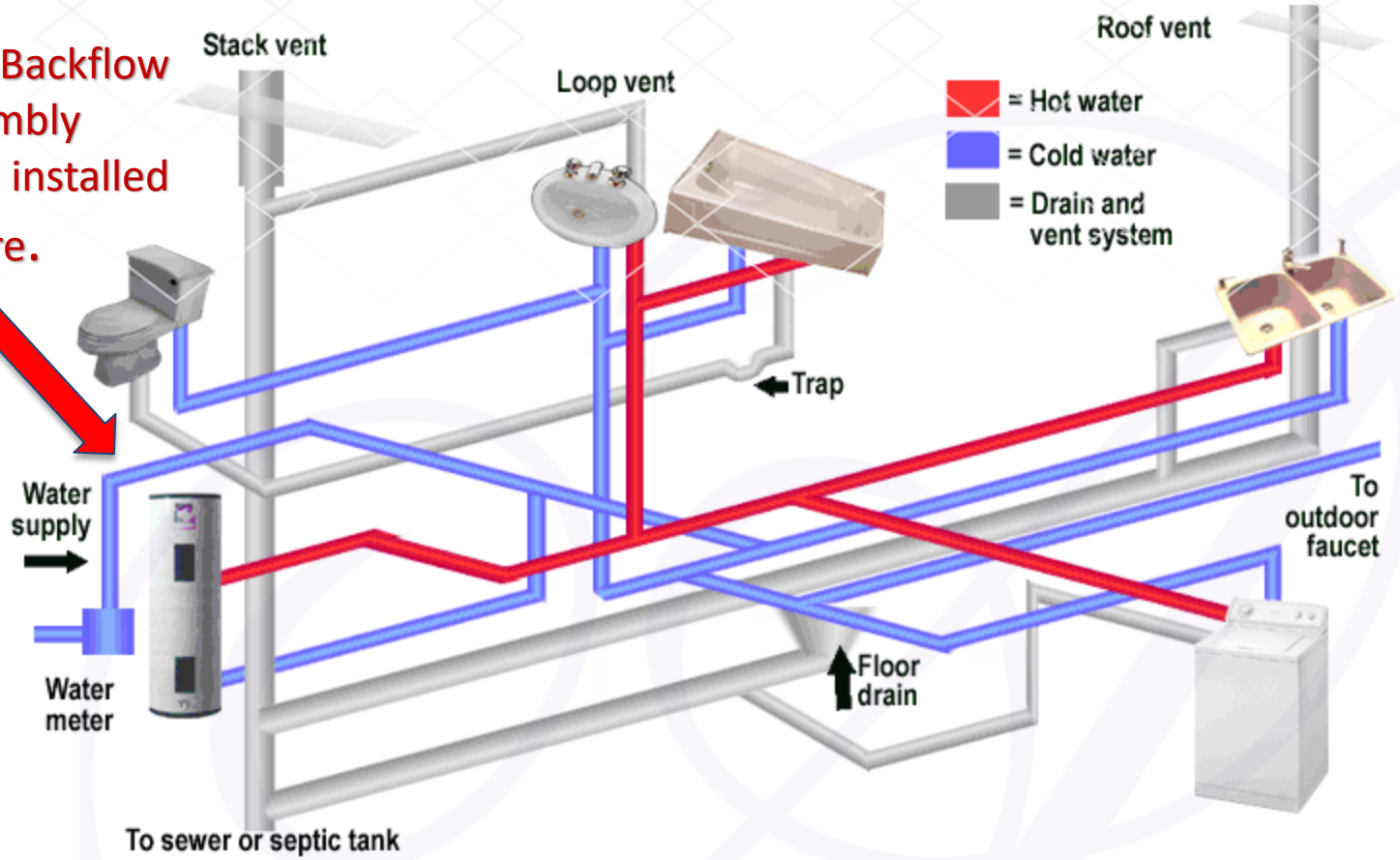
DOMESTIC EXAMPLES



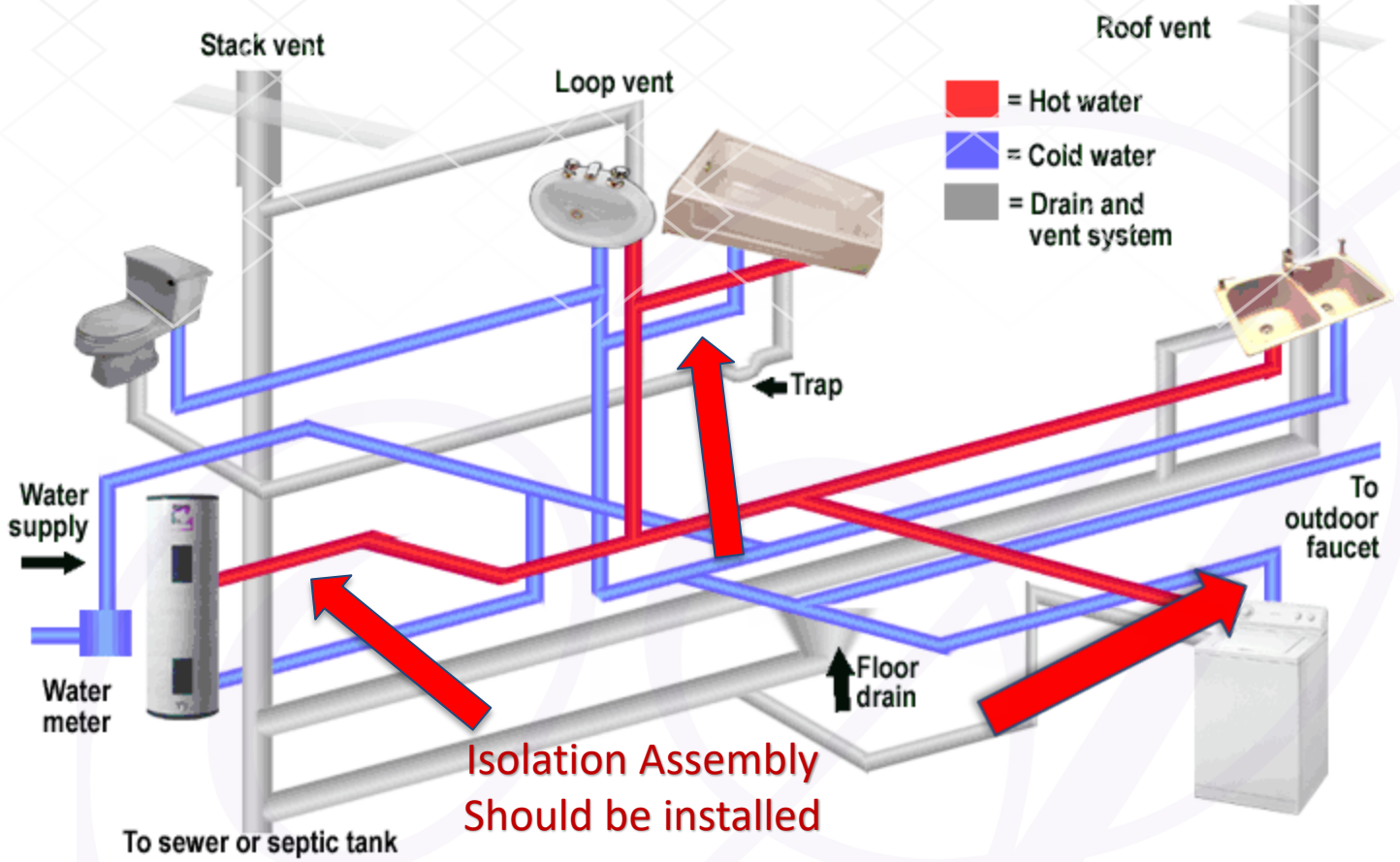
Domestic Backflow Assembly Should be installed here.

DOMESTIC EXAMPLES

Domestic Backflow Assembly Should be installed here.

