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

USC

inside: **one-day update seminars | 25 year members | gage squirting... and more**

Cross Talk

Autumn 2013

More about the **Approval Program**

The article "The Foundation Approval Program," found in the Winter 2011 edition of Cross Talk, discussed the USC Approval Program as the only approval program for backflow preventers that requires a laboratory and field evaluation before a backflow prevention assembly is granted approval and subsequently listed. The article went on to compare the USC Approval Program with other listing agencies and noted the crucial differences between them. The following is more information about what it means exactly to have a backflow preventer approved by the USC Foundation.

Approximately 30% of the assemblies that pass the USC laboratory evaluation do not pass the field evaluation the first time through. The statistic stresses the importance of having a field evaluation as part of the overall approval program. The combination of a mandatory laboratory and field evaluation allows for a more critical evaluation of how an assembly will perform under actual field conditions, a process that other approval programs lack.

In order to reduce the time needed to gain USC Approval, some have suggested that the field evaluation be shortened. However, it should be pointed out that of the assemblies that fail the field evaluation, approximately 70% fail in the last three months of the field evaluation. No

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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
- 20% off Training Tools

In the Box

- Manual of Cross-Connection Control Tenth Edition
- The List of Approved Assemblies
- Working Together for Safe Water DVD
- Cross Talk newsletter
- USC Notepad & USC Pen

Other Benefits

E-mail notification every time the List of Approved Backflow Prevention Assemblies is updated

Updates to the List of Approved Backflow Prevention Assemblies mailed quarterly

E-mail notification every time a new Special Notice is issued

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*.

Backflow Prevention Schools

Dallas Turf & Irrigation, Inc..

Justin Darbyshire

North Marin Water District

Northrop Grumman

RJ Bennett Plumbing

Tarrant County College

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.

One-Day **Update Seminars**

Earlier this year, the USC Foundation's office moved to a much larger space just on the border of the University Park Campus. The move has provided the Foundation with three times as much space than it had. And, with that added space, the Foundation was able to include a training room.

With its new training room, the Foundation can now schedule courses when necessary without waiting for availability at another training facility. Plus, having training courses and seminars at the new facilities has allowed attendees to visit with Foundation staff and ask questions relating to the work done by the Foundation.

The Foundation has scheduled several one-day seminars for 2014. All of these one-day seminars include six contact hours (0.6 CEUs). Lunch and parking are also included in the price of the seminar.

Hydraulics of Backflow
February 13, 2014
Hydraulic concepts are covered in order to explain the principles of backflow to those attending. This is a great opportunity to introduce attendees to the concepts of backflow and cross-connection control. Backsiphonage, backpressure, indirect cross-connections and direct cross-connections are all discussed. Which backflow preventers may be used under which hydraulic conditions and degrees of hazard will be covered.

Los Angeles and California Codes and Regulations
May 29, 2014
Codes covering cross-connection control in the Los Angeles area will be discussed along with specific requirements in the State of California according to Title 17 and 22 of the California Code of Regulations.

Recycled Water/Shut Down Tests
August 14, 2014
California Code of Regulations requires dual plumbed systems (those plumbed with potable drinking water along with recycled water) must be tested every four years to ensure that there are no cross-connections between the two systems. This update seminar will discuss methods used to test the systems for cross-connections. Various testing methods including the pressure test, shutdown test and dye test will be discussed.

Field Test Procedure Review
November 13, 2014
Ideal for attendees who are familiar with field-testing backflow preventers, but may need some review and/or to become familiar with changes in the Tenth Edition of the Manual of Cross-Connection Control. Discussions will include the differences between the Ninth and Tenth Edition field test procedures and diagnostic scenarios that may be causing a backflow preventer to fail during the field test procedure.

The Foundation looks forward to conducting more of its training courses and seminars at its new facilities. And, it would like to remind members of the members-only discount of 20% for all training courses and seminars. ■

25 Year **Members**

With the continuing support of its members, the USC Foundation will be celebrating its seventieth anniversary next year. The Foundation's membership program has played a big part in helping the Foundation become a leader in backflow prevention and cross-connection control.

The Foundation was established in 1944 after a cross-connection incident in the Los Angeles Harbor a year earlier convinced a group of professionals that not enough was being done to prevent backflow. Wanting to have this problem investigated by an unbiased entity without financial ties to the water products industry; these men approached the University of Southern California. Asking to remain anonymous, these men funded research to investigate this problem of backflow.

