Foundation for Cross-Connection Control and Hydraulic Research
a Division of the University of Southern California

USC

inside: **installation | ernie havlina | certification | household brochure... and more**

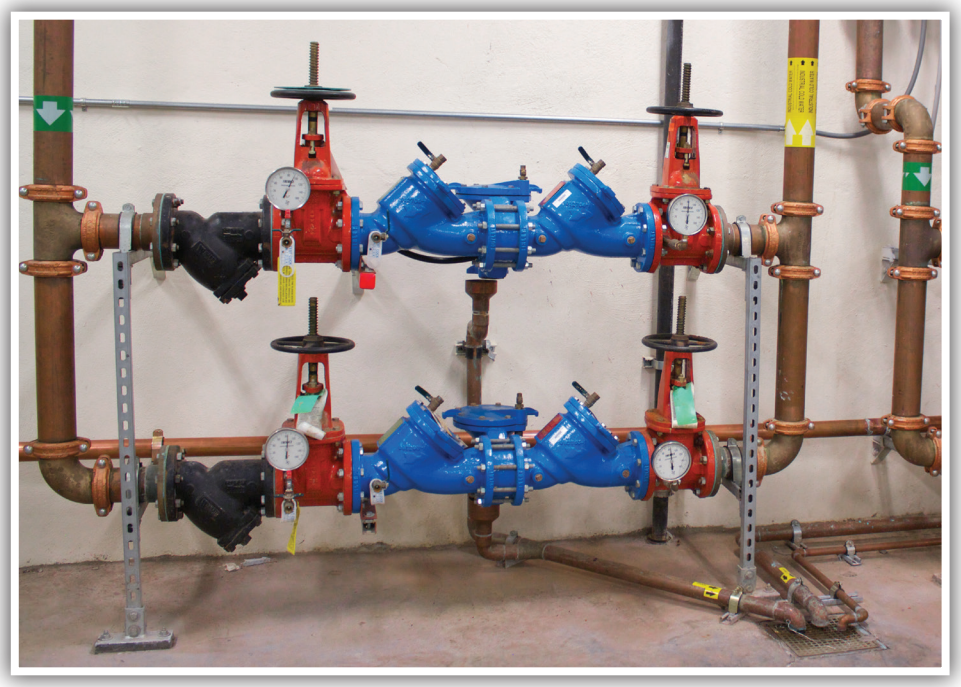
Cross Talk

Spring 2014

Installation Guidelines

Installing a backflow prevention assembly is essential to maintaining an effective cross-connection control program. So, it is vital that all administrators be aware of the installation requirements for any backflow preventer. Depending upon the jurisdiction, there may be a number of various requirements; although there are general guidelines that all jurisdictions should consider.

The *Manual of Cross-Connection Control, Tenth Edition* has a set of installation and maintenance guidelines that includes several illustrations that may be useful when requiring a customer to install a backflow preventer. This article will be discussing the following items specifically: Elevation, Clearance and Drainage, Location, Orientation and Closed Systems. The items discussed will relate to the double check valve assembly (DC) and the reduced pressure principle assembly (RP) since those are the most common backflow preventers used for system protection.



Elevation

The DC and RP must be installed between 12" and 36" above grade. There are several reasons to have a backflow preventer installed above grade. When a backflow preventer is installed below grade, the vault or pit in which an assembly is installed

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USC University of Southern California

Foundation Membership

What's included with a USC Foundation Membership

Membership Discounts

- 25% off Manual Orders
- 20% off Training Courses
- Training Tools are also discounted

Other Benefits

- Free copy of the Manual of Cross-Connection Control, each time a new edition is published
- E-mail notification every time the electronic copy of the *List of Approved Backflow Prevention Assemblies* is updated
- Updates to the *List of Approved Backflow Prevention Assemblies* mailed quarterly
- Special Notice mailed when needed
- New Cross Talk mailed quarterly

Members are encouraged to call the USC Foundation with technical questions. The USC Foundation's Engineering Staff is available to assist Members with the various aspects of field testing backflow preventers, installing backflow preventers and administering their cross-connection control program.

