

Using the Right Backflow Preventer

The decision of which type of backflow preventer to install in a particular situation is very critical to any cross-connection control program. The assembly used must be matched to the hydraulic conditions at the location and the degree of hazard involved. With only a few simple guidelines the decision to install the proper type of backflow preventer can be very easy.

First of all, the type of cross-connection must be determined. Is it a direct or indirect cross-connection? A direct cross-connection means that the connection may be subject to backpressure. As an example, if a make-up water line is connected to the discharge side of a pump in a recirculating system, this is considered a direct cross-connection. The pressure from the pump could overcome the pressure of the make-up water line, thus, subjecting it to backpressure. An indirect cross-connection can not be subject to backpressure, but only backsiphonage. An example of this is a hose submerged into a tank.

After the type of cross-connection is determined, the degree of hazard must be assessed. In general, the substance which may be in contact with the potable water supply through a cross-

connection would present one of two degrees of hazard. The substance could be a non-health hazard, called a pollutant. This means that the substance may cause the potable water to smell, taste or look bad, but will not cause illness or death if ingested. It is aesthetically objectionable, but poses no real threat to the water consumer. On the other hand, the substance involved may be a health hazard, called a contaminant. If a contaminant is introduced into the potable water supply, illness or death could result if the contaminated water is ingested.

Before the appropriate backflow prevention assembly can be chosen it must be determined if the water using application is under continuous pressure. If a water system is under pressure for more than twelve of any twenty-four hour period, it is said to be under continuous use. All Approved backflow prevention assemblies may be installed in situations where they will be under continuous use, except the atmospheric vacuum breaker (AVB). The AVB can be pressurized no more than twelve of any twenty-four hour period.

There are five basic means of preventing backflow: the air gap (AG),

Modifying Assemblies

Backflow prevention assemblies Approved by the Foundation include resilient seated shut-off valves and testcocks. The Foundation staff is often questioned regarding the use of assemblies without shut-off valves. Should the shut-off valves be removed from the assembly the Foundation's Approval would be invalidated. This includes the insertion of a spool, strainer or fitting between one of the shut-off valves and the main body of the assembly.

The Foundation policy is to Approve assemblies with the shut-off valves as an integral part of the assembly. Any change in the assembly invalidates the Foundation's Approval. The assemblies are tested at the Foundation Laboratory and in the field as a

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W²elcome!

...New Members

The Foundation continues to see a growth in Membership. This growth allows the Foundation to provide better service while maintaining the Membership fee schedule. Following is a list of the most recent additions to the Foundation's Membership Program. Thank you for your support of the Foundation and welcome to the Membership Program.

Arizona Sierra Utility Co.
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 Homosassa Special Water
 District

Lake Havasu City
 Lovelace Biomedical
 Osherg Irrigation
 Pfeiler & Associates
 Ventech

ABPA National Conference

National Conference of the American Backflow Prevention Association in Hyannis, MA will be held 26-29 April 1992. Paul Schwartz and Henry Change from the Foundation will be presenting: *The USC Approval Process, Training Courses, and An Update of Activities.* For more information contact the Foundation Office at (213) 740-2032.

Tester Course

The Foundation Laboratory

FULL 11 - 15 May 1992
 13 - 17 July 1992
 5 - 9 October 1992
 4 - 8 January 1993

Incline Village, NV

3 - 7 August 1992

Non-Members \$750.00
Members \$600.00

Program Specialist Course

USC Campus

20 - 24 July 1992
 11 - 15 January 1993

Non-Members \$800.00
Members \$640.00



Courses may be added throughout. Please contact the Foundation office for information on courses in your area or for an application for the next USC Training Course. You may also send a hard copy of a purchase order or a check to the Foundation office to reserve a space.

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 University of Southern California
 KAP-200 University Park MC-2531
 Los Angeles, California 90089-2531

A Purchase Order may also be sent via FAX to the Foundation office at (213) 740-8399

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Choosing the Right Assembly

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the reduced pressure principle assembly (RP), the double check valve assembly (DC), the pressure vacuum breaker (PVB), and the atmospheric vacuum breaker (AVB). Each of these have very specific uses.

The **air gap** is a physical separation between the inlet piping and a receiving vessel.

