Tennessee Backflow Prevention Association

c/o Dale Phelps
Gatlinburg Utilities
PO Box 5
Gatlinburg, TN 37738

Phone: 423-436-4681
Fax: 423-430-3800

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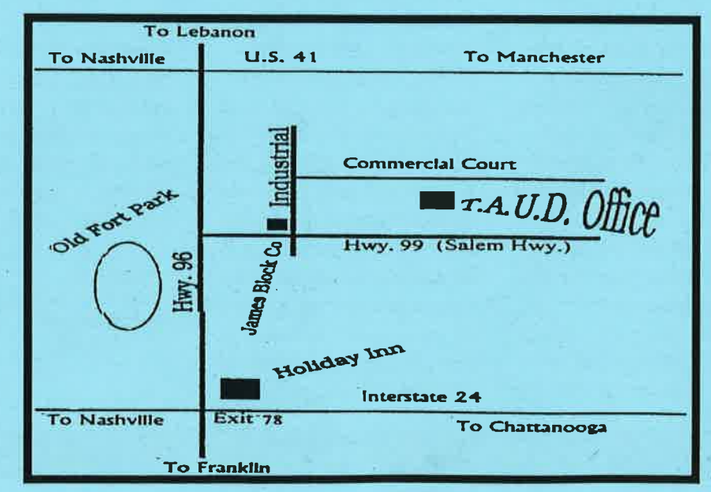
TBPA

Your Association working for safe, clean drinking water in Tennessee

Directions to next meeting at TAUD Offices in Murfreesboro

For personal assistance with directions call the TAUD Office at 615-896-9022



Tennessee Backflow Prevention Association

Tennessee Backflow News

Fall 1998

NEXT MEETING

Thursday December 3rd 1998 10AM CST

Tennessee Association of Utility Districts Conference Rm Murfreesboro TN

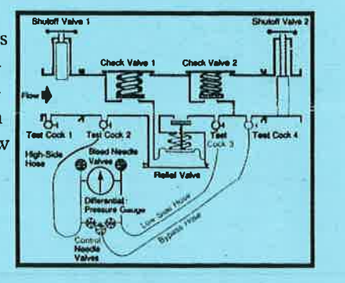
INSIDE

Backflow Assembly Testing
And Written Test Procedures – A Standard?

Backflow prevention assemblies are installed to protect a potable drinking water system from possible contamination from backflow of water from the downstream side of the system. Backflow assemblies are mechanical devices and are subject to wear and failure. Annual testing is a minimum requirement to insure the assembly is functioning properly and will prevent backflow should the conditions in the plumbing system occur.

The State of Tennessee has a voluntary certificate program administered by the Division of Water Supply, Department of Health and Environment of the State. This voluntary certificate program is not a true certification, as in an Operator Certification, Codes Inspection Certification or other professional certifications. The certificate issued to successful applicants reads "For Completing the Special Training and Demonstration of Competency in Testing Reduced Backflow Prevention Devices". Applicants are required to attend a specified amount of time of classroom instruction, pass a written test and a practical hands-on demonstration of actual testing of a reduced pressure and a double check backflow assembly.

Here is where state-wide standardization would be beneficial to everyone. Instructional classes across the



(Continued on page 3)

TBPA Update

ELECTIONS UPCOMING

The TBPA is asking for your nominations for individuals for the following Officers and Directors for 1999-2000: President, Vice-President, Secretary, Treasurer, and Director-Middle Tennessee.

The TBPA is required by the Bylaws to conduct a mail-ballot election prior to the end of the calendar year. The current Officers and Director are completing a two-year term beginning in 1997. An individual can serve up to two consecutive two-year terms of office. Ballots will be mailed to all TBPA members in good standing after the close of nominations on December 3rd. Election results will be reported in the spring issue of the Tennessee Backflow News and the Officers and Directors will be installed at the spring 1999 meeting.

Jeff Becker of Jackson Utility Division resigned as West Tennessee Director due to a re-assignment of job position at JUD. Jeff has been very active in the TBPA and has served as Director for two terms. The TBPA very much appreciates the time and effort Jeff has given to the Board and the Association, and will be missed on the Board. The TPBA Board of Directors will be seeking an individual to appoint to fill the vacancy for the completion of the term, through the end of the year 1999.

