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

USC

inside: **access to the list | orientations | laminated procedures | relief valve**

Cross Talk

Spring 2011

Assembly Orientation

As more backflow prevention assemblies continue to be installed in limited spaces, a backflow prevention assembly's orientation becomes a critical point of the installation process. Some administrative authorities have assumed that the Foundation only tests assemblies in the horizontal orientation. But, in fact, the Foundation's standards have never restricted the orientation of backflow prevention assemblies. The assemblies have always been evaluated in the orientation(s) requested by the manufacturers.

When assemblies were submitted for evaluation in the horizontal orientation, they were tested in the horizontal orientation. As it became more desirable for some assemblies to be installed in other orientations; the manufacturers submitted these assemblies, with the request that they be evaluated in other orientations.

Backflow prevention assemblies must be evaluated in the orientation(s) requested by the manufacturer in order to become approved in these orientations and be included

in the Foundation's *List of Approved Backflow Prevention Assemblies*. This includes both the laboratory and field evaluations.

It had been assumed by many that the backflow prevention assemblies were not evaluated in the field in the specific orientation approved. Some administrative authorities believing this, therefore, didn't see the significance of an assembly being approved

continued on **page 7**

Contents

USC **Viterbi**
School of Engineering

Foundation Membership

The Foundation's Membership Program provides many benefits to the Members of the Foundation. These include: a twenty-five percent discount on manuals, twenty percent discount on Foundation Training Courses for any employee of the Member company/organization, the *List of Approved Backflow Prevention Assemblies* with access to the up-to-the-minute version on the Foundation's website.

Members are encouraged to call the Foundation with technical questions. The 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 Foundation this past quarter:

1st Check Backflow
ABPA- Hawaii Chapter
Allen's Tri-State Mechanical, Inc.
Allison Transmission, Inc.
Aqua Illinois, Inc.
Central Coast Backflow Services
D. Lyle Setwyn, P.E.
DGM Industries, Inc.
Firebaugh, City of
Glendale- Parks Division, City of
Heath Fuller
Inland Water Works Supply Co.
James Null
JBC, Inc.
Johnny Pena
Kern County, Environmental Health
Kevin Oatman
Kootenai Medical Center
Palo Verde Nuclear Power Plant
PB Plumbing, Inc.
Pipe Trades JATC 525
Raytheon
Samuel Deleon
San Gabriel Valley Water Co.
Shumate Constructors, Inc.
So Cal Water Tech
Splash Plumbing
The Backflow Guy, Inc.

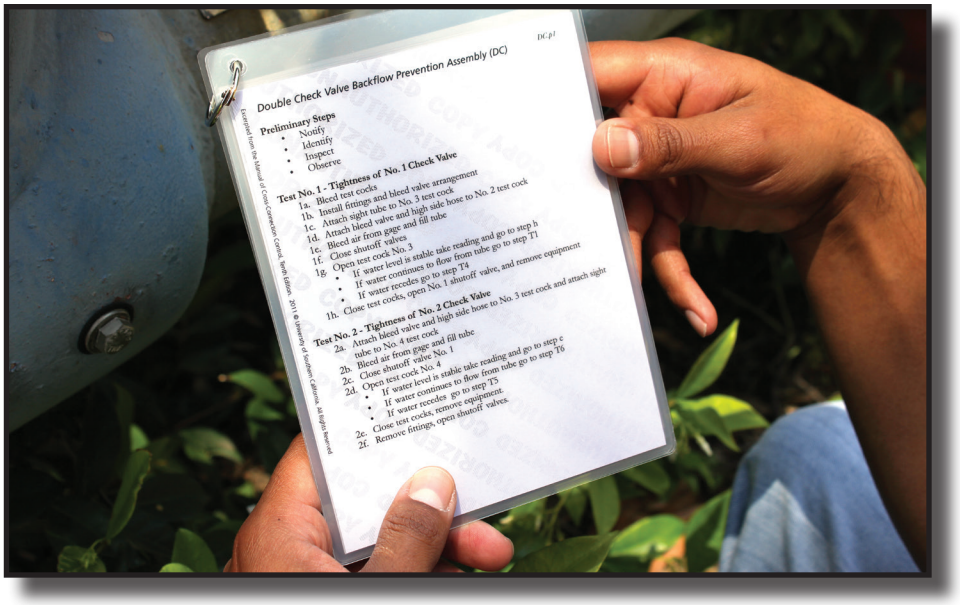
Cross Talk is published by the Foundation for Cross-Connection Control and Hydraulic Research, a division of the University of Southern California, for Foundation Members.

