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

USC

inside: **tenth edition | "lead free" california | 9th vs 10th | new field testing video**

Cross Talk

Winter 2010

Note to Members

The Foundation would like to thank all its members for their patience as the Foundation finished up the new *Manual for Cross-Connection Control, Tenth Edition*.

A complimentary copy of the *Tenth Edition* was sent out to all Foundation members at the beginning of January. If you have yet to receive a copy of the *Tenth Edition* please contact the Foundation office immediately. We're sure you'll find *Tenth Edition* to be a great improvement over the Foundation's previous editions.

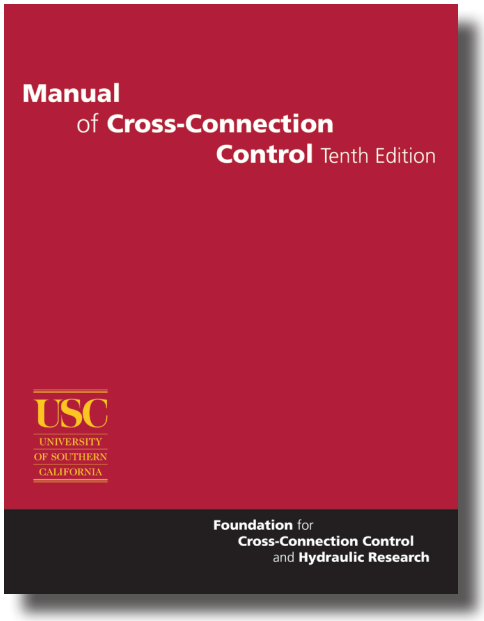
For the past six months the Foundation has not published a new *Cross Talk*. With all of the staff's time and effort focused on completing the *Tenth Edition* in 2009 it was necessary to postpone any new *Cross Talks*. Beginning with this issue *Cross Talk* will be back on schedule for quarterly publication, bringing to you the latest news and information regarding cross-connection control.

We apologize again for the inconvenience and encourage anyone with questions to contact the Foundation office via e-mail (fccchr@usc.edu) or phone (866-545-6340). ■

In the summer of 1996, the Manual Review Committee met for the first time to begin work on the *Manual of Cross Connection Control, Tenth Edition*. There were many technical issues that had to be resolved and many new portions that needed to be created. This past December the *Tenth Edition* was finally published.

The Tenth Edition

The *Tenth Edition* is a great improvement over the *Ninth Edition*. It is about 200 pages larger than the *Ninth Edition*. New chapters were created to help Testers and Cross-Connection Control Specialists understand all details of cross-connection control.



Chapter Two, titled History, discusses history from ancient civilizations to the current state-of-the-industry. Many of the developments in cross-con-

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Contents

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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 ALL EMPLOYEES 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.

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

Aero Automatic Sprinkler Co.

Akita Plumbing

Arturo Felix

B & W Y-12, LLC.

Bay Area Backflow, Inc.

Beeco

Brent A. Knowles

Cal Fire

Checkback Inc

Crestline Village Water District

Dakota Backflow Co.

Danbury, City of

Darigold, Inc.

Drains 4 Less

Erickson Service Plumbing

Everett Leon Banks

Evergreen Rural Water

Frederick Manthei

Gailey Fire Protection

Gene V. Pira, Inc.

Golden Ridge, City of

Granite Oaks Water Users Association

Holtville, City of

Hydro Designs, Inc.

Jim Woody Plumbing Services

Kirman Plumbing Co.

KV Plumbing, Inc.

Leesburg Royal Highlands, City of, FL

Legoland California, LLC.

Measurement Control Systems, Inc.

Metro Testing

Mission Plumbing & Heating

Perfection Plumbing and Drain Service

R.Tsukushi Backflow Tester

Raleigh, City of

Reliable Rooter & Plumbing

Rogue Valley Backflow Service

S.S.Dannaway Associates, Inc.

Sanders Plumbing, Inc.

Seaside Rooter Plumbing Co.

Service First Plumbing

SGA Construction

South Mesa Water Co.

Sungho Shin

Surprise, City of

The Backflow Pro., Inc.

The Plumbing Company

The Repair People, Ltd.

TNT Air and Plumbing Industries

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

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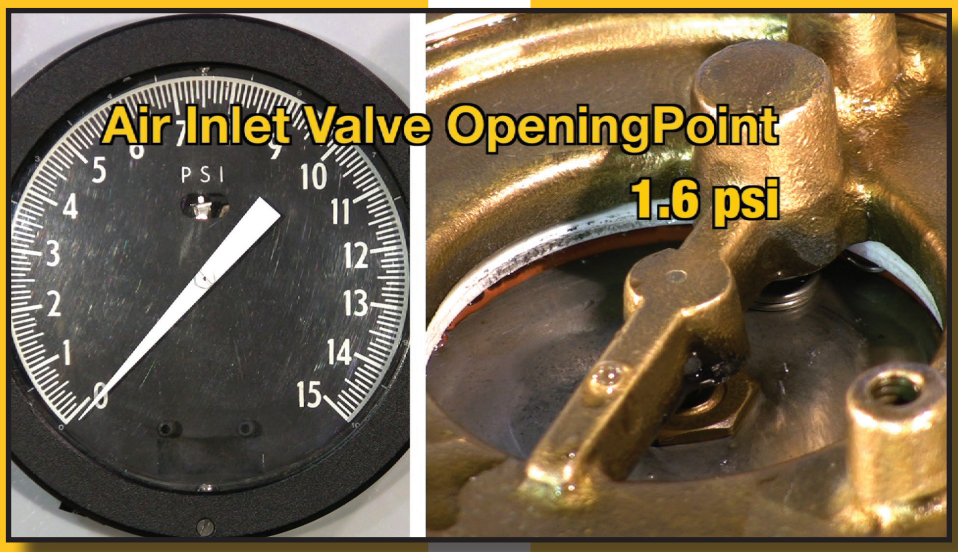
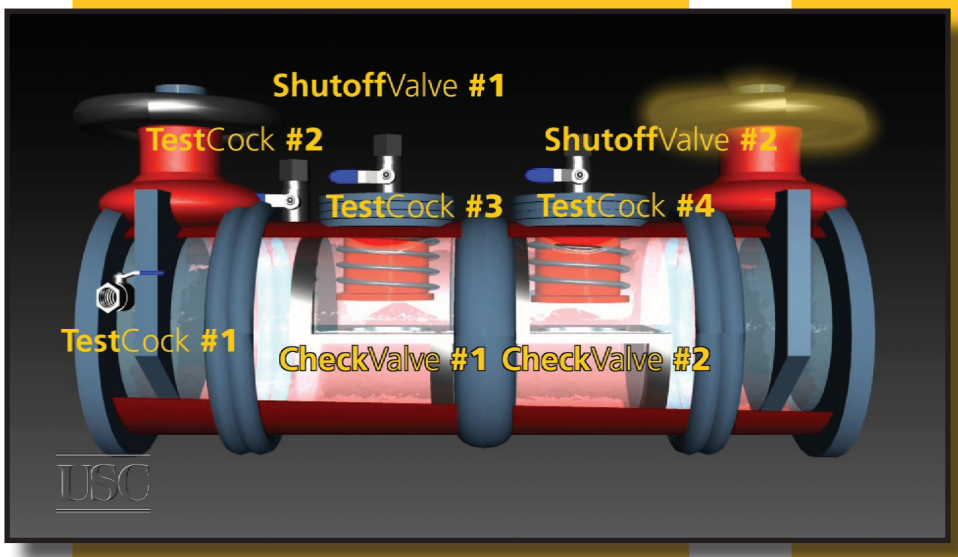
NEW Field Testing Video

