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

USC

inside: **standard for field test kits | bipf 2012 | household brochure...and more**

Cross Talk

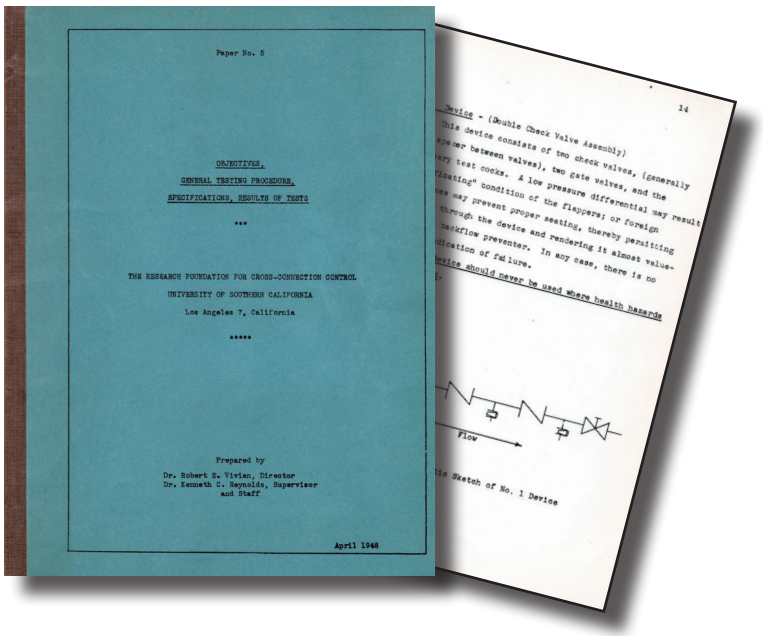
Summer 2012

USC Foundation Approaches a Milestone

With its seventieth anniversary approaching soon, the USC Foundation for Cross-Connection Control and Hydraulic Research continues to be a frontrunner in the backflow prevention industry. Beginning with its first set of general testing procedures being published in 1948 the USC Foundation has made available training courses, training tools and has developed an approval process for backflow prevention assemblies.

The University of Southern California's Board of Trustees established the USC Foundation for Cross-Connection Control Research in September of 1944. It was later renamed the USC Foundation for Cross-Connection Control and Hydraulic Research. At the time, funds were donated to the University anonymously to establish the USC Foundation. A laboratory was setup on the University Park Campus with a staff to conduct research on cross-connection control.

Shortly thereafter, the USC Foundation published *Paper No. 5: Objectives, General Testing Procedure, Specifications, Results of Tests* in April of 1948. Pre-existing backflow preventers of the time were evaluated according to *Paper No. 5* and depending on the model being tested between 20% to 75% were failing. Not just providing inadequate results but failing to prevent backflow all together.


Paper No. 5

OBJECTIVES,
GENERAL TESTING PROCEDURE,
SPECIFICATIONS, RESULTS OF TESTS

THE RESEARCH FOUNDATION FOR CROSS-CONNECTION CONTROL
UNIVERSITY OF SOUTHERN CALIFORNIA
Los Angeles 7, California

Prepared by
Dr. Robert E. Vivian, Director
Dr. Kenneth D. Reynolds, Supervisor
and Staff

April 1948

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Flow

So, in addition to field test procedures, sets of standards for backflow prevention assemblies were included in *Paper No. 5*. The standards included the double check valve assembly and the reduced pressure principle assembly.

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USC University of Southern California

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 since the last Cross Talk:

A Better Way

A. Wyman & Associates

AECOM-Wisconsin

American Water O&M

Anthony's Backflow Testing

Barlow Backflow

DC Plumbing

G. I. Hopkins

Glendale- Parks Division, City of

Gridley, City of

Griffin Plumbing, CA

HR Green, Inc.

Kern Plumbing & Backflow Services, Inc.

Newcastle Plumbing

Orange County Sanitation Dist.

Perfection Plumbing and Drain Service

PHCC Los Angeles

Raffaele Tarulli P.E.

Rand Communities Water District

Suarez Engineering Inc.

The Coca-Cola Co.