Below is a list of those who have become members of the USC Foundation since the last *Cross Talk*.

A+ Plumbing Company
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Cross Talk is published by the Foundation for Cross-Connection Control and Hydraulic Research, a Division of the University of Southern California, for Foundation Members.

in memoriam: **Ernie Havlina**

Ernie Havlina, whose dedication to protecting the water we drink along with his devotion for properly training personnel for testing backflow prevention assemblies, has died. He was 92.

Mr. Havlina was a part of the USC Foundation's Board of Advisors and served on the Manual Review Committee for the Foundation's *Manual of Cross-Connection Control* since its inception.

Born in 1921, in Los Angeles, California; Ernest J. Havlina attended the University of Southern California where he received a B.S. in Mechanical Engineering in 1943. Upon graduation he entered the U. S. Army Air Force (the U.S. Air Force became a separate branch of the military in 1947) pilot training program and soon became an Instructor.

After the U.S. Army Air Force honorably discharged him in 1945, he returned to southern California and joined the Los Angeles Department of Water and Power (LADWP) as a Sanitary Engineering Assistant in the backflow prevention program of the Sanitary Engineering Section.

As a Sanitary Engineering Associate he became a member of the Ray Derby /Roy Van Meter team in the LADWP and helped develop the program for surveying the vast Los Angeles water distribution system. He became responsible for the implementation of their meter protection plan for cross-connection control.

Mr. Havlina recognized the need for training personnel in the proper techniques for testing backflow prevention assemblies. So, he started a 35-year career of evening instruction at the Frank Wiggins Trade Technical School (later renamed Los Angeles Trade Technical College.) In parallel with these evening classes he also taught for several years at both Mt. San Antonio College and Anaheim High School-Adult Education.

Mr. Havlina became active in the American Water Works Association (AWWA), in 1962, and from March 1972 to April 1983 was Chairman of the AWWA Committee 146 on Backflow Preventers. He also joined the California/Nevada Section of AWWA where he was active on the Backflow Problems Committee and was an Administrator of the Backflow Prevention Assembly Tester Certification Program.

In 1982, Mr. Havlina was awarded the George Warren Fuller Award by the AWWA for his outstanding work in cross-connection control. He was also active in the Southern California Water Utilities Association (SCWUA); being its first Vice President. In addition, he served as Chairman of the Western States Symposium Association on Cross Connection Control.

As a member of the SCWUA General Committee on Backflow Prevention and the SCWUA Cross-Connection Control Manual Committee, Mr. Havlina participated in the writing of the first *Manual of Cross-Connection Control-Recommended Practice*, which was published in 1960. He continued his interest and activity in the Foundation's Manual Review Committee and remained a friend of the Foundation until his death.

His survivors include his wife of 70 years, Pauline and four daughters, Joan, Linda, Patricia and Marie; 13 grandchildren; 13 great grandchildren, and 3 great-great grandchildren.■

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may fill up with water—possibly contaminated water. The water in the pit could create a cross-connection between the water in the pit and the backflow preventer through the test cocks. This may occur whether the test cocks are opened or closed. With the RP there would also be a cross-connection created through the relief valve port(s).

Another reason for having assemblies installed above grade is for testing and maintenance. Some assemblies require a certain amount of vertical clearance in order to gain access to the internal components of the assembly.

For example, a check valve or relief valve may need to be lowered from the body of the assembly in order to remove the components for repair or replacement. With an assembly below grade, or even too close to ground level, it may not be possible to access the internal components.

If the assembly is installed too high, it can be dangerous to the tester to test and maintain the assembly. This is especially true when work is required on one of the larger assemblies where the covers and check valve components may weigh up to 100 pounds.