An ideal companion to the *Manual of Cross-Connection Control, Tenth Edition* is the forthcoming new *Field Testing Backflow Preventers, Instructional Video*. The instructional video is the perfect tool for those interested in learning how to field test backflow prevention assemblies.



The new instructional video has been produced from the ground-up. The video has been entirely shot in high definition and new computer graphics have been created to help testers better understand the inner workings of the assemblies.



New to the instructional video is the addition of the spill-resistant pressure vacuum breaker assembly (SVB) field test procedure with diagnostics. In addition to using a five-needle valve gage for all field test procedures, the new instructional video will include field test procedures for the reduced pressure principle backflow prevention assembly (RP) using 2 and 3-needle valve gages along with diagnostics.

The instructional video demonstrates the field test procedures for the double check valve backflow prevention assembly (DC), reduced pressure principle backflow prevention assembly (RP), pressure vacuum breaker assembly (PVB) and the spill-resistant pressure vacuum breaker assembly (SVB).

You can find a preview clip of the new instructional video in the CD-ROM, which accompanies the *Tenth Edition*.

The instructional video will be made available on DVD and high-definition Blu-ray disc and is scheduled to be released this Spring. ■

"Lead Free" in California

The State of California Legislature passed a law, which limits the amount of lead content in plumbing components intended to convey or dispense water for human consumption. Other states have, or are developing, similar laws.

The California Health and Safety Code (Section 116875, commonly known as AB 1953) has established lead free as ≤ 0.25 percent maximum weighted average lead content. Effective January 1, 2010, Section 116875 prohibits any person from introducing into commerce any pipe, plumbing fitting or fixture intended to convey or dispense water for human consumption through drinking or cooking that is not lead free. A backflow prevention assembly for non-potable services such as irrigation, fire sprinkler and industrial are excluded.

The Foundation has been asked repeatedly about the lead content of backflow prevention assemblies since the first of the year. The backflow prevention assembly manufacturers that have assemblies approved by the Foundation were asked to provide documentation to the Foundation certifying that any assemblies deemed to be "lead free" do, in fact, meet the protocols set forth by the California Department of Toxic Substances. Manufacturers responded with documentation, however, more information is needed to verify the details.

For example, most assemblies listed on the Foundation's *List of Approved Backflow Prevention Assemblies* are approved with a variety of shutoff valves. The Foundation needs to verify which shutoff valves allow the assemblies to meet the "lead free" requirements. Additionally, the documentation provided did not specify the size of the assemblies in every case. Therefore, the Foundation has been working with the third party certifying entities to verify which size and model of assemblies actually meet the requirements of AB 1953 and which shutoff valves are required to be included with the assembly in order for it to meet the requirements of AB 1953.

The Foundation has been successful in getting this information in some cases. However, some of the information is still being sought at the time of publication of this *Cross Talk*. Once the information is verified, the *List of Approved Backflow Prevention Assemblies* will be updated with the "lead free" information.

Another concern with this new regulation is spare parts. Many have asked whether or not spare parts, in themselves, need to meet the "lead free" requirements, or is it acceptable if the assembly as a whole still meets the "lead free" requirement after a spare part has been replaced. At this point the State has not made a clear indication as to which is required. Should the state require each spare part to meet the requirements of AB 1953, this could pose problems for those repairing USC approved backflow preventers.

If a USC approved backflow preventer needs a replacement part, it is necessary to use originally manufactured spare parts in order to maintain the Foundation's Approval status. If, however, modified parts which have not been evaluated and approved by USC are used to meet the requirements of AB 1953, the assembly will no longer be approved by USC. (For system protection assemblies, this will violate Title 17 of the California Administrative Code).

The Foundation publishes a printed version of the *List* each January. The publication of the printed list is being held up, at this point in time, until the third party certifying entities have had the opportunity to clarify the status of various assemblies. This printed version should already be on the press by the time this *Cross Talk* is in the hands of Members. More information on California's situation may be found at the following website:

http://www.dtsc.ca.gov/PollutionPrevention/LeadInPlumbing.cfm. ■

Low-Head Drainage in Irrigation

Water conservation continues to be a topic that occupies the minds of conservationists, lawmakers and manufacturers alike. As water purveyors encourage users to reduce their water consumption and offer rebates for more water-wise appliances, a solution to low-head drainage has been developed and will soon be seen in landscaping ordinances near you.