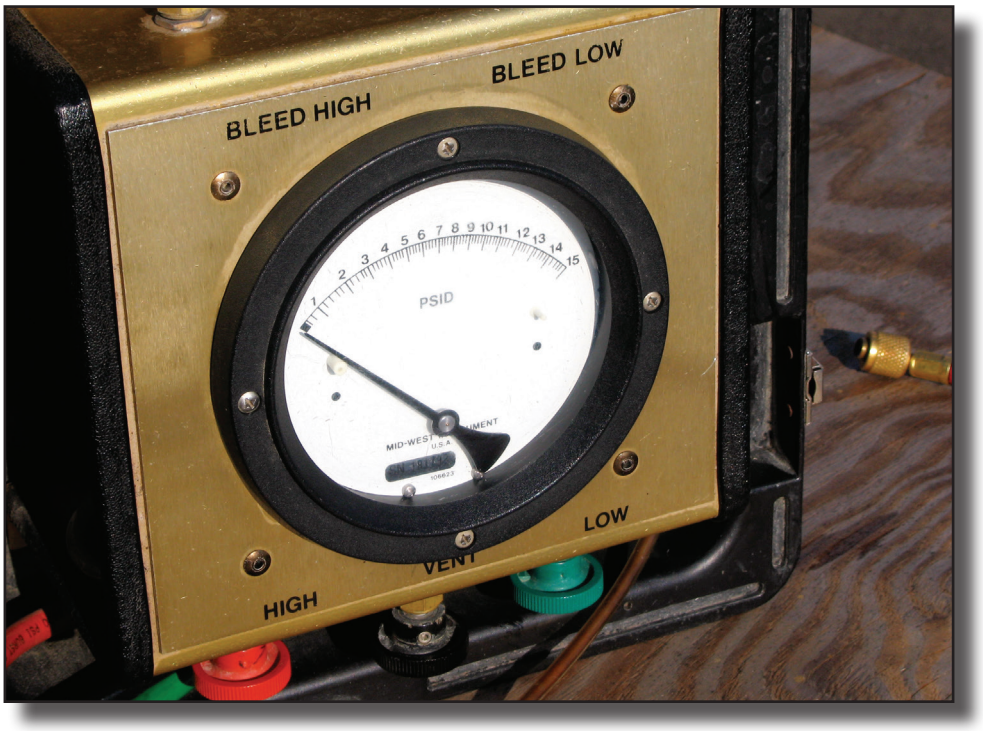
Timothy Bushnell

Van Den Eykel Landscape Services

Wilder System Solutions

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.

Standard for Field Test Kits



With the Tenth Edition of the *Manual of Cross-Connection Control*, the USC Foundation, for the first time, introduced a standard for field test kits. The USC Foundation has never had a list of approved field test kits. However, a list of acceptable gages has been available on the USC Foundation's website. This list shows gages that have been reviewed by the Foundation and found to comply with the generalized guidelines shown in Section 9 of the Ninth Edition of the Manual, but it is not an Approval.

The Field Test Kit Standard found in Chapter 10 of the Tenth Edition, includes general material and design requirements along with the evaluation of design and performance for the field test kit. Field test kits with a two, three and five needle valves are accepted for evaluation.

The field test kit approval consists of successfully completing a laboratory evaluation conducted at the USC Foundation laboratory.

The laboratory evaluation of the field test kit include

a. *Accuracy test*
b. *Hydrostatic test*
c. *Accuracy at rated temperature and pressure test*
d. *Pressurizing fatigue test*
e. *Valving flow test*
f. *Pressure dissipation test*

Approvals are granted after the field test kit successfully completes the laboratory evaluation. The approved field test kit will then appear on the *List of Approved Field Test Kits*. After a period of three years renewal of the approval is required. Renewal after three years is dependent on the field test kit continuing compliance with the standard, which include field performance. And, approvals may be rescinded if the field test kit has been modified.

No Field Test Kits have been approved according to the Standard in the Tenth Edition, to date. ■

Manifold vs Parallel Assemblies

There has been some confusion as to the differences between a manifold assembly and a parallel installation of backflow prevention assemblies.

A manifold assembly is comprised of backflow prevention assemblies of the same manufacturer, model and size. Manifold adaptor fittings on both the inlet and outlet of the manifold assembly are considered integral components. The size of the manifold is determined by the inlet and outlet connections of the manifold adaptor fittings.

The manifold assembly referenced in the *Manual of Cross-Connection Control, Tenth Edition* (Chapter 8.3.4) addresses a specifically designed product. This product is not the same as two individual assemblies installed in parallel. The Foundation previously evaluated and Approved several manifold assemblies, 25 years ago, and they were designed with two of the same make, model and size individual assemblies.

Assemblies in parallel do not have to be the same make, model and size. In many applications one of the assemblies in parallel will be opening and closing to satisfy the low flow demands and the larger assembly will only open when the customer uses more water. Parallel installations are a common occurrence in the backflow prevention industry.

parallel installation

Parallel installations of backflow prevention assemblies are used to provide uninterrupted water service to the water user, typically known as a critical service. The installation of units in parallel is referenced in Chapter 8.3 of the Tenth Edition manual. The hydraulic sizing of two (or more) assemblies in parallel is based upon the total flow rate to the customer. For example, two 3-inch RPs in parallel, have a maximum rated flow of 320 gpm each. So if the customer is using water

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The USC Foundation at the BIPF 2012

The 10th Annual Backflow Industry Product Fair p
American Backflow Prevention Association was h