This may be used to protect against a pollutant or a contaminant and it can be used in either backsiphonage or backpressure conditions. The problem with the air gap is the loss of system pressure as the water flows from the inlet piping into a receiving vessel. In order to move the water

further downstream a pumping system would be needed. Additionally, once the water falls through the air gap it is no longer considered potable, since the receiving tank is open to atmosphere and subject to contamination.

The **reduced pressure principle assembly** may be used in either backsiphonage or backpressure situations and is an acceptable means of protecting against both pollutants and contaminants. Unlike the air gap, all system pressure is not lost as water flows through the RP. There is some pressure loss through the assembly (no more than thirteen to twenty psi).

The **double check valve assembly** may be used under backsiphonage and backpressure conditions. However, the DC can only be used to protect against pollutants. It is not considered an acceptable means to protect against contaminants. The Foundation is often contacted about the use of DCs on various applications. The DC is

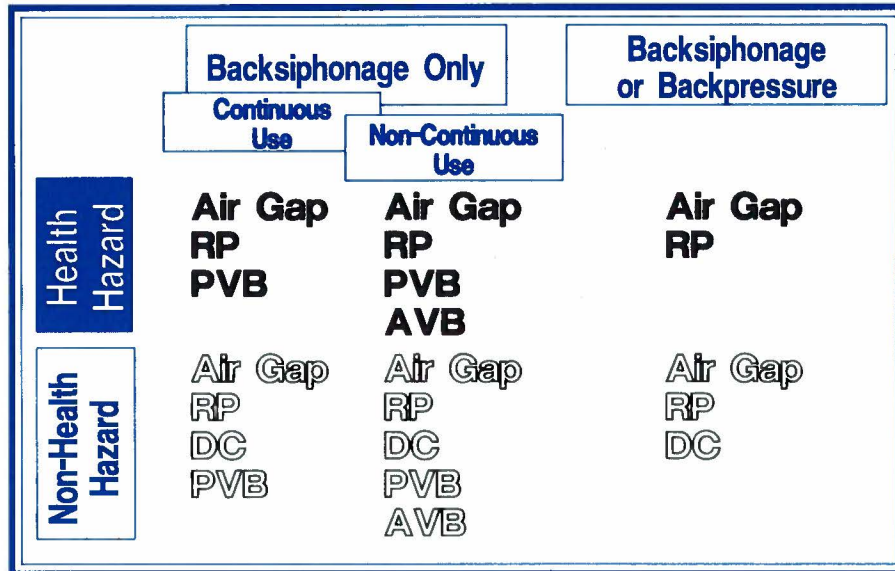
conditions. The PVB is often used as protection in irrigation systems. This is acceptable as long as the assembly is not subject to backpressure. This means that the assembly must be installed at least twelve inches above all downstream piping in order to avoid backpressure due to elevated piping downstream. Additionally, a fertilizer

injection system using pumps should never be used with a PVB. An RP would be required in that case.

The **atmospheric vacuum breaker** can also be used to protect against health and non-health hazards alike. However, like the PVB it can not be subjected to backpressure. Additionally, the AVB can not be used under

continuous pressure. Since the AVB can not be under continuous pressure, no downstream shut-off valves or obstructions are permitted.

The chart in the middle of the page summarizes the particular type of assembly which may be used for any given situation. It should also be noted that some assemblies may be more practical than others in certain applications. For example, if there is a contaminant which is not subject to backpressure, an RP would be acceptable protection, but an AVB or PVB could work just as well and could be more practical. 💧



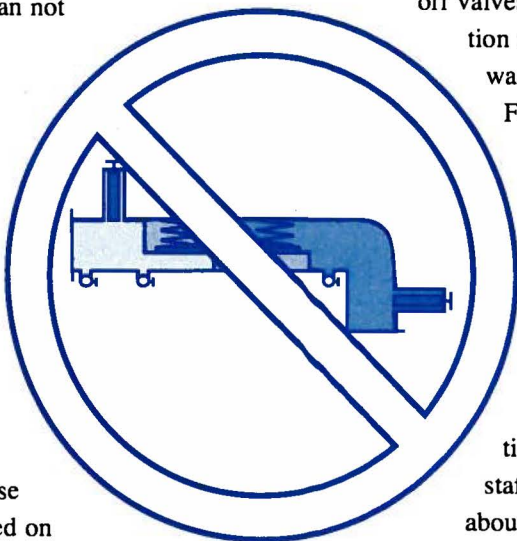
considered adequate backflow protection only in non-health hazard situations. Under health hazard conditions, a DC should never be used. An irrigation system, as an example, is considered a health hazard, because of the fertilizers, chemicals and animal deposits which may accumulate around the sprinkler heads. Therefore, a DC should never be used as backflow protection for an irrigation system.