Low-head drainage is a phenomenon whereby water drains from sprinkler heads at low elevations in an irrigation system after the water source has been shut off. In systems where there is an elevation difference between the various sprinkler heads, the residual water will flow to the lowest point and out the sprinkler heads until the system is drained. In some systems, this can be a considerable amount of water.

Anti-Drain Sprinklers to the Rescue

One solution to this problem is the anti-drain sprinkler head. These sprinkler heads contain built in check valves designed to maintain a residual pressure of up to 16 feet of water. With these check valves holding the water in the pipes, water is saved for the next time it is needed rather than running down the sidewalk and being lost.

Backflow Prevention Implications

While these anti-drain sprinkler heads seem to provide an effective solution to the low-head drainage problem, they may cause problems for the backflow prevention assemblies on irrigation systems.

Many irrigation systems use atmospheric vacuum breakers (AVB's) as backflow protection. The recommended practices found in the Foundation manual along with most plumbing codes require that AVB's not be pressurized more than 12 hours in a 24-hour period. Depending on the topography of the irrigation system, it is possible that the residual pressure resulting from these anti-drain sprinkler heads could keep the air inlet of the AVB constantly closed and thereby susceptible to disc adhesion. An AVB with the inlet disc adhered to the seat is no longer providing any form of backflow prevention.

The Foundation Investigates

In order to determine if these anti-drain sprinkler heads would indeed keep an AVB closed for more than 12 hours in a 24-hour period, the Foundation lab obtained three sample sprinkler heads to conduct a series of simple tests. A miniature irrigation system was set up in the laboratory with a water source connected to an AVB and then plumbed down to a single anti-drain sprinkler head installed at the required 6" below the critical level of the AVB. The water pressure in this system was monitored with a differential pressure gauge held at the level of the sprinkler head.

To conduct the test, sprinkler operation was simulated by flowing enough water through the sprinkler head to allow the stem of the sprinkler to pop-up and flow for several seconds. The water source was then slowly

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nection control are centered on incidents in the Los Angeles area in the 1930s and 1940s. A brief history of the Foundation is included starting in 1944 when USC established the Foundation.

Chapter Three, on hydraulics, explains the basics of general hydraulics and hydraulics

History of Cross-Connection Control

Ancient Civilizations

Civilizations have grown where there has been an abundance of drinking water, starting from prehistoric times to the present. When populations could not live directly adjacent to the drinking water supply, such as rivers and lakes; it became necessary to transport this essential water to the people for drinking purposes and irrigation of crops. Early forms of water transportation started with clay jars, animal skins and, where the geography would allow it, the development of simple ditches and canals to carry the water over long distances. The Romans developed an intricate network of aqueducts to carry water to their cities for drinking, bathing, decorative fountains and finally into the sewer system to carry away their waste. Perhaps the close proximity of the drinking water system and the waste system could have been interconnected inappropriately, constituting one of the earliest forms of a cross-connection. Even before Rome it is believed that complicated irrigation systems were used to raise water in elevation to irrigate the Hanging Gardens of Babylon, one of the Seven Wonders of the Ancient World.

The Modern Age

Many of the early water systems in cities in the United States were developed primarily for the suppression of fires in industrial areas. The first municipal water utility in the United States was established in Boston, Massachusetts in 1652 to provide domestic water and fire protection[1]. Pipes were fabricated out of hollowed logs. When needed to fight a fire the firefighters would drill a hole in the wooden water mains and plug them when finished. This was known as the "fireplug."

History

Figure 2.1
Early pipes were made of hollowed out logs

In many of the large industrial factories and mills along rivers, a system of pumps and piping from the nearby river dedicated for fighting fires in their facility would be installed. To ensure that water would be available, from either source, the water distribution system or the river, the two would be directly tied together. The fire underwriters that carried the insurance of the factory insisted that, in buildings where fire sprinklers were installed, a secondary water supply be provided to supplement the water system. A single check or gate valve was typically the only protection to prevent the river water from entering the water system . During some fire fighting efforts, it was found that not all of the water being pumped from the river went to suppressing the fire. In fact, river water was found to be pumped back into the water distribution system. The paper "Secondary Water Supplies, Their

1 Hanke, S.H. 1972. Pricing Urban Water. Pp.283-306 In: Public Prices for Public Products. S. Mushkin (ed). Washington, DC: The Urban Institute.

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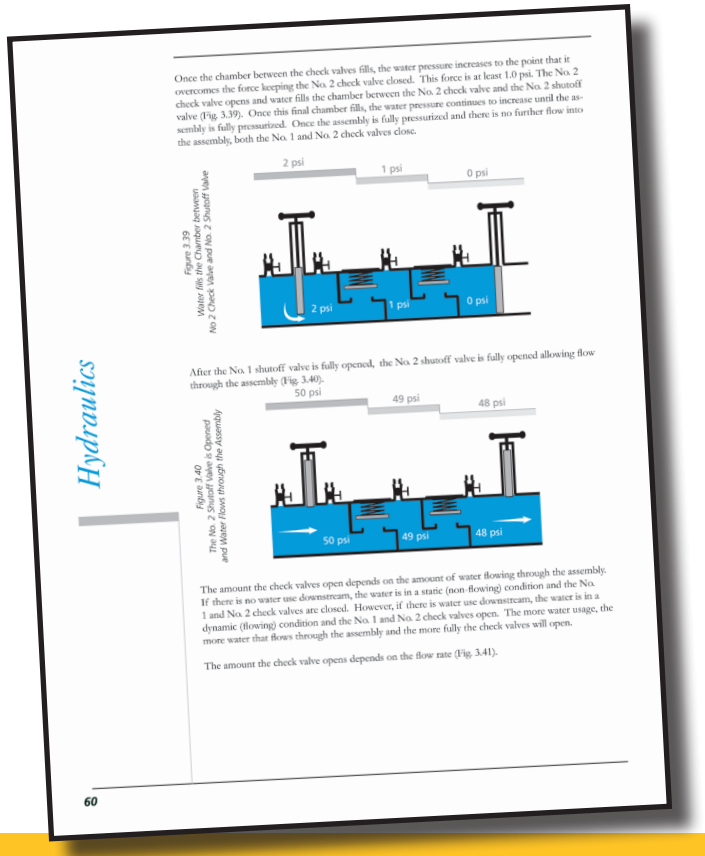
specific to backflow and also backflow prevention assemblies. Types of backflow, types of cross-connections, degrees of hazard are all discussed to help the reader understand what types of cross-connections exist and what type of backflow protection is required to prevent backflow in each situation. A general explanation of how the backflow preventers operate is included, in addition to a detailed explanation of their operation that goes far beyond the basic explanation.