In 1944, the Board of Trustees of the University of Southern California established the Foundation for Cross-Connection Control Research, now called the Foundation for Cross-Connection Control and Hydraulic Research. The Foundation began looking into methods of preventing backflow. In 1948, the Foundation published the first standards for backflow preventers in a document entitled, "Paper No. 5." Over the years, the standards have been updated and upgraded. The current standards are published in the Manual of Cross-Connection Control, Tenth Edition.

In 1967, the Southern California Water Utilities Association (SCWUA) started the USC Foundation membership program to help ensure the continuance of the Foundation's work. Originally, they collected donations from SCWUA members to help support the work of the Foundation. After a couple of years, the administration of the Foundation Membership Program was moved to the Foundation office.

The Membership Program has grown to include members from most of the US States as well as six foreign countries. In last winter's issue of Cross Talk the Foundation highlighted those Charter Members that have maintained their membership for the last forty-five years. In this issue the Foundation would like to highlight and thank those that have maintained membership in the Foundation for more than twenty-five years.

The USC Foundation will be presenting an official recognition for all Foundation charter members at an upcoming SCWUA meeting. And, 25+ members will be presented with a certificate of recognition for continued membership soon. Congratulations and thank you for your continued support! ■

Alaska

City and Borough of Juneau Alaska

Arizona

City of Chandler Water Distribution

City of Mesa

City of Tempe

Tucson Water Planning and Engineering

California

A-A Backflow Testing & Maintenance

A.S.T.I Services

Alameda County Water District

Allen T. Mitchel & Son, Inc.

Amador Water Agency

American Backflow Specialties

Astra Industrial Supply

Backflow Prevention Services, LLC.

Backflow Testing and Maintenance Co.

Bakman Water Company

BAVCO

Bellflower-Somerset Mutual Water Company

Big Bear City

Bill's Certified Testing

CA-NV Section AWWA

Calaveras Public Utility District

California Water Service Company

Centennial Water and Sanitation

City of Anaheim

City of Arcadia

City of Azusa

City of Bishop

City of Buena Park

City of Burlingame

City of Chino

City of Davis

City of Del Mar

City of Escondido

City of Fairfield

City of Gilroy

City of Huntington Beach

City of La Verne

City of Lakeport

City of Martinez

City of Merced Water System

City of Milpitas

City of Paramount
City of Poway
City of Riverside
City of Santa Barbara
City of Santa Clara
City of Santa Rosa
City of Seal Beach
City of Susanville
City of Yuba City
County of Sacramento
Crescenta Valley Water District
Crestline-Lake Arrowhead Water Agency
Desert Water Agency
East Valley Water District
Foothill Municipal Water District
Foresthill Public Utility District
Fountain Valley Water Department
Golden State Water Company
Helix Water District
Hendrickson Brothers
High Desert Water District
High View Water District
Humboldt Bay Municipal Water District
Idyllwild Water District
Indian Wells Valley Water District
June Lake Public Utility District
Keller-Wegley Engineering
La Canada Irrigation District
Laguna Beach County Water District
Lake Elizabeth Mutual Water Company
Lincoln Avenue Water Company
Lionel Arnold

Los Angeles County Department of Public Works
Los Angeles County Public Health Department
Los Angeles Department of Water and Power
Marin Municipal Water District
Maywood Mutual Water Company #1
Maywood Mutual Water Company #2
Mesa Consolidated Water District
Montebello Land and Water Company
Montecito County Water District
North Gualala Water Company
North Tahoe Public Utility District
Orange Vale Water Company
Orchard Dale Water District
Peter Peters
Placer County Water Agency
Plumbing and Pipefitting Industry – L38
Ramona Municipal Water District
Rancho California Water District
Running Springs Water District
San Dieguito Water District
Santa Fe Irrigation District
Santa Monica Water Division
Scotts Valley Water District
South Feather Water and Power
South Tahoe Public Utility District
Strathmore Public Utility District
Sweetwater Authority
Tract 349 Mutual Water Company
Valencia Water Company
Valley of the Moon Water District
West Valley Water District
Willow Creek Community Services District
Zurn Wilkins

Colorado

Ken-Caryl Ranch Water & Sanitation District

Florida

Manatee County Public Utilities Department
Jacksonville Beach Public Works Department

Georgia

City of Savannah

Hawaii

City and County of Honolulu

Illinois

Village of Westmont

Indiana

Elkhart Public Works and Utilities

Massachusetts

Ames Company
Febco
New England Water Works Association
Watts Regulator Company

Michigan

Advanced Irrigation
Mid-West Instrument

Missouri

Missouri Department of Natural Resources
Plumbers and Pipefitters Educational Fund

Nevada

City of Henderson Regulatory Programs
Las Vegas Valley Water District

New Mexico

City of Las Cruces
Viking II, Inc.