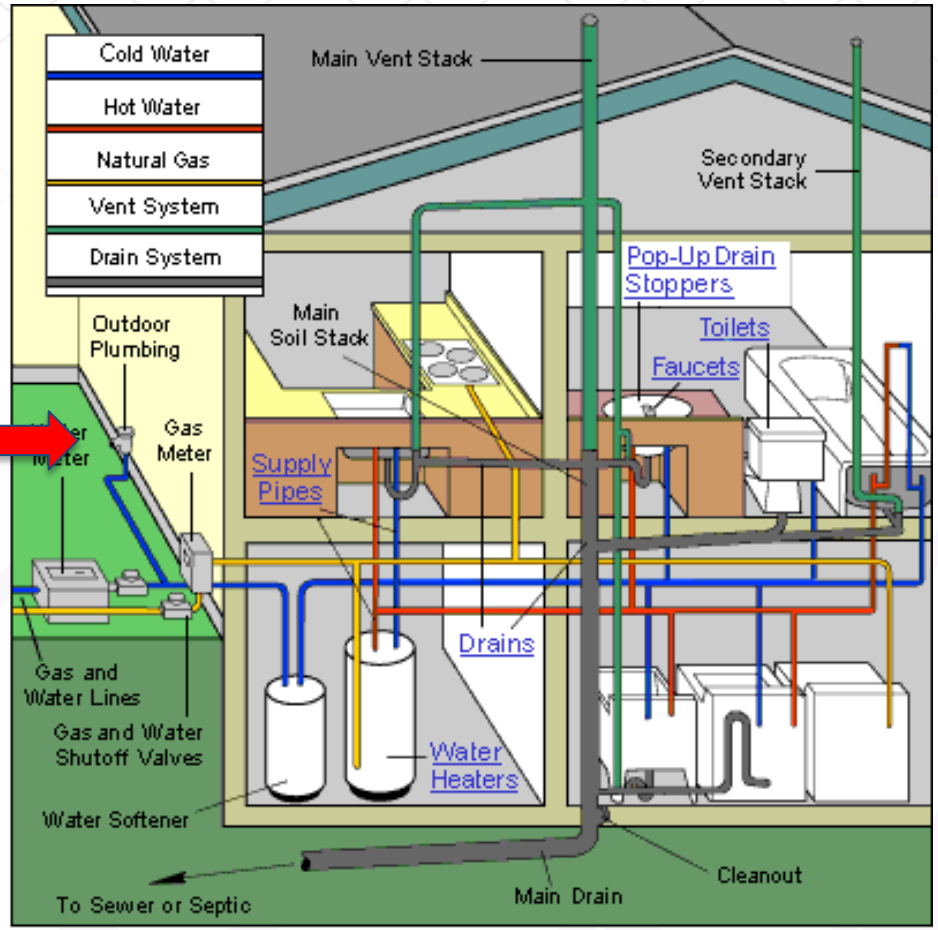


ISOLATION EXAMPLES



IRRIGATION EXAMPLES

Irrigation Backflow Assembly Should be installed here.



IRRIGATION EXAMPLES

FIRE LINE EXAMPLES

Fire Line Backflow Assembly

Is installed here.

FIRE LINE EXAMPLES

Fire Line Backflow Assembly

Is installed here.

INSTALLATIONS CAN VARY!

COMMON TYPES AND INFORMATION

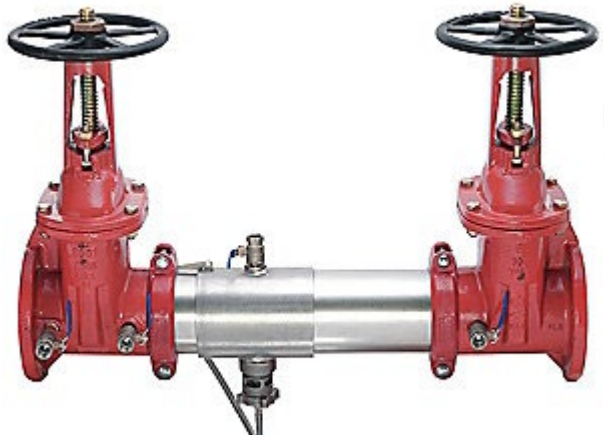
- Common types of backflow assemblies are Reduced Pressure Principle Assembly, Double Check Valve Assembly, Pressure Vacuum Breaker.

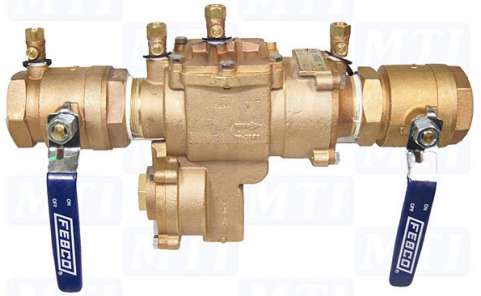
- Reduced Pressure Principle Assemblies (RP, RPZ) are the safest and two separate check valves and have a vent to atmosphere feature creating a disconnect between city and customer.