Chapter Four discusses the various elements of a cross-connection control program and is included to help the specialist in developing a cross-connection control program. Policies and procedures are discussed to help the specialist lay out the details of how a cross-connection control program should be run. This chapter will help the specialist layout the details of how their cross-connection control program will operate.

Chapter Five explains the intricacies of conducting a cross-connection control site survey. This includes information on preparing for the survey, notifying the customer and actually conducting the survey. Chapter Five combined with the following two chapters will be essential to the specialist in their site surveys, which is a big part of their cross-connection control program.

Chapter Six gives some general information about facilities. Facilities are divided into five general types (plus "other types" to encompass other facilities not specifically covered in the given categories). A section on each type of facility explains the types of facilities which may be included and what types of cross-connections may be encountered at this type of facility.



Once the chamber between the check valves fills, the water pressure increases to the point that it overcomes the force keeping the No. 2 check valve closed. This force is at least 1.0 psi. The No. 2 check valve opens and water fills the chamber between the No. 2 check valve and the No. 2 shutoff valve (Fig. 3.39). Once this final chamber fills, the water pressure continues to increase until the assembly is fully pressurized. Once the assembly is fully pressurized and there is no further flow into the assembly, both the No. 1 and No. 2 check valves close.

Figure 3.39
Water fills the Chamber between No.2 Check Valve and No. 2 Shutoff Valve

After the No. 1 shutoff valve is fully opened, the No. 2 shutoff valve is fully opened allowing flow through the assembly (Fig. 3.40).

Figure 3.40
The No. 2 Shutoff Valve is Opened and Water Flows through the Assembly

Hydraulics

The amount the check valves open depends on the amount of water flowing through the assembly. If there is no water use downstream, the water is in a static (non-flowing) condition and the No. 1 and No. 2 check valves are closed. However, if there is water use downstream, the water is in a dynamic (flowing) condition and the No. 1 and No. 2 check valves open. The more water usage, the more water that flows through the assembly and the more fully the check valves will open.

The amount the check valve opens depends on the flow rate (Fig. 3.41).

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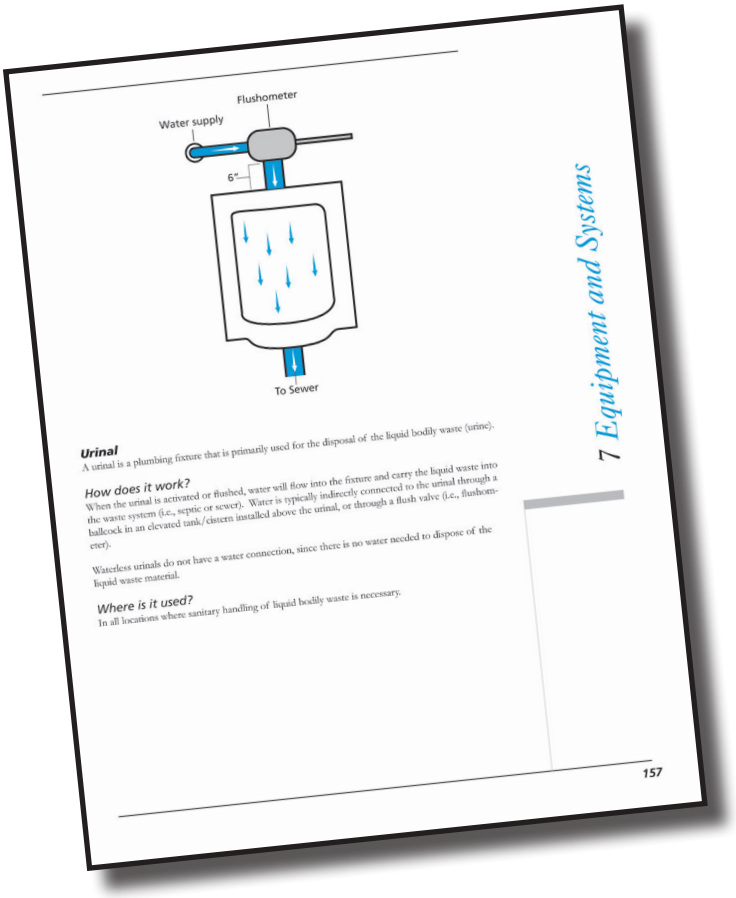
Chapter Seven shows several common pieces of equipment and systems that may be discovered on a site survey. There are illustrations of the equipment and systems showing how they work and where a cross-connection hazard may be present. Each piece of equipment includes a description of the equipment, of how it works and where it is used.