(Continued on page 12)

Tennessee Backflow Prevention Association

Name	Affiliation	Phone #	Fax #
David Kellogg, President	City of Gallatin	615-451-5922	615-452-0568
Bob Deal, Vice-President	Hixon Utility District	423-877-3513	423-875-3116
Becky Thompson, Treasurer	Madison Suburban Utility District	615-868-3201	615-868-5595
Dale Phelps, Secretary	City of Gatlinburg	423-436-4681	423-430-3800
Vacancy Director, West			
Bill Love, Director, Middle	City of Murfreesboro	615-848-3225	615-895-1241
Dave Birkholz Director, East	Loudon Utilities	423-458-2091	423-458-6781
John Hall, Director At-Large	Tennessee Association of Utility Districts	615-896-9022	615-896-8608
Larry Stinnett, Director-At-Large	Backflow Specialty Company, Inc.	423-947-5722	423-947-5722
M.C. Sorrels	ABPA Region 3 Director	704-283-8554	704-283-8010
Paul Causey	ABPA Administrative Director	409-862-7606 ABPA Headquarters	409-862-7607 ABPA Headquarters

The **Tennessee Backflow News** is published quarterly by the Tennessee Backflow Prevention Association, whose members have a common interest in protecting the drinking water from contamination through cross connections. Your ideas, experience and expertise are invited and needed by the TBPA to insure a balanced approach to backflow prevention in the State of Tennessee. Your participation and support will continue to help shape the future of this industry in Tennessee.

Opinions expressed in articles, letters or advertisements in this publication are not necessarily those supported by the TBPA. This newsletter is not to be considered as legal or professional advice. **Dues are $42 annually**, and are payable to the TBPA Treasurer. Annual dues include $15 for Tennessee and $27 for National ABPA dues. National membership is required for Tennessee membership.

The TBPA Treasurer address is:

Tennessee Backflow Prevention Assocaition
Becky Thompson, TBPA Treasurer
c/o MSUD, PO Box 175
Madison, TN 37116-0175

All other info requests and inquiries, including newsletter items and advertisements can be directed to:

Tennessee Backflow Prevention Association
Attn: Dale Phelps, Secretary
c/o Gatlinburg Utilities
PO Box 5, Gatlinburg, TN 37738-0005

TBPA/ABPA MEMBERSHIP FORM

Tennessee Backflow Prevention Association
American Backflow Prevention Association

NAME: _____

COMPANY: _____

ADDRESS: _____

CITY/ST/ZIP: _____

PHONE: _____

FAX: _____

CHECK ONE: RENEWAL: _____ MEMBER # _____

NEW : _____

. TBN Nov-98

ABPA DUES: $27.00
TBPA DUES: 15.00
ANNUAL DUES TOTAL: $42.00

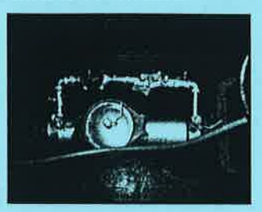
Please remit total to:
Tennessee Backflow Prevention Association
Becky Thompson, Treasurer
c/o Madison Suburban Utility District
PO Box 175
Madison, TN 37116-0175

Includes bi-monthly ABPA News Magazine and quarterly Tennessee Backflow News
Pre-payment of dues required to process application.
Membership is non-transferable. National ABPA membership required for state TBPA membership

Photo Contest!

You May Already Be A Winner!

The next issue of the Tennessee Backflow News will highlight the results of our photo contest. Send us your photos of unusual backflow installations and winners will be chosen. Be sure to put your name and address on the back of the photo if you wish it to be returned.



Wonder what else may be in this pit?

Winners will be chosen for the following prestigious awards:

- **Most Unusual Assembly**
- **Most Creative Installation**
- **What Were They Thinking?**
- **Must Be from Outer Space**

Send your pictures to:

Tennessee Backflow Prevention Association
Attn: Dale Phelps, Secretary
c/o Gatlinburg Utilities
PO Box 5, Gatlinburg, TN 37738

SEND IN YOUR ENTRY TO THE PHOTO CONTEST SOON!

Is there a backflow preventer here?

Inspectors Column ...continued...