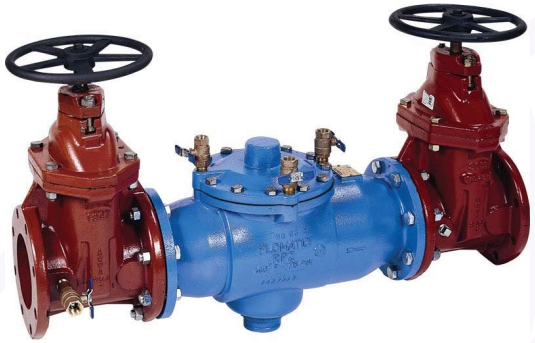
- Double Check Valve Assemblies (DC) Feature two separate check valves preventing water to flow backwards. (Similar to a Reduced Pressure Backflow Preventor)

- Pressure Vacuum Breakers have one check valve and a vent to break siphonage. Typically used in irrigation applications.

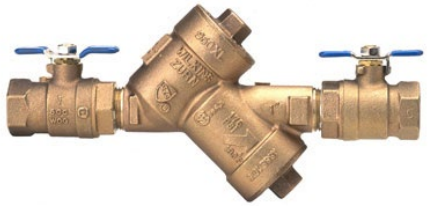
REDUCE PRESSURE (RP, RPZ)



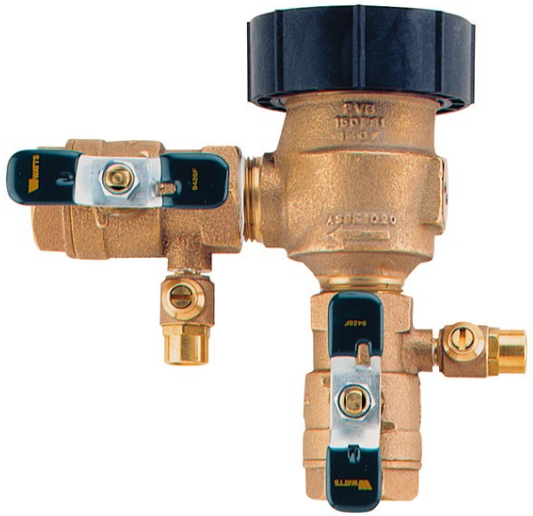




DOUBLE CHECK (DC)



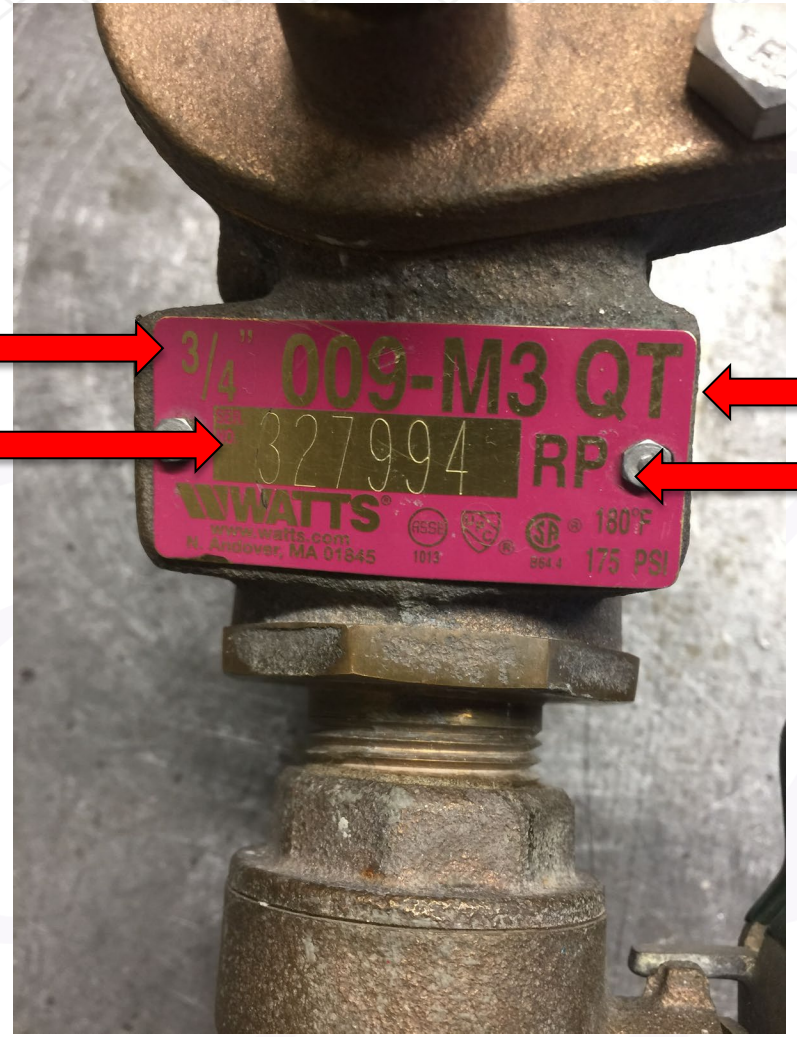
PRESSURE VACUUM BREAKER (PVB)