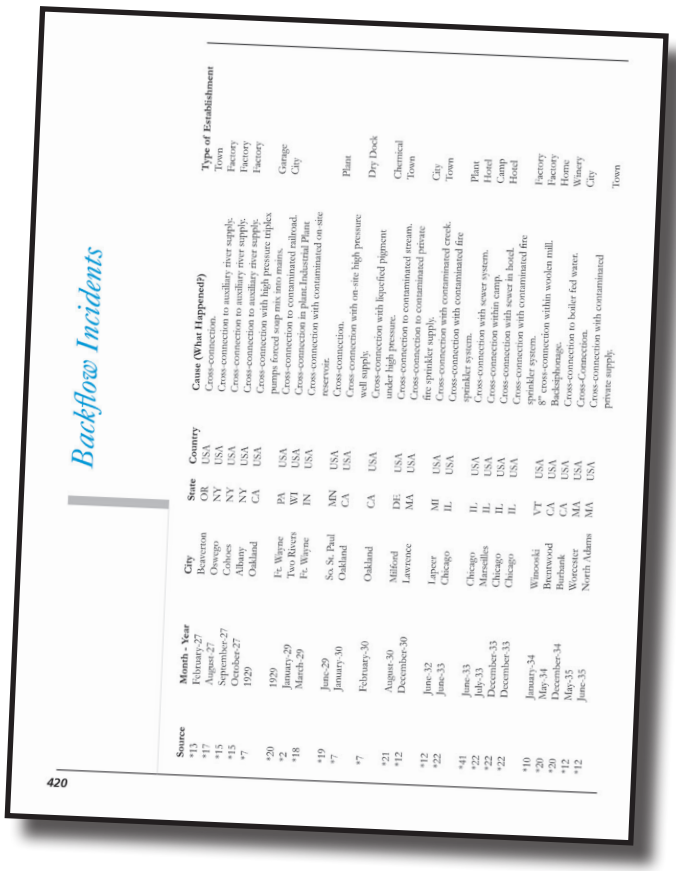
Chapter Eight includes updated sample forms, letters and a model ordinance. On the



inside back cover of the manual is a CD-ROM that includes either MS Word or PDF versions of these documents so the specialist may use them in their cross-connection control program. The Word documents may be edited to the specific needs of the agency using the forms. For example, if a cross-connection control specialist conducts a site survey (perhaps using the field survey form 8.17, on the CD) and determines a backflow preventer must be installed at the meter, a letter can be sent to the customer (such as 8.1 with any desired edits). Included with this letter could be the general guidelines for installation of backflow preventers (8.2). Again, any of the Word documents can be edited to meet the specific needs of the agency.

Chapters Nine, **Ten** and **Eleven** cover the same topics, as in the *Ninth Edition*: Field Test Procedures, Standards and the list of documented backflow incidents respectively. However, in the *Tenth Edition* a Standard for Field Test Kits has been added. Once field test kits are submitted to the Foundation, they will be evaluated and placed on a new section of the *List of Approved Backflow Prevention Assemblies* (or the *List of Approved Backflow Prevention Assemblies and Field Test Kits*, as it will be called).

The incidents included in Chapter Eleven are also included in an Excel file on the **CD-ROM**. This will allow the reader to sort through the



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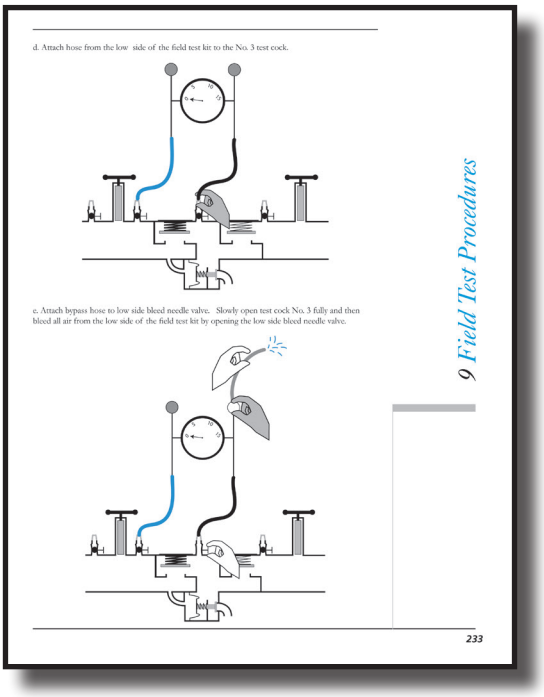
incidents based on any of the fields included in the spreadsheet.

Field Test Procedures
Although the basics of the field test procedures remain the same there are some differences that are quite important.

One of the more important changes to some testers will be the inclusion of the fully illustrated field test procedures for the Reduced Pressure Principle Assembly using two, three


d. Attach hose from the low side of the field test kit to the No. 3 test cock.

e. Attach bypass hose to low side bleed needle valve. Slowly open test cock No. 3 fully and then bleed all air from the low side of the field test kit by opening the low side bleed needle valve.

9 Field Test Procedures

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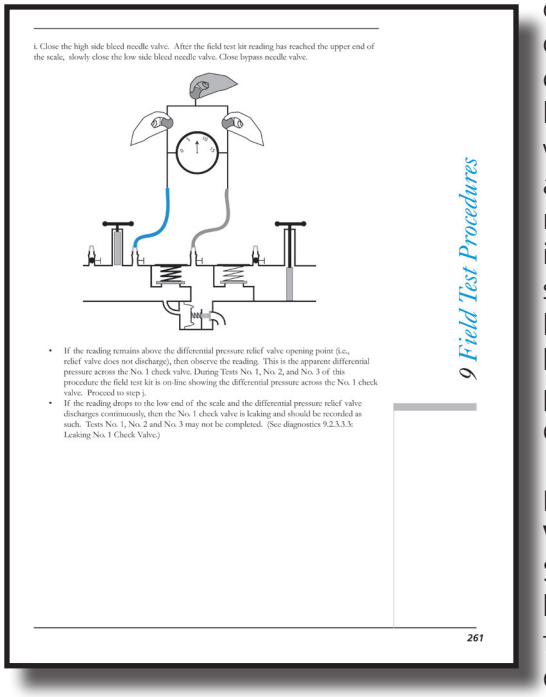
i. Close the high side bleed needle valve. After the field test kit reading has reached the upper end of the scale, slowly close the low side bleed needle valve. Close bypass needle valve.

- If the reading remains above the differential pressure relief valve opening point (i.e., relief valve does not discharge), then observe the reading. This is the apparent differential pressure across the No. 1 check valve. During Tests No. 1, No. 2, and No. 3 of this procedure the field test kit is on-line showing the differential pressure across the No. 1 check valve. Proceed to step j.
- If the reading drops to the low end of the scale and the differential pressure relief valve discharges continuously, then the No. 1 check valve is leaking and should be recorded as such. Tests No. 1, No. 2 and No. 3 may not be completed. (See diagnostics 9.2.3.3.3: Leaking No. 1 Check Valve.)