(Continued from page 12)

and find out what exists and doesn't exist within the system. And the only way to do this? Survey, survey, survey. Half the business owners will have backflow prevention devices and not know what they are. So just asking is not going to get you diddle. The business owner will tell you he does not have a device and so you will ask him to install one. He'll hire a plumber, a week later the plumber will call you, all fluffed up and ruffled, telling you that the business all ready has a device, "What are you, blind?" Ask the business owner to let you inspect the plumbing as it enters the building. Show the business owners pictures of devices, to help them recognize what you are looking for. This is the only way to got accurate information. Now running the program will be easy? Of course ... not! Now the education of the general public. Most of them are not going to want an overload of information. Knowing what it is, why it is dangerous, and how to protect themselves and their families is the mainstay of public education. Meanwhile of course you are trying to test all existing devices once a year, inspecting new installations, ensuring proper repairs are taking place, monitoring progress of technical staff training, and lets not forget, keeping the Mayor and every councilman HAPPY!

Easy, well no, I guess no one ever told me it would be easy. Training, education, dedication and time (lots of time) will get every cross connection program where it needs to be. Look for an update and I'll let you know when easy is the right word.

Angel Goike
Cross Connection Coordinator
City of Clarksville
HELP!!!!

> *"Knowing what backflow is, why it is dangerous, and how to protect themselves and their families is the mainstay of public education."*

Inspectors Column

Articles by Cross Connection Inspectors, Plumbing and Mechanical Inspectors

Fresh Meat
In the World of Cross Connections

Angel Goike
Cross Connection Coordinator
City of Clarksville

Cross Connection Control, easy? For some perhaps, or at least less complicated. Those are the ones with established programs and a community of plumbers, contractors and customers that are familiar with cross connections. Now take a system with little or no program and a community that has had no experience with the idea. Still easy? NO! Horrifying is more the word. Here is a city, a hundred years old, over 36,000 service connections and no active cross connection program. And no one to tell you what is out there!

Best piece of advice to give someone is this position? RUN! Second best, before jumping into beginning an active program, is to make sure that your governing body is well informed and behind you all the way. Change is not something anyone takes calmly. At first all you will hear is, "We've never had to do this before", and your governing body will hear the complaints. Also, city or utility ordinances/ policies concerning cross connections, must be in place to protect your right to run an effective cross connection program.

Council backing, good city ordinances, now is it easy? You wish! There is still a city full of potential backflow situations and a bunch of upset contractors, plumbers and business owners. All wanting to know what, when, where, and "How much is this going to cost me?!?"

Next step, get the technical workers, i.e. plumbers, contractors, etc., certified in backflow installation, testing and repair. Once they understand not only the dangers of backflow, but the workings of a device, they will be less harassed by the new program.

While the education of the local plumbers is proceeding, you will now have to battle the local citizens. You have to got out there

(Continued on page 13)

TBPA Update.....continued

(Continued from page 1)

The TBPA Board recently appointed Dave Birkholz to complete the East Tennessee Director term of office vacated by Bruce Giles. Dave is employed by the Loudon Utilities, is a charter member of the TBPA and a former Director.

The TBPA had a regular quarterly meeting September 3, 1998 in Hixon. The topic of discussion was the Soddy Daisy backflow program complaints (see last issue of the TBN). Mr. David Draughn, Mr. Robert Lashlee, and Mr. Gary Burris of the Division of Water Supply were present. The discussion generated an understanding regarding the State, the Water Utility and the publics' position in the situation.

Business items attended to at the meeting included the appointment of Dave Birkholz as East Tennessee Director to complete the remaining term of the resigning Bruce Giles. A motion carried to purchase a copy of the AWWARF Impact Study of Wet-Pipe Fire Systems for Chapter use. The Chapter approved the purchase of a scanner for the TBPA newsletter use. A recommendation to establish a standardized test procedure was discussed, but no official action was taken. A balance of $5253.15 was reported by the TBPA Treasurer.

ABPA UPDATE: The ABPA Board of Directors will meet in Dallas, TX on the date of November 13-14 1998. If you have any concerns or inquiries please contact the Region 3 Director (see page 2). ABPA has issued a call for nominations for Vice-President candidates, and nominations for Region 3 Director. Region 3 includes Tennessee. The 1999 ABPA International Conference will be held at the Sheraton Hyannis Resort in Hyannis, Massachucetts on April 25-28. For more info call Tom Cravens at 1-800-414-

TBPA
Tennessee Backflow Prevention Association

Standard Test Procedures Needed.....continued

(Continued from page 1)

State all teach slightly different test procedures. Some classes may be perceived as easier to pass than others. Some classes may have more or less classroom time, or hands-on time than others. Individual classes may also change their own test procedures from time to time. All of this may be confusing to testers who may be certified by one school and renew their certification in another school, where the procedures are different. While it can be anticipated that classes and instructional schools will want to update their procedures to keep up with industry changes and improvements, it seems rational that all should start on the same page. A standardized procedure for testing and instruction in the State of Tennessee is needed.