The **pressure vacuum breaker** is considered adequate protection against both pollutants and contaminants. However, it may not be used as backflow protection under backpressure

Modified Assemblies

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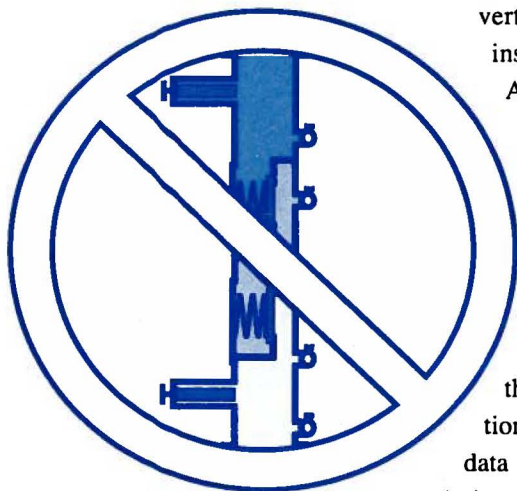
complete unit including the shut-off valves. Therefore, the Foundation can not maintain the Approval if the shut-off valves are removed, relocated, changed, or re-oriented. The only exceptions would be those clearly marked on the *List of Approved Backflow Prevention Assemblies*, published by the Foundation.



the Foundation's installation requirements, allowing the relocation of shut-off valves or the vertical installation of an assembly, which was not Approved by the Foundation for vertical installation. This is the prerogative of the administrative authority, but it should be known that the Foundation's Approval is no longer valid on such modifications. The Foundation staff is often questioned about the operation of an assembly under modified conditions, such as in a vertical installation.

Another similar area of concern is the installation of Approved backflow preventers in the vertical orientation. Although much of the sales literature for backflow preventers states that assemblies may be installed in either the horizontal or vertical orientation, this is not the case if Foundation Approval is to be maintained. Again, assemblies are only Approved for installation in the orientation under which the assembly was evaluated. Therefore, only those assemblies clearly marked on the *List of Approved Backflow Prevention Assemblies* as acceptable for vertical orientation may be installed vertically while maintaining the Foundation's Approval.

The administrative authority in a particular area may make exceptions to



Although the assembly may or may not prevent backflow, the only data the Foundation has is that data generated during the evalua-

tion process of the backflow prevention assembly. Therefore, the Foundation can only state that an assembly will be Approved if it is installed with all components properly attached and in the same orientation it was tested during the evaluation process.

As manufacturers of backflow preventers request the Foundation to evaluate assemblies in the vertical orientation, these specific assemblies will be Approved for vertical orientation if they meet the Specifications of Section 10 of the *Manual of Cross-Connection Control* while installed vertically. These assemblies will be clearly marked on the *List of Approved Backflow Prevention Assemblies*.

If there is ever a question regarding the Approval status of an assembly for vertical orientation, Members should call the Foundation Office to confirm the status of the assembly. As a standard policy *any* modification to the assembly whatsoever will invalidate the Foundation's Approval. 💧

Video

Working Together for Safe Water

VHS Video:
Non-Members \$80.00
Members \$60.00

16mm Film:
Non-Members \$200.00
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Contact the Foundation office for an order form or send a hard copy of a purchase order or a check to the Foundation office to receive a copy of the Film/Video. California residents must add appropriate sales tax.

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University of Southern California
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MRC Considers New Testing Method for the DC

As mentioned in the last issue of *Cross-Talk*, the Manual Review Committee is considering changing the testing procedure for the double check valve assembly (DC).

Currently the Eighth Edition of the *Manual of Cross-Connection Control* uses the duplex gage to test the DC. Using the duplex gage, each check valve is subjected to two pounds per square inch (psi) in the reverse direction of flow. This allows the tester to determine

whether or not the check valve will hold against a two psi *backpressure*.