9 Field Test Procedures

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and five needle valve field test kits. The *Ninth Edition* only included the illustrated version with the five needle valve field test kit. For the steps on the Double Check Valve Assembly, Pressure Vacuum Breaker Assembly and Spill Resistant Vacuum Breaker Assembly, where the needle valves are opened or closed, an inset is included which shows the two and three needle valves field test kits during the step.

Also in testing the RP, the order of test cock bleeding has been modified to reduce the possibility of activating the relief valve before it is actually tested.

Reduced Pressure Principle Assembly
The *Ninth Edition* of the manual listed under "acceptable results" for the first check of the RP of "a recommended value of at least 3.0 psid buffer greater than the relief valve opening point." This "recommended requirement" has been removed in the *Tenth Edition*.

The *Tenth Edition of the Manual of Cross-Connection Control* has the following requirements for the RP field test results: The relief valve must open at 2.0 psid or greater, the first check valve must hold a minimum value of 5.0 psid and more than the relief valve opening point; and the second check must hold tight against backpressure (see p.10 for more details).

Double Check Valve Assembly
Some detailing has been added in the field test for the double check valve assembly to include detailing on when the field test kit is to be raised to the same level as the water in the tube attached to the downstream test cock.

Pressure Vacuum Breaker Assembly
The field test procedure has been modified to show that the bleed-off valve arrangement should be attached at the beginning of the field test. Also detailing has been added to clarify when it is critical to locate the field test kit at the proper elevation.

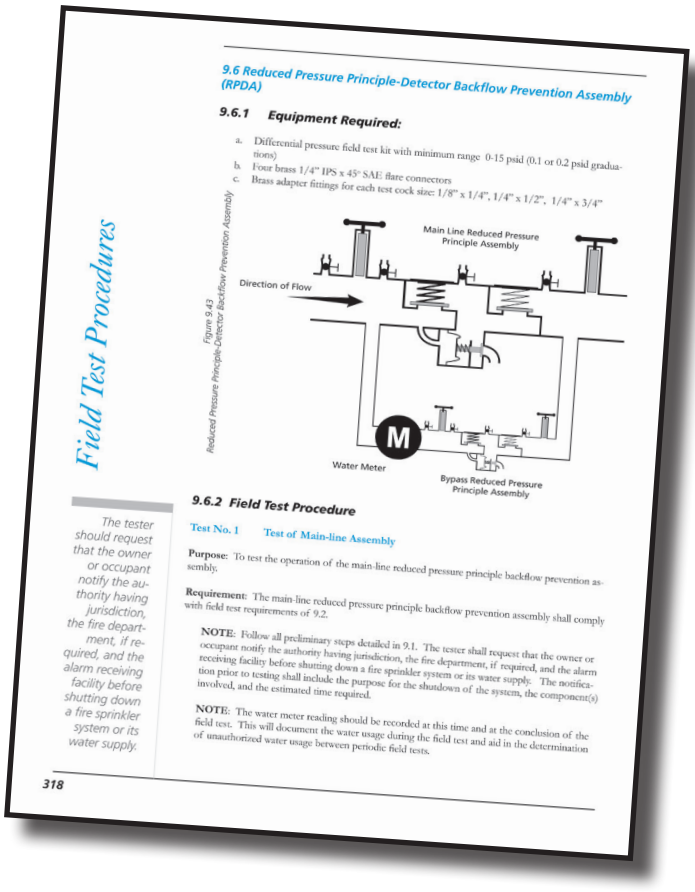
Spill Resistant Vacuum Breaker Assembly
The field test procedure has been changed to test the check valve before testing the air inlet

valve. The procedure has also been modified to attach the bleed-off valve arrangement at the beginning of the field test. Also detailing has been added to clarify when it is critical to locate the field test kit at the proper elevation.

Other Changes

New language has been added to help verify detection of flow through the bypasses on the double check detector assembly and the reduced pressure principle detector assembly. There are also new sections demonstrating the field test procedures for the reduced pressure principle detector assembly-Type II and the double check valve detector assembly-Type II

Certification and the Tenth Edition



Field Test Procedures

9.6 Reduced Pressure Principle-Detector Backflow Prevention Assembly (RPDA)

9.6.1 Equipment Required:

a. Differential pressure field test kit with minimum range 0-15 psid (0.1 or 0.2 psid graduations)
b. Four brass 1/4" IPS x 45° SAE flare connectors
c. Brass adapter fittings for each test cock size: 1/8" x 1/4", 1/4" x 1/2", 1/4" x 3/4"

Figure 9.43
Reduced Pressure Principle-Detector Backflow Prevention Assembly

Main Line Reduced Pressure Principle Assembly
Direction of Flow
M
Water Meter
Bypass Reduced Pressure Principle Assembly

9.6.2 Field Test Procedure

Test No. 1 Test of Main-line Assembly

Purpose: To test the operation of the main-line reduced pressure principle backflow prevention assembly.

Requirement: The main-line reduced pressure principle backflow prevention assembly shall comply with field test requirements of 9.2.

NOTE: Follow all preliminary steps detailed in 9.1. The tester shall request that the owner or occupant notify the authority having jurisdiction, the fire department, if required, and the alarm receiving facility before shutting down a fire sprinkler system or its water supply. The notification prior to testing shall include the purpose for the shutdown of the system, the component(s) involved, and the estimated time required.

NOTE: The water meter reading should be recorded at this time and at the conclusion of the field test. This will document the water usage during the field test and aid in the determination of unauthorized water usage between periodic field tests.

The tester should request that the owner or occupant notify the authority having jurisdiction, the fire department, if required, and the alarm receiving facility before shutting down a fire sprinkler system or its water supply.