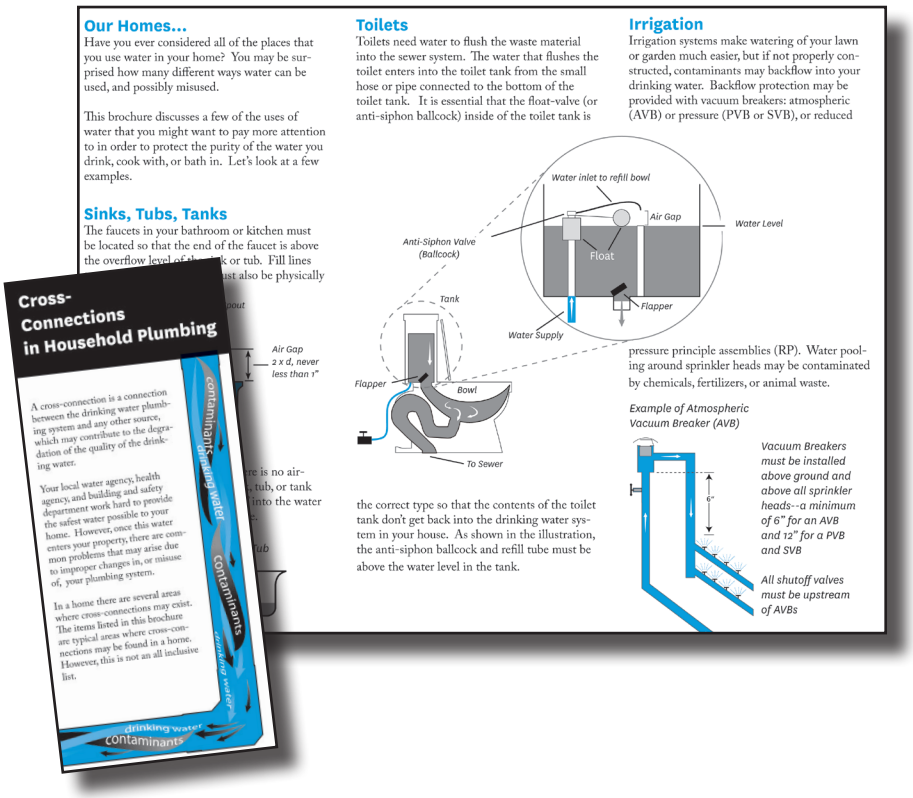
Sessions at the fair covered everything from repai
dates. Additionally, USC Foundation staff demons
tion assemblies according to the Tenth Edition ma
portions of the new Field Testing Backflow Preventers DVD playing at the USC Foundation's exhibition booth.

Meanwhile other attendees took a tour of the Foundation's laboratory where Foundation staff demonstrated the labora
tures using the Foundation's thermal loop system. Attendees watched as Foundation staff demonstrated measuring the
Foundation's small and large cycle systems were on display to demonstrate to attendees how the Foundation simulates
ization, depressurization, backpressure, re-pressurization and others.

The Foundation would like to thank all who came by the booth in the auditorium and visited the laboratory. ■

Cross-Connections in Household Plumbing Brochure

Cross-Connections are not limited to restaurants, factories or other large establishments; they may be prevalent in the home as well. The USC Foundation has put together an illustrated brochure highlighting possible cross-connections that may be found in the home.



The Cross-Connections in Household Plumbing illustrated 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, a toilet needs water to flush the waste material into the sewer system, therefore, it is essential that the fill-valve (ballcock) inside of the toilet tank is the correct type so that the contents of the toilet do not get back into the drinking water system in the home.

Other items illustrated in the brochure include boilers, hose bibs and irrigation systems.

The illustrated brochure is ideal to create awareness among communities about cross-connections found in the home.

The USC 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. ■

ɹut on by the Southern California chapter of the
eld at Friendship Auditorium in Los Angeles in June.

r and lead-free issues to certification program up-
strated field-testing procedures for backflow preven-
anual. Attendees also had an opportunity to watch

atory's ability to test assemblies at elevated tempera-
e hardness of elastomers using a durometer. And, the
specific sets of operating conditions such as: pressur-

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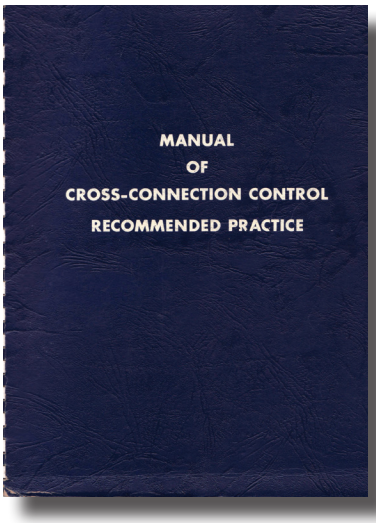
From the beginning, the USC Standards have required a field evaluation as part of the approval process. The initial requirement stated that three assemblies would be tested in the field for six months. If the assemblies passed, it was granted *provisional* approval, and three more of the same assemblies, which were granted provisional approval, were installed in the field for a three-year field evaluation. If the three assemblies were determined at the end of the three years to pass the field evaluation that particular model and size of backflow preventer was granted *full* approval and included in the USC Foundation's listing of approved assemblies .