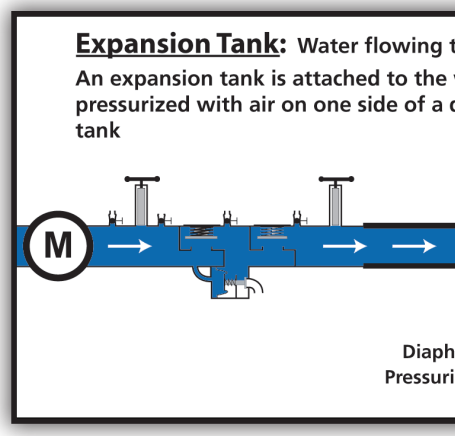
Clearance and Drainage

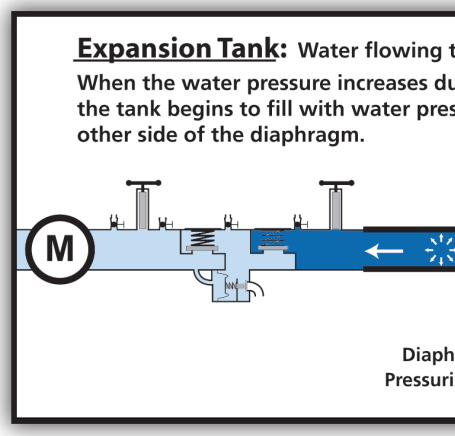
Aside from the elevation, it is important to have enough clearance around the assembly. This is simply to allow the tester to test and maintain the assembly. As some assemblies are installed in areas subject to freezing, it is necessary for them to be installed in a warm environment or in an enclosure in order to protect them from freezing. In some areas, it may also be prudent to protect the assemblies from vandalism.

Whenever an enclosure is used, it is important to have adequate clearance for testing and maintenance. Additionally, the enclosure must allow adequate drainage. Double check valve assemblies may get the surrounding area wet when testing is being performed, but the RPs can discharge large quantities of water. A ¾" or 1" RP may discharge up to 125 gallons per minute of water, so having adequate drainage is crucial.

Location

When backflow preventers are installed for system protection; they should be installed as close to the water meter or service connection as possible, with no interconnections between the water meter or service connection and the backflow preventer. Any interconnections between the service connection and the backflow preventer could allow backflow to occur through these connections into the potable service connection. In some situations it may be necessary to install a backflow preventer in a basement or at a location adjacent to a building, but away from the service connection. When this is necessary, all precautions should be made to ensure that connections are not made to the water line upstream of the backflow preventer. This may be done my marking the pipe clearly, or encasing the pipe in concrete. Even though precautions may be taken, it is best to have the backflow preventer installed as close as possible to the service connection.



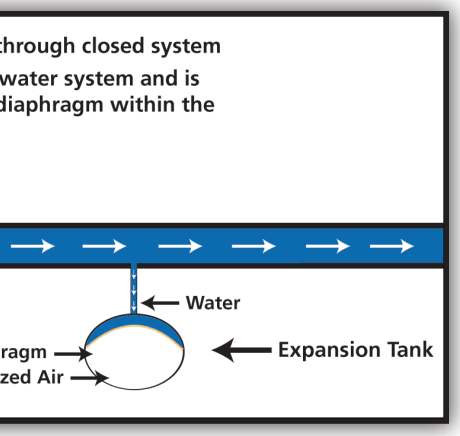


Orientation

It is essential that assemblies approved by the USC Foundation be installed in the orientation in which they were approved.

As stated on the *USC List of Approved Backflow Prevention Assemblies*:

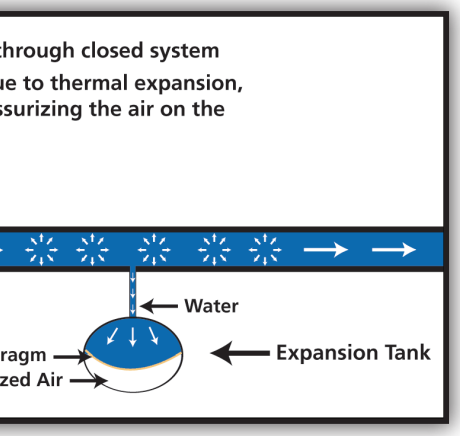
... all of the assemblies listed are Approved for the INDICATED ORIENTATION(S) ONLY. Rotation of assemblies on either axis will invalidate the USC Foundation's Approval.



This is important, as the USC Foundation's Approval cannot extend to an orientation that the USC Foundation Staff have not evaluated in the laboratory and the field.