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Many testers as well as trainers are concerned about using the *Tenth Edition* field test procedures, when the certification program they use may not be using the *Tenth Edition* yet.

Some certifying bodies may move to accepting the *Tenth Edition* Field Test Procedures immediately, some may allow testers to test according to the *Ninth* or *Tenth Edition* immediately with a time frame for moving to the *Tenth Edition* exclusively and yet others may continue to use the *Ninth Edition* for a period of time. Some certifying agencies may not have made a determination as to what their policy will be regarding certification with the *Tenth Edition* field test procedures.

Each tester will need to determine what the policy is with the certifying body they wish to certify through. The Foundation has published a document detailing the differences between the field test procedures in the *Ninth Edition* against those in the *Tenth Edition*. This allows trainers to use the *Tenth Edition* for the training course and yet discuss the differences in the field test procedures, so that students will still be able to pass a test using the *Ninth Edition* procedures (see p.10 for more details).

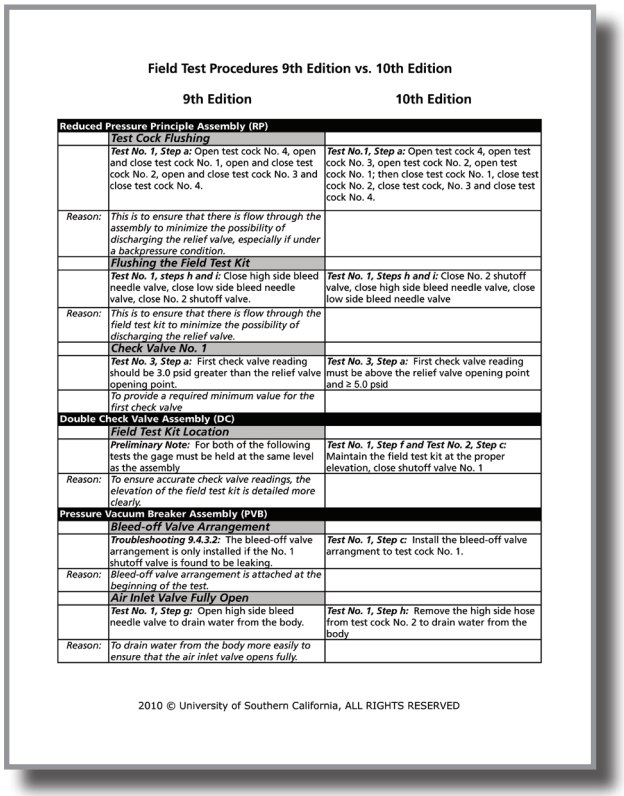
The Foundation will be teaching according to the *Tenth Edition* field test procedures. However, because some students may want to know how to test according to the *Ninth Edition* for an upcoming certification exam, the Foundation staff will demonstrate the differences. For students needing to retake the USC training course exam, the Foundation staff will continue to allow testing according to either field test procedure for a year. After that, the Foundation will require students to test according to the *Tenth Edition* in order to pass the course.

Although some certifying entities may still require field testing according to the *Ninth Edition*, these manuals are no longer available. Training instructors will still be able to teach according to the *Ninth Edition* using the *Tenth Edition* with the help of the document detailing the differences between the procedures that the Foundation has made available. ■

9th Edition vs 10th Edition

Field Test Procedures

With the introduction of the *Tenth Edition* many have inquired as to the differences between the two sets of field test procedures. The Foundation has put together a worksheet that lists the differences between the two procedures side-by-side.



Field Test Procedures 9th Edition vs. 10th Edition

	9th Edition	10th Edition
Reduced Pressure Principle Assembly (RP)		
	Test Cock Flushing	
	Test No. 1, Step a: Open test cock No. 4, open and close test cock No. 1, open and close test cock No. 2, open and close test cock No. 3 and close test cock No. 4.	***Test No.1, Step a:*** Open test cock 4, open test cock No. 3, open test cock No. 2, open test cock No. 1; then close test cock No. 1, close test cock No. 2, close test cock, No. 3 and close test cock No. 4.
Reason:	*This is to ensure that there is flow through the assembly to minimize the possibility of discharging the relief valve, especially if under a backpressure condition.*	
	Flushing the Field Test Kit	
	Test No. 1, steps h and i: Close high side bleed needle valve, close low side bleed needle valve, close No. 2 shutoff valve.	***Test No. 1, Steps h and i:*** Close No. 2 shutoff valve, close high side bleed needle valve, close low side bleed needle valve
Reason:	*This is to ensure that there is flow through the field test kit to minimize the possibility of discharging the relief valve.*	
	Check Valve No. 1	
	Test No. 3, Step a: First check valve reading should be 3.0 psid greater than the relief valve opening point.	***Test No. 3, Step a:*** First check valve reading must be above the relief valve opening point and ≥ 5.0 psid
	To provide a required minimum value for the first check valve	
Double Check Valve Assembly (DC)		
	Field Test Kit Location	
	Preliminary Note: For both of the following tests the gage must be held at the same level as the assembly	***Test No. 1, Step f and Test No. 2, Step c:*** Maintain the field test kit at the proper elevation, close shutoff valve No. 1
Reason:	*To ensure accurate check valve readings, the elevation of the field test kit is detailed more clearly.*	
Pressure Vacuum Breaker Assembly (PVB)		
	Bleed-off Valve Arrangement	
	Troubleshooting 9.4.3.2: The bleed-off valve arrangement is only installed if the No. 1 shutoff valve is found to be leaking.	***Test No. 1, Step c:*** Install the bleed-off valve arrangment to test cock No. 1.
Reason:	*Bleed-off valve arrangement is attached at the beginning of the test.*	
	Air Inlet Valve Fully Open	
	Test No. 1, Step g: Open high side bleed needle valve to drain water from the body.	***Test No. 1, Step h:*** Remove the high side hose from test cock No. 2 to drain water from the body
Reason:	*To drain water from the body more easily to ensure that the air inlet valve opens fully.*	

The worksheet is available on the Foundation's website (www.usc.edu/fccchr) in the 'Frequently Requested Documents' section of the site. It is available in PDF format and requires Adobe Reader to view.