With the proposed method, using only the high side hose of the differential pressure gage, the tester would determine if each check valve can hold

easily determine if there are any shut-off valve leaks or elastomer (rubber) disc compression. Using the confirmation with the duplex gage test the tester can determine if one of the shut-off valves is leaking and which shut-off valve it is. Additionally, the tester can compensate for any disc compression.

Testing the DC using the differential gage method would eliminate the disc compression problem all together. This is because the check valve is being tested in the direction of flow and disc compression is a result of

subjecting the check valve to backpressure. It is also possible to compensate for the shut-off valve leaks with the differential gage method.

Although both testing procedures are able to determine if the assembly will prevent backflow, the direction-of-flow test allows the tester to determine if the assembly is operating within its design characteristics. Additionally, it is possible for a check valve to pass the backpressure test and yet not pass the direction-of-flow test. However, it is unlikely for a check valve to fail the backpressure test and pass the direction-of-flow test. The error most testers make with the duplex gage method is the amount of the backpressure applied. Rather than applying a small (two to five psi) backpressure, they open their

Differential

DUPLEX
The Manual Review Committee is expected to make a decision regarding which gage will be used in testing the DC in the Ninth Edition of the Manual

at least a one psi differential *in the direction of flow*. If each of the check valves can hold one psi in the direction of flow, then it follows, the check valve would also be able to hold against small backpressures subjected to the check valve. One requirement of the Approval process for double check valve assem-

Both testing procedures have advantages and disadvantages

lies is the ability of each check valve to maintain a one psi difference in the direction of flow.

Both testing procedures have advantages and disadvantages. One major advantage of the testing procedure using the duplex gage is the ability to

Manual

The Eighth Edition of the Manual of Cross-Connection Control is available for order. The prices are as follows for each copy of the Manual.

Non-Member - \$37.00 each
Non-Member (in quantities of 10 or more) - \$29.60 each
Member - \$27.75 each

California residents must add appropriate sales tax. To order please send a check or a hard copy of a purchase order to:

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Manuals may also be ordered by sending a Purchase Order via FAX to the Foundation office at (213) 740-8399. All Manual orders are processed within 3 days of receipt. There is an extra charge should UPS Blue Label, or Next Day Air shipment be required.

Considering a new DC Testing Method

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needle valves too far or too quickly causing backpressures which are too great. Some testers go to the extreme of applying full line pressure to the back side of a check valve.

Should the Manual Review Committee change the testing procedure to the differential gage method, the Manual would clearly show the proper method of determining shut-off valve leaks, and how much leakage can be tolerated. Additionally, the Foundation's *Short Course for the Testing of Backflow Prevention Assemblies* would reflect the new testing procedure with an emphasis on demonstrating the proper means of detecting shut-off valve leaks. Another benefit to the tester would be the elimination of the need for two gages. Both the reduced pressure principle assembly, and the pressure vacuum breaker assembly are tested with the differential pressure gage. If the double check valve assembly were to be tested with the differential pressure gage, there would be no need for the tester to purchase an additional gage (i.e., duplex gage).


The certified backflow prevention assembly tester may be concerned about learning a new testing procedure, especially if the tester is required to recertify soon. However, the tester is already performing a similar test when testing the check valve of the pressure vacuum breaker assembly (*Manual of Cross-Connection Control - Eighth Edition*, Section 9.4, Test No. 2). The check valve of the pressure vacuum breaker is being tested in the direction-of-flow with the differential pressure

gage. This being the case, the tester does not have to learn a totally new test procedure.

The Manual Review Committee will be meeting shortly to discuss the possibility of changing the testing procedure. If you have experience with both procedures and have any comments you would like the committee to consider, please forward them to the Foundation Office as soon as possible. Comments on other portions of the

Manual are welcome and encouraged from the Foundation Membership. Comments should be directed to the Manual Review Committee at:

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Or, you may wish to FAX your comments to (213) 740-8399. 

New Feature on the List

The next issue of the Foundation's *List of Approved Backflow Prevention Assemblies* will have a new feature. In many instances the Foundation is questioned about the specific model of the backflow prevention assembly which is to be used with a particular detector assembly. The new *List* will show which bypass assembly should accompany a detector assembly. This will be included for both the double check detector assemblies (DCDAs) and the reduced pressure principle detector assemblies (RPDAs).