INFORMATION

- Most information about the backflow assembly can be found on an information plate. Generally located on the top or side of the backflow assembly.
- Sometimes they might not have a plate, but information will be stamped / etched on the side of the assembly itself.

INFORMATION



INFORMATION

CROSS CONNECTION BACKFLOW TESTING

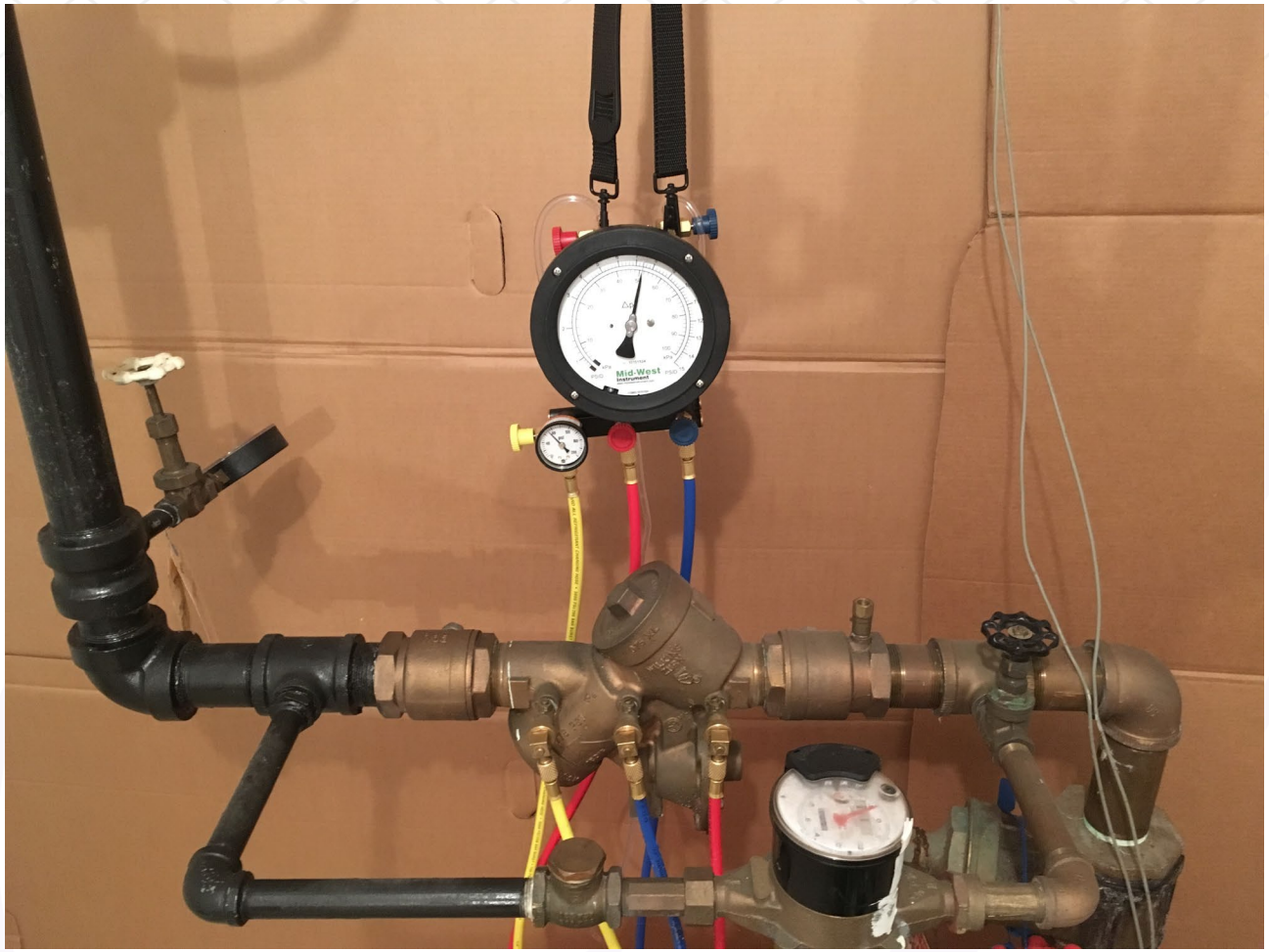
Backflows should be Tested Annually. The state of Colorado allows the following certifications.