Most written test procedures that are widely used and accepted today are derived from either the USC Foundation Manual or the NEWWA (New England Section of the American Water Works Association).

Written test procedures can be found in:

- USC Foundation 9th Edition Manual

(Continued on page 11)

Two proposed backflow test procedures on pages 7 – 9 of this issue

TBPA – Your Information Pipeline

The Tennessee Backflow Prevention Association (TBPA) can be your information pipeline about backflow prevention and cross connection control. Chartered as a Chapter of the American Backflow Prevention Association (ABPA) in 1995, the TBPA has members all across the State of Tennessee. Members of the TBPA share a common interest in protecting drinking water from contamination through cross-connections. TBPA is dedicated to education and technical assistance, and is committed to advancing all aspects of backflow prevention for the continued protection of all water users.

Membership is open to anyone with an interest in cross connection control and maintaining water quality standards. This Association is invaluable for the professional who seeks continuing knowledge and up to date information in this constantly changing field.

The TBPA meets quarterly across the State, and once annually hosts a one-day Conference with seminars and an equipment trade show. This Annual Conference is usually held in the month of March.

Besides the obvious benefits of meeting other professionals with common interests, as a member you will benefit from:

- Education, including local seminars and training, and access to an extensive library of materials through the ABPA office.
- The "ABPA News" and the "Tennessee Backflow News", national and state publications that will keep you up to date.
- Technical assistance with cross connection control programs and issues.
- The opportunity to serve on and benefit from local and national committees working to solve problems and address important cross connection issues.
- Full voting privileges and an opportunity to serve the Association as a leader or committee member, gaining local and national recognition for your work and efforts.

The TBPA is a 501(c)3 non-profit corporation, with no compensation to officers or directors. All income is from membership dues, corporate donations and conference registration fees.

The Tennessee Backflow News is published quarterly and mailed to the membership. Membership requires current payment of annual ABPA and TBPA dues. For membership information see page 2. Connect to the information pipeline – support your TBPA !

Connect to the information pipeline – Support your TBPA!

WHAT'S NEW

1999 TBPA Conference Announced

The Tennessee Backflow Prevention Association will host the Fourth Annual Conference and Trade Show March 25, 1999 at the Holiday Inn Holidome in Murfreesboro, Tennessee.

The Conference registration fee will be $50, and rooms are available at the Holiday Inn Holidome for $50 per night.

For more information regarding the seminar topics and featured speakers at the conference stay tuned for the next issue of the Tennessee Backflow News.

For further information please contact TBPA President David Kellogg at 615-451-5922 or email at gpu@edge.net.

New Equipment and Trends in the Backflow Industry

FEBCO

Febco reports that they have recently received full USC Foundation approval for the model 860 Reduced Pressure Assembly sizes 1/2 through 2 inch. This brings the 860 line of RP's fully USC Foundation approved from 1/2 inch through 8 inch. The 860U with union ends has also received full USC approval in sizes 1/4 through 2 inch.

WATTS

As reported in the last issue, Watts has received full USC Foundation approval on the 3/4 and 1 inch 909QT in a vertical up installation. This approval begins with serial number 461650.

CONBRACO

Conbraco Industries reports that it has received full USC Foundation approval on its new line of 1/4 through 2 inch Reduced Pressure assemblies with top-access test cocks. These assemblies resemble the existing Conbraco body style but have the test cocks installed vertical in the top of the body casting to allow easier access when installed near walls and other obstructions. This line of assemblies is designated by the letter (T) at the end of the model number.

MISSION:
Educating the Public

A new first-of-its kind video is now available, produced by the Michigan Backflow Prevention Association. This educational tool is designed to be used while conducting public education seminars.

This 14–minute video is packed with valuable public information. This is a must have for every video library!

The video was sponsored by the following organizations: BAVCO, Conbraco, FEBCO, Mid-West Instrument, Plumbing Heating Industry of Detroit, Watts Regulator, Zurn/Wilkins, Michigan Chapter ASSE, Eastern Michigan ASPE, and the Michigan backflow Prevention Association.

The Michigan Association is making this video available to anyone for a $5 donation plus $5 shipping charge. To purchase your copy contact MBPA President Ron Chapman at 313-337-1241 or e-mail at RCHAP8508@aol.com.