printed on recycled paper

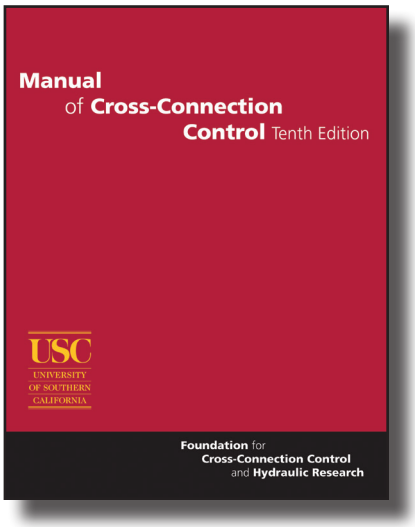
Laminated
Field Test Procedures

The new laminated version of the field test procedures that have been available for the past couple of months have been very well received. Customers have been quick to purchase the abbreviated field test procedures with the Tenth Edition manual.

For every *Manual of Cross-Connection Control, Tenth Edition* purchased, members may add a copy of the abbreviated field test procedures for the discounted member price of $8.00, plus shipping. The abbreviated procedures are not available as a standalone product.



Members that have already purchased Tenth Editions are eligible to purchase one laminated set of field test procedures for each Tenth Edition purchased. For example, if a member purchased a set of five Tenth Edition manuals six months ago, that member is eligible to purchase five abbreviated field test procedures today.



In addition, all Foundation members received a complimentary copy of the Tenth Edition manual when it was released a little of over one year ago. Members may also purchase a set of laminated field test procedures to accompany that manual.

The abbreviated version is made up of six sheets measuring 5" x 7" held together with a ring to keep the sheets together for easy carrying. The sheets are laminated to prevent any water, during testing, from damaging the sheets. These are ideal for students of tester training during their sessions in the wet lab area.

The abbreviated version does not have any illustrations or in-depth diagnostic procedures. It is meant to give testers a short bullet-point list of the steps to complete field tests for the four backflow prevention assemblies. This includes the two, three and five-needle valve methods for testing the reduced pressure principle assembly.

Being able to carry around the procedures in abbreviated form will be of great use for students and testers alike. If members have any questions regarding the abbreviated procedures feel free to contact the Foundation office. ■

Exercising the Relief Valve

The Foundation regularly receives enquiries about exercising the relief valve of a reduced pressure principle backflow prevention assembly. It is important for the tester to understand that during a backflow condition, the relief valve is designed to discharge without being exercised first. In fact the assembly should be able to remain in operation without the relief valve being activated between annual field tests and still operate properly when a backflow situation arises.

Exercising the relief valve in order to get a passing result during the field test is, in effect, creating a false condition. This is precisely why the USC Field Test Procedures are designed so that the relief valve is not activated prior to obtaining the relief valve opening point reading.

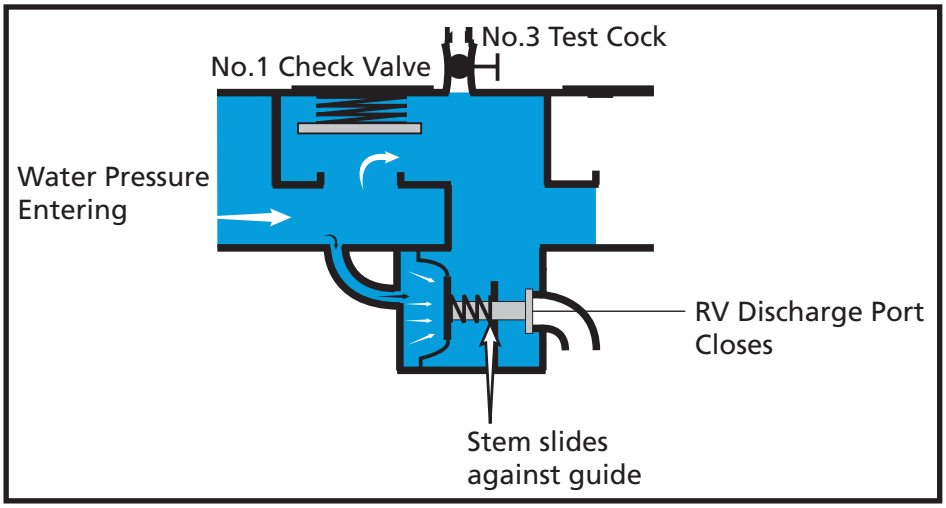
It is important that the field tester obtain a good relief valve reading, the very first time the relief valve is activated in order to accurately determine how the backflow preventer's relief valve operates in its normal pattern of use.