ABPA-
American Backflow Prevention Association

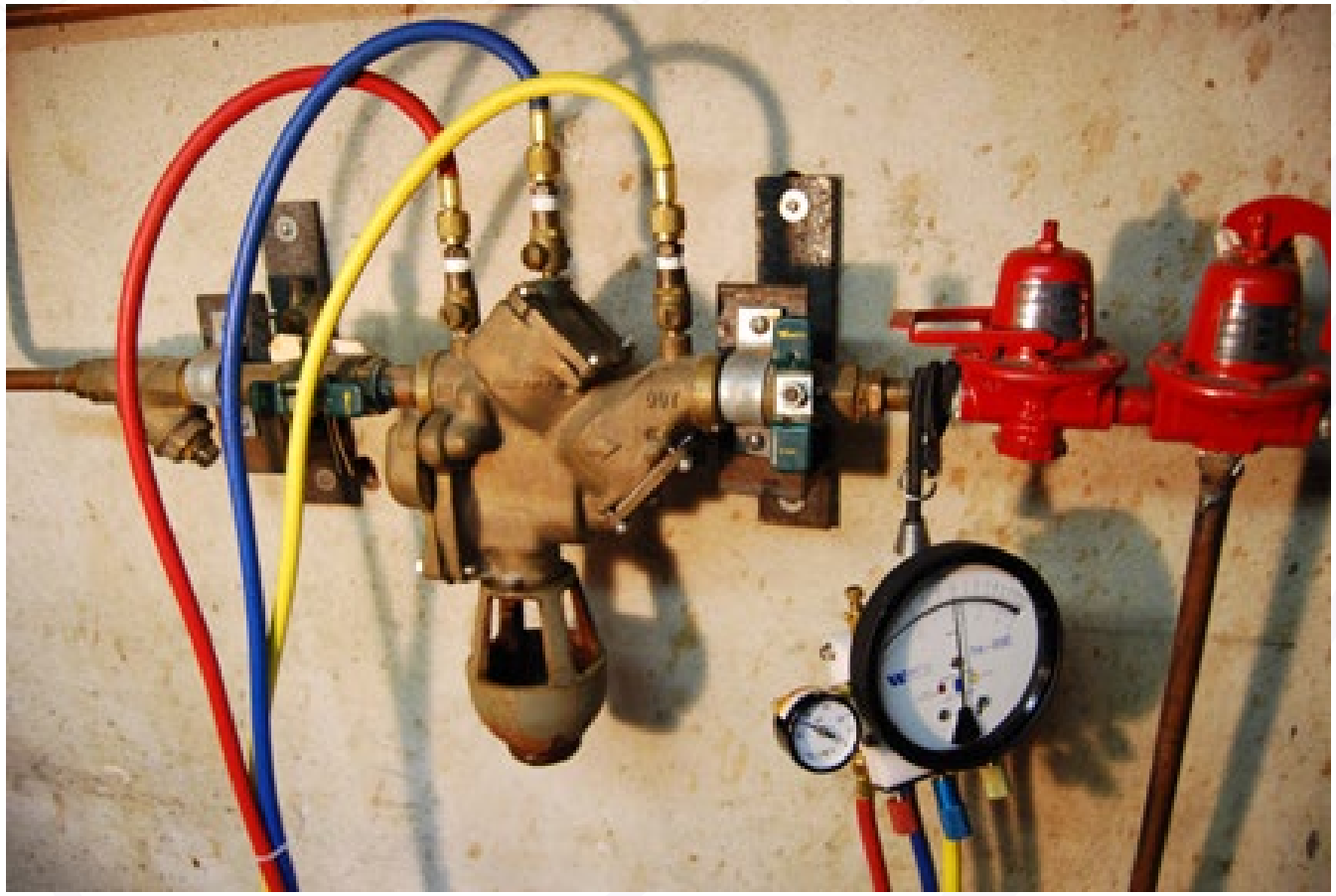
ASSE-
American Society of Sanitary Engineers

