

Testing the Double Check

Handling Disc Compression

The double check valve field test procedures introduced in the Ninth Edition of the *Manual of Cross-Connection Control* have been well received by students and administrative authorities (i.e., water and health agencies) alike. Students have found that the procedure is easier to learn than the procedure shown in the Eighth Edition of the Manual and administrative authorities have found the information obtained to be more valuable. Overall, the single hose direction of flow field testing method has been widely accepted and considered quite an improvement over the duplex gage method.

There is a scenario which may arise in some situations while testing the double check which requires special attention. The scenario arises while testing the second check valve of assemblies which are subject to large amounts of disc compression. (Please see inset on page 3.) In the initial testing procedure there are three possibilities. This can be found in the Manual in Section 9.3.2, Test Number 2, Step *d* (page 149 if you want to look it up). The assembly is isolated, the gage is on line with the high side hose attached to the number three

test cock (see illustration, page 4), and the tester opens the number four test cock which has the sight tube attached to it. At this point the water level in the sight tube can remain steady: (this is the ideal situation; the tester just takes a reading and moves on) or the level in the tube can recede: (the tester drops the level of the gage to the centerline of the assembly and takes a reading) or the water

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continues to flow through the tube. This third possibility is what requires more attention. If the water flows continuously from the tube, the tester is to move to Section 9.3.3.4 of the Manual and continue the test with troubleshooting step *T5* which reads as follows.

T5. If at Test No. 2 Step d water continues to flow from the No. 4 test cock, one of the shutoff

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The SVB

Proper uses of the Spill-Resistant Vacuum Breaker

With the publication of the Ninth Edition of the *Manual of Cross-Connection Control*, Specifications for a Spill-resistant Pressure Vacuum Breaker (SVB) were introduced. Although there are currently no SVB assemblies Approved by the Foundation, much discussion has arisen as to the proper use of the assembly and what exactly it is designed to do.

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Highlights

- Disc Compression on the DC
- SVB Applications
- Acceptable Gages
- The List on the Internet
- Private Labeling

Membership²

The Foundation Membership grew again in this last quarter. The newest Members are listed below. The Foundation encourages Members to take advantage of the many benefits of Foundation Membership. Additional copies of the *Manual of Cross-Connection Control* are available to Members at a 25% discount. Members receive a 20% discount on training courses and 25% discounts on the Training Tools. Members are also encouraged to contact the Foundation office with any questions regarding cross-connection control.

ABPA, Austin Chapter
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& Air Conditioning
AG Enterprises
David T. Adams
Alco Water Service
Auckland City Council
Backflow Prevention
Services of Iowa
Bailey Mechanical
City of Camarillo
City of Chino Hills
Cross Connection
Consultants
Norman M. Ellis
Irrigation By Design, Inc.
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Utilities
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City of Post Falls
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Testing the Double Check Valve Assembly

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valves is leaking. Observe the reading on the gage, but do not record it at this time. Open the bleed-off valve.

◆ If the water does not continue to flow from the bleed-off valve go to **T6** below.

◆ If the water continues to flow from the bleed-off valve, and the bleed-off valve can be adjusted so there is a slight drip from the No. 4 test cock. Go to step **T7** in this section; or,

◆ If it is not possible to adjust the bleed-off valve to allow a slight drip at the No. 4 test cock, the No. 1 shutoff valve should be checked to make sure it is closed tight. Then proceed to step **T8**

The third point requires

careful examination. Water is flowing from the sight tube attached to the No. 4 test cock and from the bleed-off valve which is attached to the No. 3 test cock. Adjusting the bleed off valve does not provide adequate flow of water to compensate for the leaking No. 1 shutoff valve. So, we move to section **T8**, which tells us to check the tightness of the No. 1 shutoff valve. If this doesn't help we move on to step **T9**

T8. If, after checking the tightness of the No. 1 shutoff valve, it is possible to adjust the bleed-off valve so there is a slight drip from the No. 4 test cock, record the reading on the gage as the static pressure drop across the

No. 2 check valve and return to Test No. 2 step **f**. If it is not possible to adjust the bleed-off valve so that the water flowing at the No. 4 test cock is a slight drip, proceed to step **T9**.