There are other factors that will affect the opening operation of a relief valve in addition to the testing order of the checks and relief valve. Following is a discussion of the operation of a relief valve and why different opening point readings may be obtained when testing the relief valve.

The opening point of the relief valve is determined, in part, by the relief valve spring. The springs are designed to operate within specific tolerances. They may vary slightly from one spring to the next. After some initial use, the spring will "set" or settle in at a fairly consistent point. However, one may still find that the relief valve opening point changes.

The spring is not the only factor, that determines the relief valve opening point. In fact, there may be several factors involved depending upon the design of the relief valve. One of the primary factors will be the sliding surfaces within the relief valve.

When the relief valve opens some of the surfaces slide against other surfaces within the relief valve, such as guide stems. In some cases the sliding surfaces operate as a piston in a cylinder. The condition of the surfaces may change depending upon the local water conditions and how much movement the relief valve gets. If the relief valve is moving on a regular basis the sliding surfaces will usually glide freely without any hindrances. Howev-



er, if the assembly has been sitting for a while without any relief valve activity, some small deposits from the water may build up upon the sliding surfaces requiring more force to move them, thus a lower relief valve opening point might be obtained.

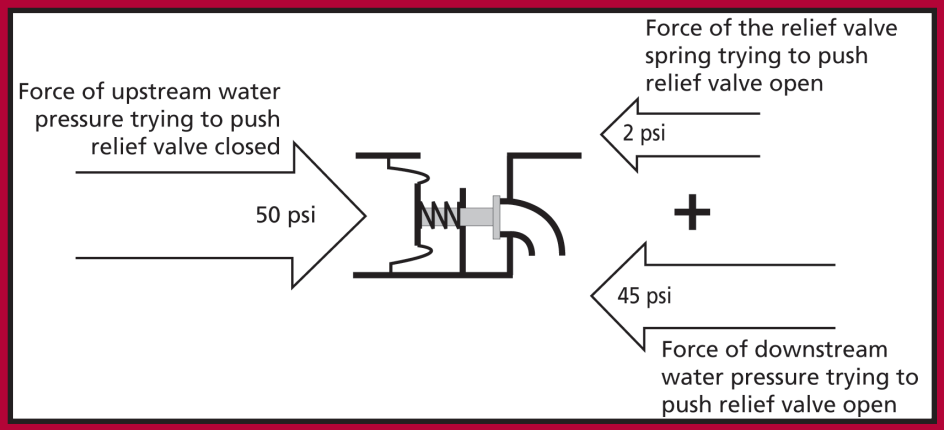
If this is the case, the relief valve may have a higher reading if tested again immediately following the initial test. This is why it is so important for the tester not to activate the relief valve before determining the relief valve opening point. If the tester activates the relief valve and then determines the relief valve opening point, the reading is likely to be higher than if the tester determined the relief valve opening point without first exercising the relief valve. A stiff diaphragm may have a similar effect.

In field testing the reduced pressure principle backflow prevention assembly, many agencies suggest that the components be tested in order of: the first check valve, the second check valve, and finally the relief valve. Testing in this order may affect the relief valve opening point reading, particularly testing the second check before the relief valve. Should the second check valve leak, the relief valve would open before it is tested—thus exercising the relief valve. As a relief valve is exercised the opening point tends to increase. In this case the tester may have missed the relief valve's actual opening point. In an actual backflow situation, of course, the relief valve is never exercised before backflow occurs.
The Foundation's recommendation is to follow the field test procedures in the *Manual of Cross-Connection Control, Tenth Edition* which calls for the relief valve to be tested first, then the second check valve and finally the first check valve.