CROSS CONNECTION CONTROL
BACKFLOW TESTING

CROSS CONNECTION BACKFLOW TESTING



CROSS CONNECTION BACKFLOW TESTING



CROSS CONNECTION
PROBLEMS?

EXAMPLES!

CROSS CONNECTION

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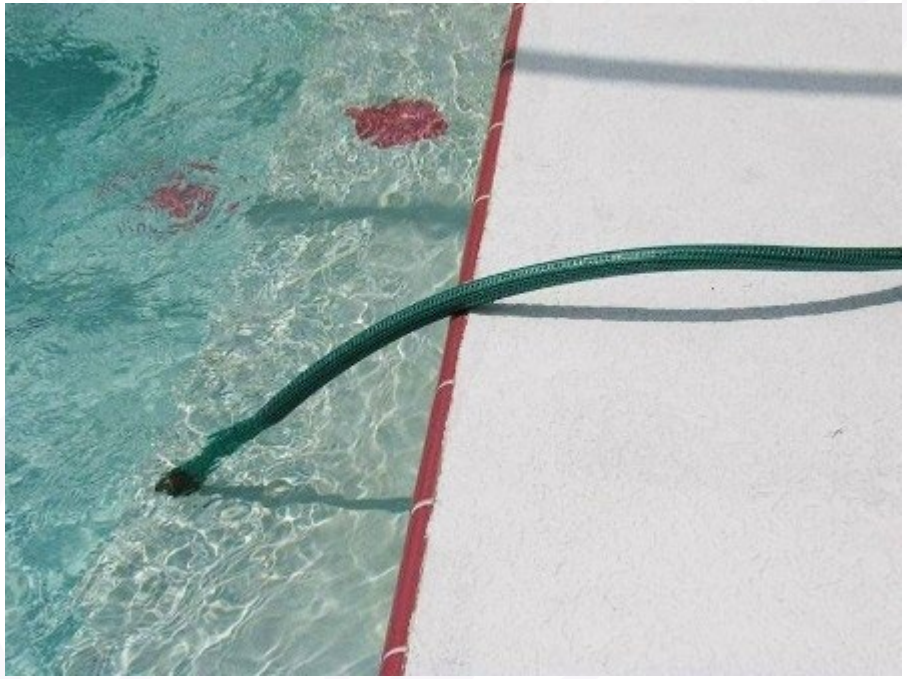

CROSS CONNECTION

CROSS CONNECTION

QUESTIONS ???

Q. What is the best method of Backflow Protection?
A. Air Gap

Q. Name 2 types of Backflow Prevention Assemblies?
A. Reduced Pressure Zone (RP/RPZ), Double Check (DC), Pressure Vacuum Breaker (PVB)

Q. What is one condition that contributes to backflow?
A. Backpressure or Backsiphonage

Q. Which Backflow Prevention Assembly is needed for a high degree of hazard?
A. Reduced Pressure Zone (RP/RPZ)

Fun Facts

Aurora Water currently tracks approximately 11,000 backflow prevention assemblies across Aurora.

4,500 – Domestic / 2,300 – Fire / 4,100 – Irrigation

THANK YOU!

Aurora Water Cross Connection Control

303-326-8520

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