Backflow Prevention Assembly Information:

Assembly Types & Installation Requirements

The information provided here provides general information which in no way alleviates the customer and/or installer from reviewing plumbing code, manufacturer, and/or other city requirements for backflow prevention assemblies, plumbing, etc. Please reference the city of Boulder Design and Construction Standards and read Chapter 5: Water Design.

Topics Included In This Document Follow:

- Assembly Types
- Which Assembly To Choose
- Where To Install Assemblies
- Permanent Installation Requirements
- Temporary Installation Requirements
- USC Approval
- Other Methods Of Backflow Prevention
- Prevention Of Assemblies Freezing
- Prevention Of Assembly Theft

Assembly Types:

There are three main types of Backflow Prevention Assemblies, (BPFAs) which are allowed. They are as follows:

The DC (Double Check)

Generally considered to protect against low hazards.

Quick Notes:

- Does not normally dump water
- May be placed below grade in certain circumstances (check with the Backflow Program)
- Should still be protected from freezing & flooding

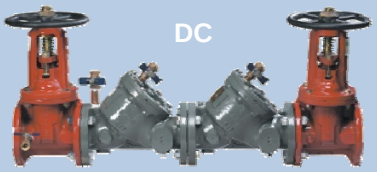
The PVB (Pressure Vacuum Breaker)

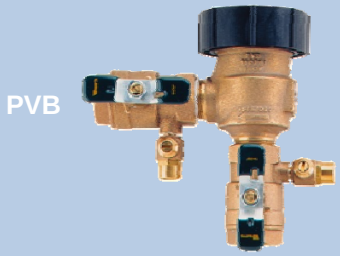
Used specifically for outdoor irrigation systems.

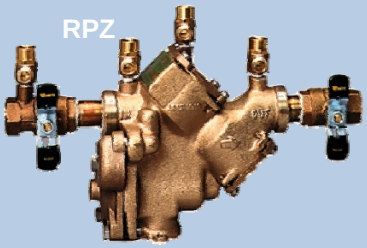
Quick Notes:

- Can dump water.
- Must be installed 12" (inches) above the highest sprinkler head and cannot have continuous backpressure.
- Will need to be protected from freezing & flooding

(Continued on the following Page)







Backflow Prevention Assemblies Pictures Appear Courtesy of Febco, a Watts Regulator Company and Watts Regulator Company

Drinking Water Program / Backflow Prevention Program
5605 N 63rd Street Boulder, CO 80301
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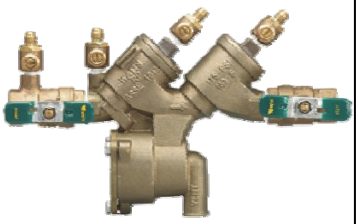
The RPZ (Reduced Pressure Zone)

Generally considered to be the highest degree of protection among the testable assemblies.

Quick Notes:

- Will dump water
- Drains must be installed and sized according to plumbing code - (Increasing drain size may help prevent flooding
- Must be installed 12" above grade
- Will need to be protected from freezing & flooding

RPZ



Which Assembly To Choose:

Of these BFPAs, the RPZ should be considered the standard. In other words, **if you are wondering what type of BFPA to install, the RPZ should be used unless otherwise allowed by the Program.** As RPZs can dump water it is important that RPZs have adequate room to drain. If there are any problems which require you to use a different assembly you should contact the Backflow Prevention Program.

- Please note, for fire lines where there is a dry system or a wet system (with NO chemicals), a DC will be allowed.
- PVBs should only be used in outdoor settings

Where To Install Assemblies & "Containment":

State regulation and backflow programs are, in general, responsible for monitoring the installation and annual testing of "containment" assemblies**. To be called "containment," the assembly the assembly must be installed after the meter but prior to any plumbing branches.** It is possible that two containment assemblies may be required if branches exist such that a single assembly cannot be used. Other assemblies may be required inside a property by plumbing code. These other assemblies are called "isolation" assemblies because they isolate internal hazards. The backflow program does not track these assemblies unless there is a specific need to (this is rare). However, it is strongly recommended that isolation assemblies are tested annually along with containment assemblies as they can keep water inside the property safe for consumption. Plumbing code may allow some points of isolation to be protected by devices (non-testable assemblies) such as dual checks.