If members have anymore questions regarding exercising the relief valve please contact the Foundation office. ■

Explaining the Relief Valve

The relief valve closes when the forces acting on the high pressure side of the elastic element, such as a rubber diaphragm, are greater than the forces acting on the low pressure side. The force acting on the high pressure side is the water pressure from the upstream side of the assembly. The forces acting on the low pressure side is the water pressure from the chamber between the two check valves plus the force of the relief valve spring.

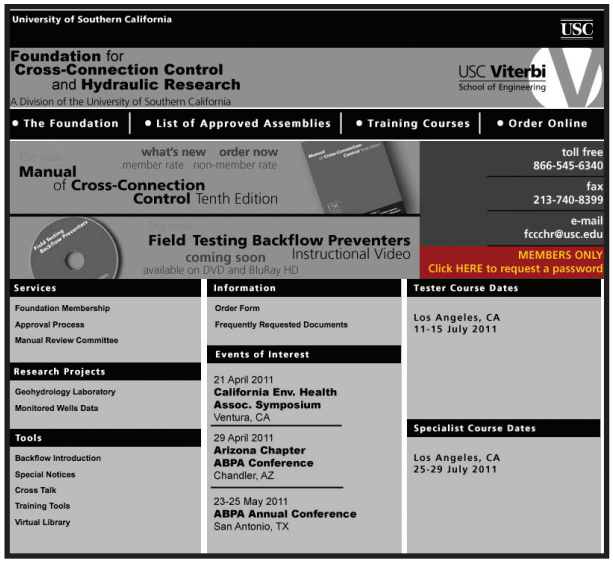


The high pressure side of the diaphragm is pressurized with the water from the upstream side of the No. 1 check valve. The low pressure side of the diaphragm is pressurized with the water from the downstream side of the No. 1 check valve (chamber between the check valves). This is why the operation of the relief valve is hydraulically dependent upon the differential pressure across the No. 1 check valve. The relief valve will open when the forces acting on the low pressure side of the diaphragm are greater than the forces acting on the high pressure side, discharging water from the chamber between the check valves to keep the pressure in this chamber lower than the pressure upstream of the No. 1 check valve (at least two psi lower). The force from the relief valve spring is acting to push the relief valve open. ■

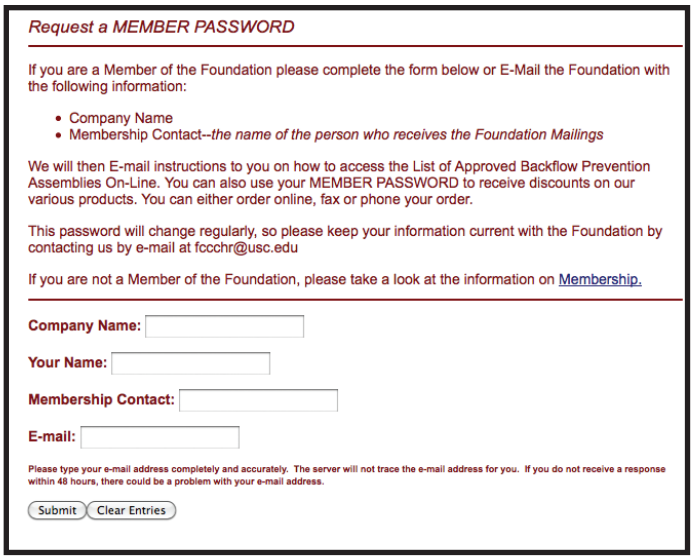
Access to the List

The *List of Approved Backflow Prevention Assemblies* continues to be a valuable source of information for anyone involved in cross-connection control. Keeping up-to-date with the most current List is crucial. The best way to stay current is downloading the List from the Foundation's website (http://www.usc.edu/fccchr) since it is updated as changes are made to the List.

As part of the Foundation membership program members have exclusive access to the List. Aside from receiving the List in paper form once a year along with a quarterly update of changes. All members may download the latest version of the List via the Foundation's website. The List on the Foundation's website is updated every time there are any changes including additions or deletions of backflow prevention assemblies. This information may be invaluable to someone working in the field in determining what assemblies to install or to those administering a cross-connection control program.