The Tennessee Backflow Prevention Association has limited copies of this video available for loan to members who wish to show the video as part of their public education program.

Contact TBPA President David Kellogg at 615-451-5922 or email at gpu@edge.net.

Test & Repair Tips

Q: The relief valve does not open when I test a particular RP device, what's wrong?

A: When testing the relief valve, water pressure from the inlet side (Hi pressure) is being brought into the zone (between the two check valves) through the gage hoses. The higher pressure increases the zone pressure, which decreases the pressure differential, allowing the relief valve to open. If the relief valve does not open, consider the following: (A) The higher pressure is not reaching the zone, or (B) the relief valve mechanism is not responding.

A leaking #2 shutoff valve can allow enough water flow through the assembly during testing to maintain a differential across the #1 check valve, which keep the relief valve from opening. This may be obvious if you open the low side test gage needle valve more than 1/4 turn and the relief valve does not open.

A plugged sensing line or passageway to the relief valve may in some cases prevent the relief valve from opening. The higher water pressure may have no effect on the relief valve.

It is possible that the relief valve components themselves may be just plain stuck, thereby not responding to the increased zone pressure during the test. Moving parts of the relief valve may become stuck in the housing and disassembly may be necessary.

Remember – all proper repairs should include a good inspection of the interior of the assembly and parts, and a thorough cleaning of the interior and all parts. Any replacement parts used in repair are required to be original manufacturer's repair parts for that particular assembly.

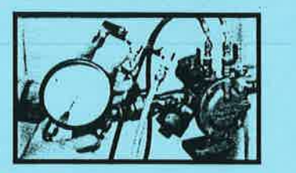
Many Happy Repairs!

More tips each Issue!

Standard Test Procedures Needed.....continued

(Continued from page 3)

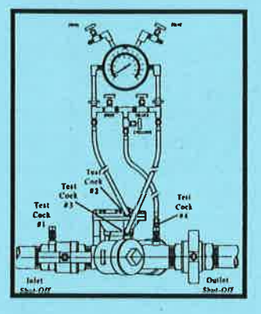
- ASSE Series 5000 Professional Qualifications
- AWWA M-14 Recommended Practices for Backflow Prevention and Cross Connection Control



All the above test procedures may differ slightly or greatly in some parts, though they all test the components of a backflow prevention assembly.
There is discussion across the State of Tennessee concerning the need for a standard test procedure for classroom instruction and certification. Printed in this newsletter are copies of two possible test procedures. You are invited to examine and use the procedures and comment about them. You are also invited to send a copy of a test procedure you may use or wish to be considered.

Some points to consider regarding test procedures may include: (1) proper steps in the proper sequence, (2) easy to follow and understand, (3) reasonably prevents accidental dumping of relief valve, (4) able to determine and/or diagnose leaky shutoff valves, (5) concise, ideally one page per assembly type.

The goal and mission of the TBPA is to protect the quality of our drinking water, and standard test procedures for all testers and instructors will help put us all on the same page for preventing backflow.



Please send us your comments about these Test Procedures. We welcome your own or other test procedures for publication.

PUBLICATION PROFILE

ASSE Publications

Cross Connection Protection Device Booklet

This 14-page booklet in its 5th Edition details the types of backflow prevention devices available for cross connection control. The booklet contains an application chart with the current types of backflow prevention devices, with the applicable degrees of hazard, and recommendations for installation. Backflow devices are also individually detailed regarding their capabilities and intended usage, and a guideline for selection of the proper type of backflow preventer is included. Cost is $12.50

Plumbing Dictionary

Containing more than 4,000 plumbing words and terms, abbreviations, with charts and illustrations. Used by many schools and apprentice programs. Cost is $12.50

Residential Plumbing Inspector's Manual

Excellent guide to the basic essentials of plumbing installation in residential one and two family dwellings. Numerous drawings and illustrations, the manual includes information on pools, fuel gas piping, water heaters, vents, traps, joints and connections, and much more. 138 pages, cost is $10.00.

ASSE also publishes the **Series 5000 Professional Qualification Standards for Backflow Prevention Assemblies for Testers, Repairers and Surveyors**. This package is $31.

ASSE Publications can be reached by: 216-835-3040 phone, 216-835-3488 fax, or at ASSE@IX.netcom.com (e-mail).

International Plumbing Code Video Series

The International Conference of Building Officials (ICBO) has published four new videos based on the 1997 International Plumbing Code (IPC). The titles include: *Methods of Protection Against Backflow*, *Vents and Venting*, *Water Heaters*, and *Sanitary Drainage*.