If a tester or specialist comes across a detector assembly in the field, they will be able to determine if the bypass assembly is the proper assembly, or if an unauthorized change has occurred. It is important to realize that the detector assemblies are Approved (like all Foundation Approved assemblies) as a complete assembly including shut-off valves, testcocks, by-pass backflow preventer and by-pass meter. The *List* already shows which meters are acceptable with the detector assemblies, since it is possible to change out the meter on the by-pass arrangement without affecting the Approval status. (This is only if the new meter is listed as an acceptable meter for the particular assembly in question.)

The new *List* will contain all of the information necessary for identifying the correct bypass backflow preventer. Now the tester or specialist can simply check their copy of the *List of Approved Backflow Prevention Assemblies* and know immediately if the correct by-pass arrangement is included as part of the detector assembly. This information should *not* be used for ordering by-pass assemblies for RPDAs or DCDAs. Since not all of the by-pass backflow preventers are stock assemblies, it is necessary to order the by-pass assembly specifying that the by-pass backflow preventer for a specific size and model of detector assembly is needed.

The Essentials of Cross-Connection Control

A Graphic Slide Presentation

The Foundation is now accepting orders for *The Essentials of Cross-Connection Control*, a graphic slide presentation.

This 35mm slide presentation package *The Essentials of Cross-Connection Control* contains 60 color graphic slides. You can rearrange the presentation adding your own slides to customize your presentation to your audience. These slides were created specifically to enhance the explanation and presentation of cross-connection control essentials.

The slides cover some basic hydraulics, definitions of the various terms such as *Backflow*, *Backpressure*, *Backsiphonage*, *Cross-Connection*, etc. Generic graphics of each of the of the acceptable means of backflow prevention are shown (the air gap, the reduced pressure principle backflow preventer, the double check valve assembly, the pressure vacuum breaker, and the atmospheric vacuum breaker). The applications of each of the backflow preventers is discussed as related to the hydraulic condition of the installation and the degree of hazard involved.

This package comes in a three-ring binder with a description of each slide, along with a black and white

representation of the slide. Each slide is represented on a different page. This allows you to change the order of the presentation to suit your specific needs for the presentation at hand. Additionally, your own photographic slides may be inserted at various points to enhance the presentation of certain topics as they relate to your audience. The slide package is available at the prices listed below.



Foundation Members \$100
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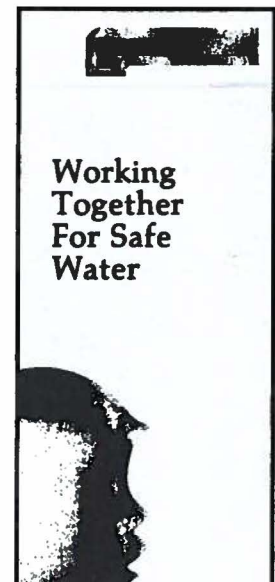
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Cross-Connection Control Informational Brochures

The informational brochure entitled *Working Together for Safe Water* is a great complement to the slide presentation *The Essentials of Cross-Connection Control*. You'll be able to explain all the concepts of cross-connection control to your audience using the slide presentation. Then you can hand out the brochure. This gives those in attendance something to take with them which will help them to comprehend fully the topics discussed.

The brochures come with the name, address and telephone number of the ordering agency, so those who desire more information or have questions, can call you directly.

This brochure can be used to explain the basic concepts of cross-connection control, helping the water user understand why they may need to install a backflow preventer or comply with periodic testing requirements. To request a sample of the brochure with an order form contact the Foundation office at: (213) 740-2032 or you may FAX your request to (213) 740-8399.



Calendar of Events

This calendar lists activities which the Foundation plans on participating in over the next few months. For more information contact the Foundation office.

26 - 29 April 1992 - American Backflow Prevention Association National Conference, Hyannis, MA

10 June 1992 - Western States Symposium Association, Buena Park, CA

18 - 22 June 1992 - American Water Works Association National Conference, Vancouver, BC CANADA

8 July 1992 - Western States Symposium Association, Phoenix, AZ

13 - 17 July 1992 - Tester Short Course, Foundation Laboratory, Los Angeles, CA

20 - 24 July 1992 - Program Specialist Course, USC Campus, Los Angeles, CA

3 - 7 August 1992 - Tester Short Course, Incline Village, NV



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