If it is determined that a specific isolation assembly is to be tracked, the backflow program will require annual testing of both the containment assembly and the specific isolation assembly. If true containment cannot be achieved, the Program Coordinator will determine if isolation assemblies can be tested in lieu of a single containment assembly. However, whenever possible containment will be required.

Permanent Installation Requirements:

1. All installations of backflow prevention assemblies (BFPAs) must be done by a licensed plumber.
2. Installation must be done in accordance with plumbing code (height, clearance, etc.)
3. Installation must be all city of Boulder Design and Construction Standards.
4. All manufacturer specifications must be met.
5. When fire suppression systems are involved it is critical that the hydraulics be reviewed to ensure that fire suppression system can function properly after the BFPA has been installed. Retrofitting BFPAs on fire lines may require a redesign of the fire suppression system.
6. Assemblies must be must approved for the given orientation (i.e. horizontal, vertical, etc) in which they are installed. Installations of BFPAs not approved for the given orientation will have to be replaced or re-plumbed such that the assembly is in its approved orientation. (see "USC Approval" below)

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7. Assemblies must be tested upon Installation (and annually thereafter) by a certified backflow prevention assembly tester. For more information please click on the "BFPA Testers" link on the Program Home Page.
8. For tests done on BFPAs installed on fire lines/ fire suppression systems, the tester should also have a current registration with the Colorado Division of Fire Safety (see the "BFPA Testers" link on the Program Home Page).

Temporary Installation Requirements (Hydrants):

1. All hydrants being used by a contractor must have backflow prevention
2. BFPAs should be tested upon installation and every time they are moved
3. Tests should be submitted to the backflow program
4. In general hydrant use should always use an RPZ
5. BFPAs on hydrants must be supported
6. BFPAs on hydrants must remain 12" (inches) above grade
7. For BFPAs remaining in place over night, enclosures may be purchased to prevent theft.
8. For tanker trucks or any vessel being filled who opt to use an Air Gap instead of an RPZ, the Air Gap must be installed correctly (see "Other Methods Of Backflow Prevention" below).

USC Approval:

All assemblies must be approved by the University of Southern California's Foundation for Cross-Connection Control and Hydraulic Research (USC FCCC&HR); otherwise known as being "USC approved". USC approval is met. Check with your BFPA manufacturer or on the product specification sheets to verify that the assembly is USC approved. Additionally, you must confirm that the assembly is approved in the given orientation for which it is being installed (i.e. horizontal; vertical; etc).

Other Methods Of Backflow Prevention:

The air gap method may be used in certain circumstances in lieu of a backflow prevention assembly as allowed by the Backflow Program. All provisions for Air Gaps on assembly drains must be followed.

- Without sidewall interference, Air Gaps must be 2 times the diameter of the filling pipe above the flood rim of the receiving vessel, tank, etc.
- If there is sidewall interference the Air Gap distance may change. Consult plumbing code and/or the Backflow Program if you have a question about your Air Gap.

Preventing Assemblies From Freezing:

Backflow Prevention Assemblies (BFPAs) can be divided into two groups: A) Seasonally Used BFPAs; B) BFPAs Used Year-round. Below you will find some options for freeze proofing or "winterizing" both groups.

Seasonally Used BFPAs:

- Backflow prevention assemblies are often wrapped with insulation for winter. Sometimes this will require blowing out the BFPA and/or lines supplying it for prior to insulating. Contact a professional if you are unsure of how to do this.
- PVBs (used strictly for irrigation) may be removed for winter provided that A) the open supply lines are plugged/capped to prevent contamination; B) the assembly is immediately tested upon installation the following spring. Contact a professional if you are unsure how to do this.

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- If a heated enclosure is installed, used, and is functioning it could be used as need year-round.