The video on backflow protection details the eight methods of protection that are outlined in the chapter six of the IPC. How contamination can occur from Backpressure and backsiphonage is explained in detail.

The Vents and Venting video covers all aspects of proper fixture venting and options, from chapter nine of the IPC.

Sanitary Drainage contains information relating to the drain systems including design, installation, materials, and sump pumps, etc.

Water Heaters comes from chapter five of the IPC, highlighting the topics of safety devices, discharge piping, labeling and more.

The complete four part videotape series is available for $79.00. Individual tapes cost $24.95. You may order from the ICBO by calling 800-284-4406.

Manual Update – New Concept of Detector Assembly Suggested

The Manual of Cross Connection Control is currently under revision. With this revision the Manual Review Committee (MRC) has had several open meetings. During these meetings representatives of backflow prevention assembly manufacturers, gage manufacturers, water agencies, health agencies, and individuals are welcome to present any information to the committee which they feel will benefit the users of the Tenth Edition of the Manual. Several suggestions have already been made.

One innovative suggestion, which has been "approved in concept", is the suggestion that specifications for a new type of detector assembly be included in the next edition of the manual. The specifications would be for both a double check detector assembly and a reduced pressure assembly.

Initially many think that this type of assembly will not provide the protection that the original concept of a DCDA or RPDA provide. However, upon close examination, the assembly provides the same level of protection. All the water flows through the number one check valve AND either the number two check valve or the bypass check valve. So all water must flow through two check valves. Likewise, any backflow would need to overcome two check valves just as with the currently approved DCDA's.

Any suggestions or comments regarding the Tenth Edition of the Manual may be sent to the Foundation office or comments may be left on the MRC web site. The latest information is also available on this web site.

Reprinted with permission from Cross Talk, Spring 1998, University of Southern California Foundation for Cross-Connection Control and Hydraulic Research.

Reduced Pressure Backflow Assembly Test Procedure
Abbreviated from U.S.C. Manual 9th Edition
For a Five Valve Differential Pressure Test Kit

Start	See preliminary steps on back. Establish direction of flow, number the testcocks, install appropriate test adaptors.
Setup #1 Check Valve	**Requirement: #1 Check Valve must close tight in the direction of flow** * Open testcock #4 to establish flow thru device. flush out all testcocks, in order of #3, #2 (open slowly). Close #4. * Attach hi side gage hose to testcock #2, low side hose to testcock #3. Slowly open testcock #3 and open low side bleed needle valve to bleed air from gage. Slowly open testcock #2 and open hi side bleed needle valve to bleed air from gage. Close hi side bleed needle valve, then low side bleed needle valve. Close #2 shutoff valve. * Observe #1 check valve as "tight" or "leaking", depending upon gage needle movement. Do not record differential at this time.
Relief Valve	**Requirement: Relief Valve must open at 2.0 psid or greater** * Close bypass needle valve, open hi side needle valve one full turn. Open low side needle valve slowly, not exceeding 1/4 turn max. **Note:** Care should be taken to assure that the tester does not accidentally activate the relief valve prior to this point of the test. * *Record* the relief valve opening point, close low side needle valve.
#2 Check Valve Backpressure	**Requirement: Check Valve shall be tight against backpressure** * Open bypass needle valve to bleed thru vent hose, then close bypass needle valve. * Attach bypass hose to #4 testcock, open #4 testcock, open low side bleed needle valve to bleed zone, then close. Open bypass needle valve. * Observe and ***record*** #2 check as "tight" or "leaking", according to gage needle movement.
#2 Shutoff Valve	**Requirement: #2 Shutoff Valve must close drip-tight** * Close hi side testcock on device, observe and ***record*** #2 shutoff valve as "tight" or "leaking". **Note:** If the gate valve leaks excessively and cannot be compensated for, the shutoff valve must be repaired and the assembly then re-tested.
#1 Check Differential	**Requirement: Check Valve must close tight above 5.0 psid** * Open hi side testcock on device, re-establish gage pressure by bleeding low side needle valve. * ***Record*** actual pressure drop or "differential" across #1 check valve.
#2 Check Direction Of Flow	**Requirement: Check Valve must hold a minimum 1.0 Psid in the direction-of-flow** * Close all testcocks, move low side hose to #4 testcock, move hi side hose to #3 testcock. Open testcocks and bleed gage to re-establish gage pressure. * ***Record*** actual pressure drop or "differential" across #2 check valve.
End	* Re-establish water service, shut off all testcocks, remove and drain test equipment, prepare written test report.
DP 9/98	**NOTE:** When testing for check valve tightness and #2 shutoff valve tightness, a steady needle with no flow thru the assembly (static water condition) indicates a closed tight seal. A descending needle indicates a leak, an ascending needle indicates a #2 shutoff valve leak with downstream backpressure. For details and further explanation of this test procedure see Section 9 of the 9th Edition of the U.S.C. Foundation Manual of Cross Connection Control.