New York

Matco Products, Inc.

North Carolina

Town of Nags Head

Ohio

City of Akron
Kerr Marketing Agency

Oregon

Clackamas Community College

Pennsylvania

City of Philadelphia

South Carolina

Conbraco Industries

Texas

American Backflow Prevention Association
City of Lewisville

Washington

Cla Val Company

Charter Members

City of Burbank
California Domestic Water Company
City of El Monte
City of El Segundo
City of Inglewood
Irvine Ranch Water District
City of Manhattan Beach
City of Monrovia
Newhall County Water District
City of Oxnard
Park Water Company & Subsidiaries
City of Pasadena
City of Redlands
Rowland Water District
San Bernardino Water Department
City of San Diego
San Gabriel County Water District
San Gabriel Valley Water Company
City of Signal Hill,
City of Torrance,
Vallecitos Water District
City of Vernon
Walnut Valley Water District
Yorba Linda Water District

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amount of laboratory testing can simulate putting an assembly in actual operating field conditions.

It was also noted in the Winter 2011 Cross Talk article that all evaluation conducted for the USC Approval Program is conducted by USC Staff. Third parties are not permitted to conduct the evaluation either in the lab or the field; whereas other standards allow for third party labs to conduct the evaluation and submit the data to the approving or listing agency for approval or listing.

In fact, it is possible for a manufacturer of backflow preventers (if they have a lab authorized by the approving/listing agency) to test their own assembly in their own facility and submit the data to the approving agency for approval or listing.

Because many questions were brought up regarding the USC Approval Program as compared with others, the Foundation Staff started gathering data on assemblies being submitted to USC for evaluation.

The Foundation Staff looked at the assemblies submitted to USC for evaluation since 2009, which had already been approved by another listing agency. Of the assemblies that were listed by other approval agencies and subsequently submitted to USC for evaluation; over 50% of them did not pass the USC laboratory evaluation the first time. That means, assemblies that are already listed by other agencies, installed and actually in service in those jurisdictions that accept the other listing, may not gain USC Approval.

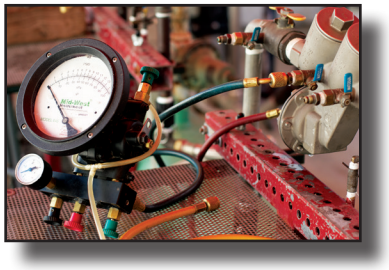
During the USC Approval Program when there is a failure in the lab or the field, the Foundation works with the manufacturer to solve the problem that caused the failure. So, in most cases, the assembly is modified before it can pass the laboratory and field evaluations. This modified assembly may then become approved by USC. But assemblies that were already approved by another listing agency and installed in the field are not the same configuration as those subsequently approved by USC; because changes were made to the design in order for the assemblies to pass the USC evaluation. So, the final USC approved assembly is not likely to be the same design as the assembly with the same model number listed by another listing agency.

As always, the Foundation encourages its members that require USC Approval to not allow assemblies to be installed until they are shown on the USC List of Approved Backflow Prevention Assemblies.