Members are urged to sign up on the Foundation's homepage for automated notifications via e-mail. The benefit for using the Foundation's website automated password request form is that from that point forward the member will be notified of all password and List changes. Anytime the List is updated the member receives notification via e-mail. Members can go on the Foundation's website and click on the "Need a Password?" link on the homepage. The moment the link is clicked a pop-up will appear which will request the 'Company's Name,' 'Your Name,' 'Membership Contact Name' and 'E-mail address.'



Please note that all the information given must match with the information that the Foundation has in its database or the request for a member password will be denied. It is key that you communicate with the Foundation membership contact person in your agency/company to retrieve all the information necessary.

It is essential to keep the e-mail information current with the Foundation. If there is an e-mail address change please e-mail the Foundation (fccchr@usc.edu) explaining the change along with the new e-mail address. When members stop receiving notices regarding updates to the List, it is often due to the fact that the Member's e-mail address has changed.

After gaining access to the List, it is important members be aware of how they may share that information within their agency/company. Any employee of the member agency/company may use the List. When the mem-

continued on **page 7**

access to the list: continued

continued from **page 6**

bers use it within their own organization or with their own customers, it is permissible to reproduce those portions of the List, which are needed.

In many cases a member agency needs to pass on the information contained in the List to others as part of the official capacity of the agency. For example, a water agency is a member and requires a customer to install a USC Approved 2" reduced pressure principle assembly (RP). It is permissible in this case for the agency to provide their customer with the data regarding the approved 2" reduced pressure principle assemblies.

What is not permissible is for a member to reproduce the List and distribute it indiscriminately. It is not permissible to provide the List to other agencies so they could, in turn, provide it to their customers. And, it is not permissible to forward the List password or publish the List on the Internet. Each individual within a member agency/company should request access to the List individually. This way each person is updated when the List is updated.

If members have questions about the notification list or distributing the List within their organization please contact the Foundation office. ■

assembly orientation: continued

continued from **page 1**

in a specific orientation and were allowing assemblies to be installed in any orientation, regardless of what was listed on the List. Other administrative authorities would only allow backflow prevention assemblies to be installed horizontally thinking that the Foundation only tested assemblies in that orientation.

Each size and model of a backflow prevention assembly submitted to the Foundation for evaluation is evaluated separately. Additionally, if it is requested that these assemblies be evaluated in different orientations, then the different orientations are evaluated separately as well.

The Standard in Chapter 10 of the *Manual of Cross-Connection Control, Tenth Edition* states that at least three of each size and model of a backflow prevention assembly must be submitted in the field for the field evaluation of the Approval Program. If a manufacturer submits a specific model and size of backflow preventer to the Foundation for evaluation in both the horizontal and vertical orientations, it must complete both the laboratory and field evaluation in each orientation.

In addition, when double check valve assemblies and double check detector assemblies are being tested in the horizontal and vertical up orientations at the same time a cumulative three assemblies must be tested in the field. Chapter 10.1.2.1.3 of the Tenth Edition states in sub-section e:

For the initial submittal of DC & DCDA's in the horizontal (H) and vertical flowing upward (VU) orientations, the field evaluation will require three assemblies in acceptable field sites including:

1. One flowing horizontal orientation and
2. One flowing vertical up (VU) orientation
3. One site at discretion of the manufacturer

All backflow prevention assemblies that appear on the List have successfully completed both the laboratory and field evaluations of the approval program in the designated orientation. An orientation key is included with the List to explain better the orientation abbreviations. ■

USC

Training Courses

Tester Course

Los Angeles, CA
11-15 July 2011

Los Angeles, CA
3-7 October 2011

Los Angeles, CA
9-13 January 2012

Specialist Course

Los Angeles, CA
25-29 July 2011

Los Angeles, CA
23-27 January 2012

Upcoming Events

ABPA Western Regional Backflow Conference
Las Vegas, NV
26-28 September 2011

CA-NV AWWA Annual Fall 2011 Conference
Reno, NV
17-20 October 2011

Contact **Information**

Phone: 866-545-6340
Fax: **213-740-8399**
E-mail: fccchr@usc.edu
Website: **www.usc.edu/fccchr**

Foundation for
Cross-Connection Control
and **Hydraulic Research**

University of Southern California
Kaprielian Hall 200
3620 South Vermont Avenue
Los Angeles, California 90089-2531

First Class
US Postage PAID
University of
Southern California

USC **Viterbi**
School of Engineering