Troubleshooting Summary

PROBLEM:	MAY BE CAUSED BY:
Relief Valve discharges continuously	1. Faulty #1 check 2. Faulty #2 check with backpressure 3. Faulty relief valve 4. Plugged relief valve sensing line
Relief Valve discharges intermittently	1. Properly working assembly with large pressure fluctuations 2. No. 1 check buffer too small with line pressure fluctuations 3. Water hammer
Relief Valve discharges after #2 shutoff valve is closed	1. Faulty #1 check - dirty or damaged disc or seat 2. Leak thru relief valve diaphragm
Relief Valve would not open during test, differential on gage would not drop	1. Leaky #2 shutoff valve with flow thru assembly
Relief Valve would not open during test, differential drops to zero	1. Relief Valve stuck closed, due to corrosion or scale 2. Relief Valve sensing line plugged
Relief Valve opens too high during test (with sufficiently high #1 check valve reading)	1. Faulty relief valve, due to dirty or damaged disc or seat
#1 Check reading too low, with less than 3.0 psid buffer	1. Dirty or damaged disc or seat. 2. Guide members hanging up

Note: Many failures are caused by water-borne debris fouling the check valves. Many problems can be corrected by cleaning the internal components of the assembly. Carefully observe the condition of the components.	**Repair Note:** Lubricants shall only be used to assist with the reassembly of components, and shall be non-toxic. Only manufacturers replacement parts shall be used for repair. All backflow assemblies shall be tested immediately after repair or relocation.

Exercising the Relief Valve

It is one of the objectives of the field test procedure to determine the opening point value of the differential pressure relief valve, the first time it opens. If the relief valve is activated (caused to open) prematurely a misleading value may be recorded. By causing the relief valve to open prematurely, the exercising of the moving components in the relief valve will generally produce higher relief valve opening point values. If the initial opening point would have been below the minimum 2.0 psid, but the tester activates the relief valve and then records the opening point value as greater than 2.0 psid, the tester may inadvertently pass an assembly which is not functioning properly.

Test Gage Equipment

Properly calibrated test gage equipment is essential to insure accurate test results. Gages should be checked for accuracy at least once annually, and re-calibrated if the gage inaccuracy exceeds the gage specifications. Copies of all gage accuracy verification and calibration results shall be kept by the gage owner and made available upon request. Local administrative authorities should be consulted regarding local gage verification/calibration requirements. All gages shall meet the accuracy requirements of the latest edition of the U.S.C. Foundation Manual. **Gages that do not meet all these requirements shall not be used.** The tester must observe the condition of the gage equipment during all portions of the field test procedures. Visually inspect the gage for obvious leakage or damage. The gage shall zero out when not pressurized, needle valves and fittings should be drip-tight, gage should always be drained after use and protected from freezing damage.

Preliminary Steps

A. **Notify** the owner and on-site personnel that the water service will be interrupted for the purposes of the test. Critical water usage locations require advance coordination for interruption of water service.

B. **Identify** the assembly by the make, model, size, serial number and record on the test form.

C. **Inspect** the assembly for proper components for the test procedure (shutoff valves, properly located testcocks, etc)

D. **Observe** the area immediately around the assembly for signs of leakage. A wet spot under the relief valve port indicates possible fouling of the assembly or line pressure fluctuations.

Reduced Pressure Principle Assemblies Field Test Procedure

CONNECTING AND BLEEDING THE TEST GAUGE

A. Begin procedure with all test gauge valves in open position.
B. Flush all test cocks before attaching hoses.
C. Connect high side hose to test cock #2 and low side hose to test cock #3. ***(on the RPBP)***
D. Open #3 test cock to bleed air from low side hose.
E. Open #2 test cock to bleed air from high side hose.
F. Close high side valve. Gauge should "peg out" to the right.
G. Close low side valve.
H. Close #2 shut-off valve. (Gauge will be on-line during all remaining tests.)