BFPAs Used Year-round:

- For BFPAs which are used year-round, freezing is a concern. Sometimes assemblies are not protected and still function although this greatly depends on climate and temperature ranges during the given year.
- If an assembly is indoors, it may not need to be protected. However, for assemblies in unheated rooms or basements, protection from freezing may be necessary.
- If for example, a DC (Double Check) is installed outdoors below grade, geothermal heat *may* prevent freezing. However, this is no guarantee. **Not protecting your backflow prevention assembly is risky and is not recommended in any circumstance.**
- For BFPAs which are used year round and are subject to freezing insulation may be used to help prevent freezing so long as the assembly is easily accessible when a test is required. Provisions need to be made to keep BFPA test cocks clear of debris from insulation material.
- Because some BFPAs, like RPZs, are more prone to freezing because they must be installed at least 12" (inches) above grade. In these cases, heated enclosures may be purchased to protect the BFPA. These assemblies often require that permanent electricity be supplied to the heated enclosure.

Prevention Of Assembly Freezing:

The following links show PDFs of some heated enclosure manufacturers. Others may exist. The city of Boulder does not sponsor, support or otherwise vouch for any of the following vendors. The following list is strictly informational.

Aqua Shield Enclosures
http://www.mechagents.com/docs/aquashield.pdf

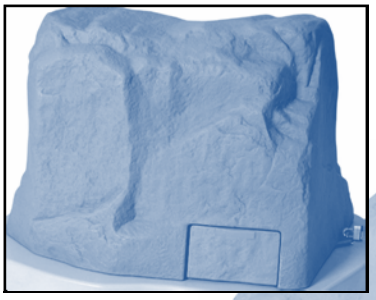
Dekkora Enclosures
http://www.dekorraproducts.com/Backflow.pdf

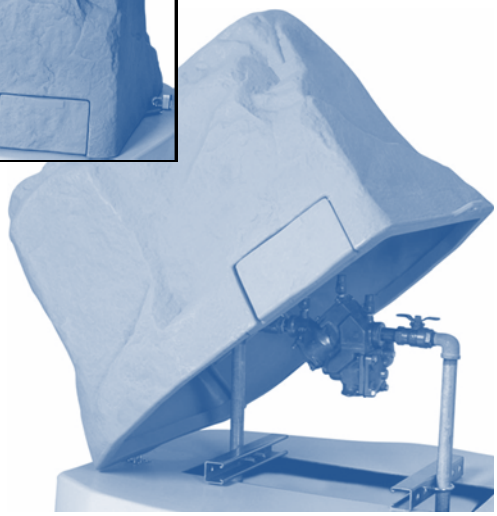
Hot-Box
http://hot-box.com/catalog/HotBox_Catalog.pdf

WattsRock
http://wwww.watts.com/pdf/ES-WattsRock.pdf

Safe-T-Cover
http://www.safe-t-cover.com/files/ProtectYourselfBrochure.pdf

Strong Box
http://www.vitproducts.com/download/pdf/Enclosures_2_08.pdf





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Prevention Of Assembly Theft:

Theft of Backflow Prevention Assemblies (BFPAs) has become an increasing concern. If you need information about protecting BFPAs from theft please:

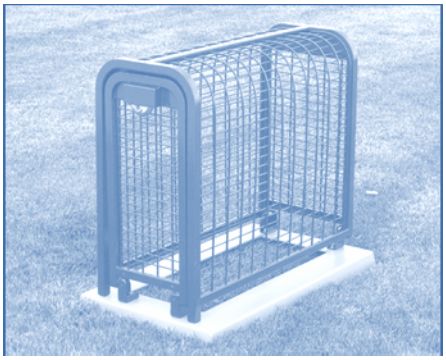
1. Consult with your plumber, tester, or contractor
2. Review the "Freeze Proofing" section above, as some of these options may also help prevent freezing
3. Below are some links with *some* potential product solutions to stop theft of BFPA's

The following links show PDFs of some heated enclosure manufacturers. Others may exist. The city of Boulder does not sponsor, support or otherwise vouch for any of the following vendors. The following list is strictly informational.

Allspec Enclosures
http://www.allspecenclosures.com/images/catalog/Allspec%20Price%20List%202008.pdf

Sentry Backflow Cable Guard
http://www.backflowtheftprevention.com/img/pdf/sentry_spec%20cableguard.jpg

Strong Box (The Guardian)
pdf



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