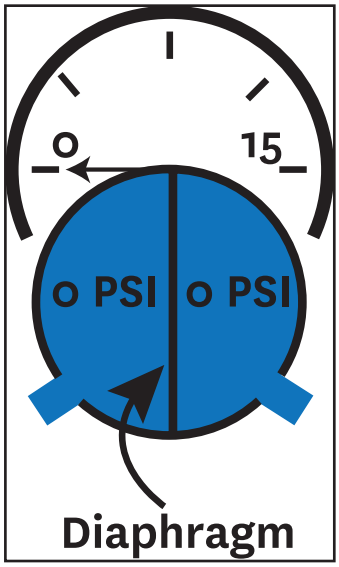
The Foundation has created a brochure detailing the USC Approval Program. A PDF version of this brochure is available on the Foundation website (fccchr.usc.edu). If you'd like a hard copy of this brochure, please contact the Foundation Office. ■

Gage **Squirting**

The USC Foundation has been offering the Course for the Training of Backflow Prevention Assembly Testers since 1971. For many of the attendees it is their first time working on a backflow preventer and using a field test kit, which contains a differential pressure gage. Sometimes the attendees will encounter something during the field test procedure that, seemingly, cannot be explained. One of those unexplained phenomena is the gage squirting water out of one side as the other side is being pressurized. Understanding how a differential pressure gage works is the first step in explaining this phenomenon.



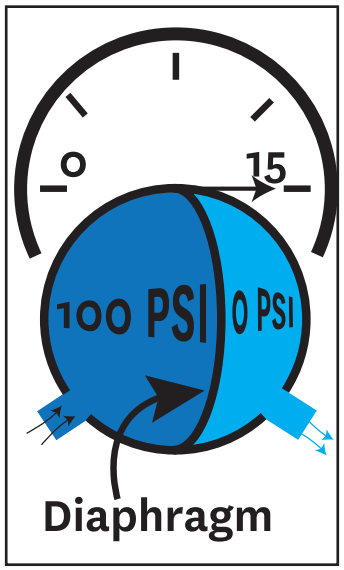
The Tenth Edition of the Manual of Cross-Connection Control field test procedures, covered in Chapter 9, requires the use of a differential pressure gage. A differential pressure gage has two inputs, the high side and low side. The gage is designed so that the reading on the gage is the difference in pressure between the high and the low sides of the gage. For example, when testing the reduced pressure principle assembly (RP) the gage shows the difference in pressure between the No. 2 test cock (where the high side hose is attached) and the No. 3 test cock (where the low side hose is attached).



Differential Pressure Gage NOT Pressurized

When the gage is attached to the RP, water is introduced into both sides of the gage. The actual designs of the differential gages may vary, but the general idea is that the high-pressure water pushes on one side of a divider (e.g., a rubber diaphragm) and the low-pressure water pushes on the other side of the divider. The reading on the gage indicates the difference in pressure between the high and low side. So, if the pressure were the same on both sides of the gage, the reading would be zero.

Now assume the test has ended and the gage is disconnected from the backflow preventer. Although it is disconnected, there still may be water on both sides of the gage. This occurs after the differential gage has been used to test an RP, which uses both the high side and low side of the gage. Then that gage is used on a Pressure Vacuum Breaker (PVB or SVB) or Double Check Valve Assembly (DC), which only uses the high side of the gage. Now, this is where the unexplained phenomenon takes place.



Differential Pressure Gage High Side Pressurized

High pressure is introduced to the high side of the gage, which pushes against the diaphragm in the gage. There is residual water left in the low side of the gage, but it is not under pressure. The diaphragm pushes this water out of the gage, causing the gage to squirt. This is the normal reaction if the gage still has water in it from a previous test. If the water is not drained from the gage after testing an RP, it is likely that some water will squirt out of the low side of the gage the next time the high side of the gage is pressurized.

The tester should not worry about the squirting during a training course or in the field. There should only be a small amount of water discharge from the gage. The tester can continue on with the field test without any worries.

If you have any questions please feel free to contact the Foundation office. ■

Training

Courses 2014

all courses in Los Angeles, CA unless noted

Tester Course

6-10 January
5-9 May
14-18 July
20-24 October

Specialist Course

27-31 January
17-21 March
28 July-1 August

One Day Update Seminar

13 February
Hydraulics of Backflow
29 May
L.A./CA Codes & Regulations
14 August
Recycled Water Shutdown Test
13 November
Field Test Procedures

Social **Media**

follow us at twitter.com/uscfccchr

like us on our Facebook page
facebook.com/uscfccchr

subscribe to our YouTube channel
youtube.com/uscfccchr

Upcoming

Events

Association of California Water Agencies
Fall Conference & Exhibition
Los Angeles, CA
3-6 December 2013

TREEO Cross-Connection Control
Conference
Orlando, FL
5-6 March 2014

Nebraska ABPA
Cross-Connection Control Workshop
Kearney, NE
12 March 2014

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