Records indicate that full approval was granted to two models of reduced pressure principle assemblies and one model of double check valve assembly in October of 1948. Today, the *List of Approved Backflow Prevention Assemblies* includes close to 3000 assemblies. Although many of those may be of the of the same model and size, but listed twice or more for various orientations.

The current approval process includes, not only the rigorous laboratory evaluation detailed in Chapter 10 of the Tenth Edition, but also a required one year field evaluation in which three assemblies of each size and model are field tested monthly for a year. At the end of the year the assemblies are disassembled to determine if the assembly is still operating properly. It is not until these conditions are met that the assembly is granted Approval and included in the *List*. There is no provisional Approval.

Following *Paper No. 5*, the University published *USCEC Report 48-101* in January of 1959. The paper included updated standards for the double check valve assembly, the reduced pressure principle assembly as well as some policy recommendations for a cross-connection control program, recommendations on which facilities should have backflow preventers and a list of definitions.

In August of 1960, twenty months after the publication of *USCEC Report 48-101*, the *Manual of Cross-Connection Control Recommended Practice* was published. The Manual included information on Objectives, Policies, Responsibilities, Definitions, Typical Facilities needing backflow protection, Cross-Connection Control Practices, Sample letters and forms, field test procedures, standards for the backflow preventers and a section listing documented backflow incidents.



The *Manual of Cross-Connection Control Recommended Practice* would later become what is known today as the *Manual of Cross-Connection Control*.

Currently in its Tenth Edition, the manual has become an essential tool for anyone involved in backflow prevention and cross-connection control with its wealth of information. Detailed chapters like Hydraulics, Facilities and Elements of a Program continue to make the manual a valuable resource. The manual also includes the field test procedures and the Standards to which backflow prevention assemblies are evaluated for inclusion in the *List of Approved Backflow Prevention Assemblies*.

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usc foundation approaches milestone: continued

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For nearly seven decades the USC Foundation continues to perform everyday at its highest level with integrity and respect. USC Staff performs all Laboratory and Field Testing.

The USC Foundation does not use third party laboratories or field testers. The USC Staff is trained extensively in the intricacies of the laboratory and field evaluation procedures.

The USC Foundation permits the manufacturers of the backflow preventers under evaluation to witness the evaluation, but does not permit them to partake in the evaluation process, thus, preventing even the appearance of a conflict of interest.

Only USC Staff conducts the field testing of backflow prevention assemblies under the USC Foundation Approval Process. This is critical in order to determine how well the backflow preventer is performing under actual operating conditions in the field.

All Laboratory and Field work is done in the strictest adherence to the USC Foundation's Operational Manual. (USC Foundation complies with ISO/IEC 17025:2005, which is the standard for laboratories)

The USC Foundation, although self-supporting and not a recipient of any University funding, must maintain the highest level of integrity in its financial dealings. As a division of the University, purchasing, payroll, income, expenditures and policies are all governed by University Policies. So, even though the USC Foundation is self-funded; purchasing, salaries, etc. are all governed by the University. This makes it impossible for anyone on staff to have any personal financial benefit tied to the results of any evaluation, thus avoiding conflicts of interest.

The University of Southern California is considered one of the Top Research Universities in the World. As a division of the University, the USC Foundation must maintain the same level of integrity in all of its business dealings. ■

manifold vs. parallel assemblies: continued

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and 320 gallons per minute through the individual assemblies is not exceeded, then they are being used within their rated capacity.

Even if two units in parallel are the same exact make, model and size, this does not mean they will work in unison (i.e., open/close simultaneously). There tends to be a primary and secondary assembly. The spring loads are not exactly the same between the two units in parallel, so the water will tend to flow through the assembly with the lower pressure loss (i.e., primary). The secondary assembly will begin to open as the flow rate increases.

If members have any more questions regarding the difference between a manifold and parallel installation please contact the Foundation office. ■

Training Courses

Tester Course

Los Angeles, CA
15-19 October 2012

Los Angeles, CA
14-18 January 2013

Los Angeles, CA
22-26 April 2013

Specialist Course

Los Angeles, CA
7-11 January 2013

Upcoming Events

ABPA Western Regional
Backflow Conference
Las Vegas, NV
24-26 September 2012

CA/NV AWWA
Annual Fall Conference
San Diego, CA
8-11 October 2012

Tennessee
Backflow Prevention Association
Jackson, TN
25-26 October 2012

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