TESTING CHECK VALVE NO. 1

A. Observe the pressure differential gauge. If gauge needle falls, #1 check valve is leaking and the device must be repaired. If gauge remains steady, #1 check valve is reported as closed tight and test procedures are continued.
B. Record the test gauge reading as the pressure drop across the first check valve.

TESTING THE DIFFERENTIAL PRESSURE RELIEF VALVE

A. Close the by-pass valve.
B. Open the high side valve.
C. While feeling for water discharging from the relief valve, slightly open the low side valve until the test gauge needle falls slowly.
D. When the device discharges, record the gauge reading as the differential pressure at which the relief valve opened. (This reading must be at least 2 psid and there should be at least a 3 psid buffer between this reading and the pressure drop across the first check.)

TESTING CHECK VALVE NO. 2

A. Close the high side valve.
B. Open the by-pass valve and bleed water from the low side valve.
C. When all air is bled, connect the by-pass hose to #4 test cock while allowing a small amount of water to run from the hose.
D. Close the low side valve.
E. Open the high side valve and #4 test cock. (Gauge will fall approximately .5 psid.)
F. Observe the pressure differential gauge. If gauge needle falls, #2 check valve is leaking. If needle remains steady, #2 check valve should be recorded as closed tight.

TESTING THE NO. 2 SHUT OFF VALVE AND REESTABLISHING CUSTOMER SERVICE

A. Close #2 test cock. If gauge needle falls, #2 shut off valve is leaking and must be repaired and device must be re-tested. If needle remains steady #2 shut off valve is closed tight.
B. Open #2 shut off valve, close all test cocks and remove all hoses.

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Double Check Valve Assemblies Field Test Procedure

Flush all test cocks before connecting hoses
Begin procedure with all test gauge valves open

TESTING CHECK VALVE NO. 1

A. Insure shutoff valve #1 is open and shutoff valve #2 is closed ***(on the DCV).***
B. Connect high side hose to test cock #2, connect the low side hose to test cock #3 ***(on the DCV).***
C. Open test cock #3 to bleed the air from the low side hose ***(on the DCV).***
D. Open test cock #2 to bleed the air from the high side hose ***(on the DCV).***
E. Close the high side valve ***(on the test kit).*** *(GAUGE SHOULD "PEG OUT" TO THE RIGHT.)*
F. Close the low side valve ***(on the test kit).***
G. If gauge reading remains steady and is a minimum of 1.0 PSID, check valve #1 is recorded as closed tight.
H. Record gauge reading as pressure drops across #1 check valve.

TESTING FOR LEAKY NO. 2 SHUTOFF VALVE

A. Connect bypass hose loosely to test cock #4 ***(on the DCV).***
B. Insure the bypass valve is open ***(on the test kit).*** Open low side valve to bleed air from the gauge & hose ***(on the test kit).*** When all air is expelled from the hose, tighten bypass hose connection to test cock #4. Close low side valve ***(on the test kit)*** & open test cock #4 ***(on the DCV)*** & high side valve ***(on the test kit).***
C. Close test cock #2 ***(on the DCV).***
If gauge is steady, shutoff valve # 2 is closed tight. If gauge drops to 0 PSID, shutoff #2 leaks. If gauge rises, shutoff valve #2 leaks and there is back pressure. If leaking, shutoff valve #2 must be repaired or replaced.
D. Close test cock #3 and #4 ***(on the DCV).***

Begin procedure with all test gauge valves open

TESTING CHECK VALVE NO. 2 STEPS

A. Move the high side hose to test cock #3, Connect the low side hose to test cock #4 ***(on the DCV).***
B. Open test cock #4 to bleed the air from the low side hose ***(on the DCV).***
C. Open test cock #3 to bleed the air from the high side hose ***(on the DCV).***
D. Close the high side valve ***(on the test kit).*** *(GAUGE SHOULD "PEG OUT" TO THE RIGHT.)*
E. Close the low side valve ***(on the test kit).***
F. If gauge reading remains steady and is a minimum of 1.0 PSID check valve #2 is recorded as closed tight.
G. Open # 2 shut off valve ***(on the DCV).*** Close all test cocks ***(on the DCV)*** and remove all hoses.

OPEN ALL VALVES ON TEST KIT (LEAVE OPEN FOR STORAGE) AND INSURE ALL WATER IS DRAINED FROM TEST KIT

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