The worksheet outlines the four backflow prevention assemblies (RP, DC, PVB, SVB) and lists reasons for each change in the *Tenth Edition*.

For example, a common change found in the *Tenth Edition* concerns the location of the field test kit when performing various parts of the test. The *Ninth Edition* of the manual stated in a preliminary note for the DC, PVB and SVB that the field test kit must be maintained at the proper elevation. The *Tenth Edition* specifies when it is necessary to have the field test kit at the proper elevation. This helps the tester to know specifically when to raise or lower the level of the field test kit.

Details of field test procedure changes are found on pages eight and nine of this *Cross Talk*.

Most changes in the procedures are subtle. There is one change that may be considered less subtle, the elimination of the 3.0 psid buffer between the first check reading and the relief valve opening point on the reduced pressure principle assembly (RP). Although, the Foundation has taught the 3.0 psid buffer in Foundation Training courses, the *Ninth Edition* of the manual stated under the "requirement" for Test No. 3 is that "the static pressure drop across check valve No. 1 should be at least 3.0 psi greater than the relief valve opening point." Since the term "should" was used some agencies did not require the 3.0 psid buffer in order for the assembly to pass the field test.

The 3.0 psid buffer was originally recommended because having the buffer would reduce the nuisance of the relief valve discharging whenever there is a slight pressure fluctuation. Whether the 3.0 psid buffer exists or not, does not affect the assembly's ability to prevent backflow. The Manual Review Committee decided to remove the 3.0 psid buffer and have the requirements that the first check hold at a value greater than the relief valve openiong point and at least 5.0 psid; and the relief valve open at a value of at least 2.0 psid.

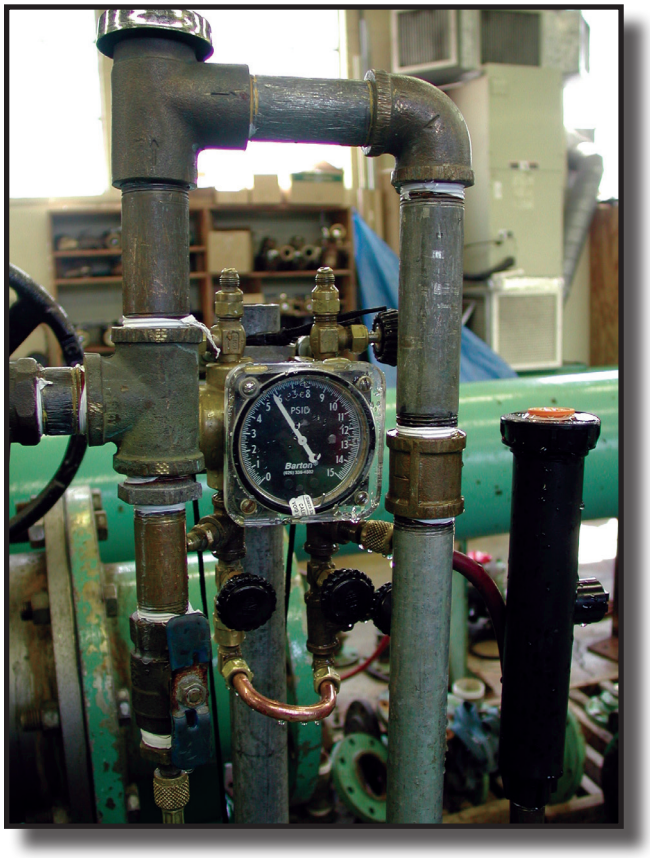
The Foundation recognizes that some certifying agencies have yet to adopt the *Tenth Edition* procedures. Unfortunately, the entire supply of *Ninth Editions* has been depleted. The *Tenth Edition* combined with this worksheet available on the Foundation's website will allow testers to learn the procedure that is needed for their specific certification, whether it be the *Ninth* or *Tenth Edition* of the manual. ■

Low-Head Drainage in Irrigation: continued

continued from **page 5**

closed to stop the flow of water and allow the check in the sprinkler to close.

The initial residual pressure of the water trapped in the system was recorded as soon as the water was shut off. Then the system was left untouched overnight and revisited



over 12 hours later in order to observe both the pressure contained in the system as well as the condition of the air inlet of the AVB.

The Foundation Finds

The Foundation staff found that the checks in all of the anti-drain sprinkler heads held the AVB closed after water stopped flowing and, in most cases, enough pressure was maintained in the system to keep the AVB inlet closed for more than 12 hours.

The Foundation Recommends

It is important that the type of backflow prevention assembly being used be considered in all irrigation design plans. An AVB may only be installed in a system that will be pressurized for no more than 12 hours in a 24-hour period. If anti-drain sprinkler heads are used to prevent low-head drainage and the backflow preventer for that system will be installed at an elevation that will not drop to atmospheric pressure once the system is shut down, an AVB must not be used.

Other vacuum breakers that may be used in these systems to adequately provide backflow protection would be pressure vacuum breakers or spill-resistant vacuum breakers. If there is any possibility of backpressure in the system, a reduced pressure principle backflow preventer must be used.

To determine if an irrigation system is affected by this change, one should first check to see if anti-drain sprinkler heads are installed. The documentation for the sprinkler head would mention features like "anti-drain" or "built-in check valve." It may also be possible to look up this information online, based on the sprinkler head's model. If the sprinkler head is an anti-drain head, the proper type of backflow preventer must be installed on the system.

With proper irrigation system design, one can be water-wise and protect the safety of drinking water at the same time. ■

The Foundation offers a brochure on cross-connection control, *Working Together for Safe Water*, which is used to explain the concepts of cross-connection control in a simple written format.

The Foundation imprints the name and address of the ordering agency or company on the brochures.

Please contact us via e-mail or phone to request a sample.

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3 March 2010

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Hollywood, CA
29 March-1 April 2010

2010 ABPA Education Conference & Tradeshow
New Orleans, LA
17-19 May 2010

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