Closed Systems

Once a backflow preventer has been installed on a water system; the system downstream of the backflow preventer becomes a "closed system." In this context a closed system means that water or water pressure is not able to move in and out of the system freely, as it had been able to before a backflow preventer was installed.



For example, if there is a facility that has an area subjected to high temperatures. The pipes in that area could heat up. As the water heats up, the volume of the water would increase. In an open system (one without a backflow preventer), the water would simply flow back into the distribution system. However, once this becomes a closed system, there is no place for the water to go, so the pressure just increases. Small increases in temperature could increase the pressure by four or five times, creating many problems for components of the system not designed to handle the increased pressure.

Another concern in a closed system is water hammer. Water hammer is a pressure surge created when the water flow stops suddenly. If a solenoid valve closes suddenly, the water suddenly stops creating a pressure wave back in the opposite direction. In an open system, this wave flows back out into the distribution system where it dissipates. If, however, the system is closed because of the installation of a backflow preventer, the wave will stop at the downstream side of the assembly and bounce back into the customer's water system. The wave may continue to bounce back and forth creating problems, such as shaking or breaking pipes.

It is important that customers who are being required to install a backflow preventer and therefore creating a closed system be aware of issues like increased water pressures and water hammers. One of the most common ways to alleviate these issues is the installation of an expansion tank. The expansion tank is basically a sealed chamber with a diaphragm separating one side with water from the other side with pressurized air. One side is attached to the water system downstream of the backflow preventer. As pressure increases, the diaphragm moves compressing the air on the other side of the tank; this absorbs the pressure buildup in the system. Whether the customer uses an expansion tank or another method to deal with the closed system, they must be made aware of the dangers and consequences of the closed system.

The above-mentioned guidelines are an important part of any installation of a backflow preventer. And even though installation

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Certification at **Training Courses**

Certification requirements for cross-connection control specialists and backflow prevention assembly testers vary between states, counties and water authorities. And, one of the more frequent questions the USC Foundation office receives has to do with certification at its training courses. Successfully completing a USC Foundation training course does NOT automatically translate into certification. But, the Foundation works with other organizations to provide certification opportunities for its training course attendees.

The Foundation's Course for the *Training of Cross-Connection Control Program Specialists* has, for several years, made available to its attendees the option to opt-out of the USC exam at the end of the week-long course for a certification exam by the American Backflow Prevention Association (ABPA) or the California-Nevada Section of the American Water Works Association (CA/NV Section AWWA). The USC Foundation then accepts the score from the certifying entity as the score for the written portion of the training course exam.

Attendees interested in the ABPA Cross-Connection Control Specialist Certification must be currently certified as an ABPA Backflow Prevention Assembly Tester. Those attendees interested in the CA/NV Section AWWA Cross-Connection Control Program Specialist Certification will first need to hold a current CA/NV Section AWWA Backflow Prevention Assemblies Tester Certificate.

Any attendee who is interested in taking a specialist certification exam must provide the completed application and payment for the exam to the respective organization on the first day of the Specialist Course at the latest.

Since the Foundation's *Course for the Training of Backflow Prevention Assembly Testers* exam is scored differently from those exams offered by certifying entities the Foundation does not allow attendees to opt-out of the USC test. Instead, the Foundation has made arrangements with the ABPA to hold a certification exam the day after the week-long Tester Course. This will allow the attendees of the Tester Course the opportunity to take a tester certification exam while the training details are still fresh in the attendees' minds.

The ABPA Certification Exam includes a written and a hands-on portion, similar to the USC Tester Course Exam and it takes place at the same location as the course.

Please note that the ABPA exam is NOT part of the USC Tester Training Course and so ABPA proctors will administer it. To register for the ABPA certification please contact the ABPA at (877) 227-2127 or visit

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installation guidelines: continued

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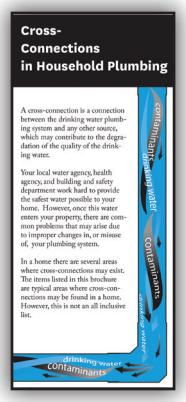
guidelines may differ from jurisdiction to jurisdiction and may include more detail; having a set of general guidelines to begin with is important.

More information about the installation and maintenance guidelines of backflow preventers may be found in Chapter 8 of the *Manual of Cross-Connection Control, Tenth Edition*. In addition, the CD-ROM that is included with the Tenth Edition manual contains a Microsoft Word document of the guidelines that may be customized for any administrative authority. ■

Spotlight: Cross-Connections in Household Plumbing Brochure

Regularly water authorities across the country have difficulty in communicating to the end user the importance of cross-connection control. And, since the end user may not be familiar with terms such as backflow and backsiphonage, water authorities are frequently looking for ways to inform the general public about backflow to give them a general understanding so they can protect their homes from the dangers of backflow. So, the USC Foundation makes available an informational brochure targeting the home.

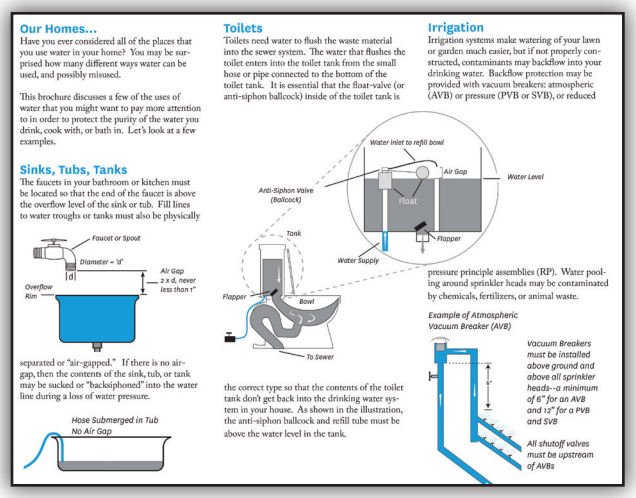


The *Cross-Connections in Household Plumbing* brochure takes a straightforward approach in explaining possible cross-connections that may be found in the home. The brochure uses illustrations of common plumbing fixtures like a toilet and sink to explain where cross-connections may be found and how to protect them from possibly contaminating the water supply.

For example, hose bibbs are part of everyday life and they are used to hook up a garden hose to water the plants, wash the car, clean out the gutters, fill the swimming pool, etc. However, every time a garden hose is connected to a hose bibb, the end of the water line is extended. To make sure that no harmful materials are drawn back into the garden hose, a vacuum breaker should be installed on each hose bibb.

The illustrated brochure is ideal to create awareness among communities about cross-connections found in the home. Other items illustrated in the brochure include boilers, hose bibbs and irrigation systems.

Once the end user is aware that cross-connections are not limited to restaurants, factories or other large establishments; the more likely they are to pay attention to the possibility of them in the home. And, with that awareness the end user may be more likely to comply with any requirements set forth by the administrative authority.



The Foundation imprints the name and address of the ordering agency or company on the brochure so that the reader can contact the agency or company directly for more information. A sample of this brochure may be viewed online, or a physical copy will be sent upon request. ■

certification at training courses: continued

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the ABPA website at www.abpa.org. Those wishing to register for the CA/NV AWWA Tester exam please contact the CA/NV AWWA at (909) 481-7200 or visit their website at www.ca-nv-awwa.org and make arrangements to take the exam with them. For any other questions regarding the training courses please contact the Foundation office. ■

Training

Courses 2014

all courses in Los Angeles, CA unless noted

Tester Course

14-18 July
20-24 October

Specialist Course

28 July-1 August

One Day Update Seminar

14 August
Recycled Water Shutdown Test
15 September
ADDED DUE TO POPULAR DEMAND
Los Angeles & California Codes and Regulations
13 November
Field Test Procedures

Social **Media**

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Upcoming

Events

ABPA Western Region Backflow Conference
Las Vegas, NV
8-9 September 2014

Mid-Atlantic Cross Connection Control Conference (MAC-4)
Washington, D.C.
9 October 2014

Western Washington Cross Connection Control Seminar
Tacoma, WA
22 October 2014

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