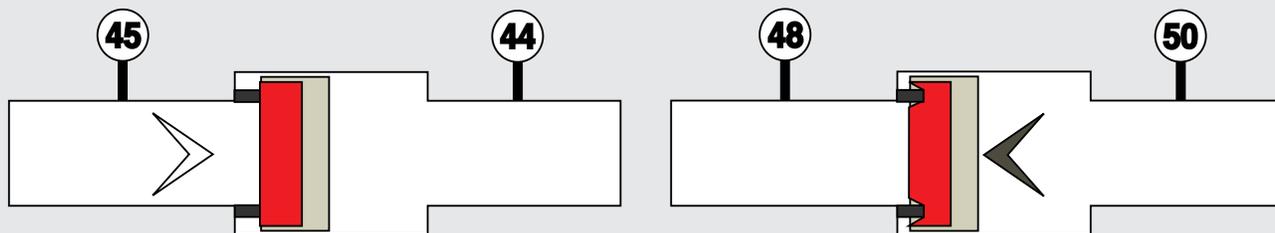
T9. If it is not possible to adjust the bleed-off valve so that the water flowing from the No. 4 test cock is a slight drip, and if check valve No. 1 was holding less than 1.0 psi in Test No. 1, the No. 1 check valve must be repaired before testing the No. 2 check valve. Then return to Test No. 1 step **a**. Otherwise go to step **T10**.

T10. If check valve No. 1 was holding 1.0 psi or more in Test No. 1, close the bleed-off valve and open the No. 2 test cock.

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What is disc compression?

Disc compression is a fairly common occurrence during the field testing of a backflow prevention assembly. In most cases it does not present a problem, however, it is important to understand when disc compression is occurring and what to do under specific circumstances. Disc compression is simply the compression of the elastomer disc of one of a backflow preventer's check valves. This occurs when the pressure downstream of the check valve increases pressing the seat into the check valve disc. This, in itself, is not a problem. However, the movement of the disc into the area upstream of the



check valve causes the upstream region to decrease in area, which causes the water pressure to increase. When the water pressure increases, gage readings may be affected. For example, disc compression of the second check valve of a reduced pressure principle assembly, would cause the pressure in the zone between the two check valves to increase which would, in turn, cause the differential pressure reading across the No. 1 check valve to decrease.

Thus, the tester must compensate for the disc compression. Under certain circumstances, the tester must compensate for disc compression while testing the double check, as discussed in the article *DC Test Procedures* beginning on page 1.

Testing the Double Check

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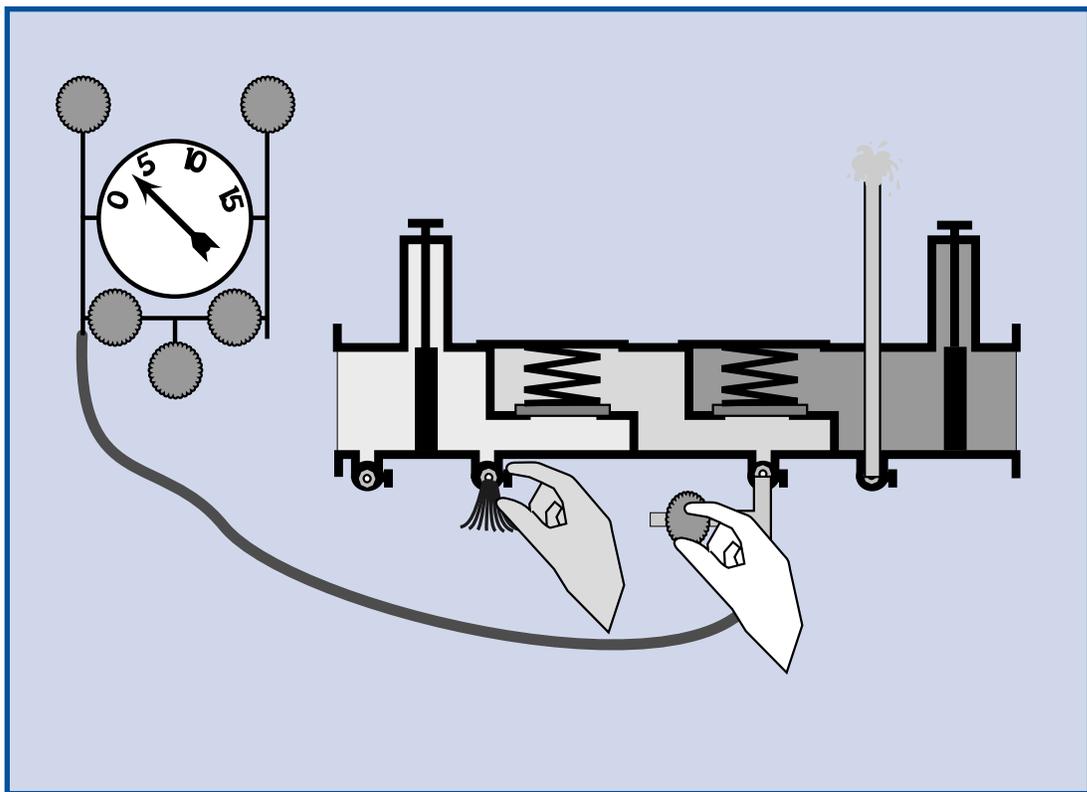
Record the reading on the gage as the static pressure drop across the No. 2 check valve and return to Test No. 2. Step f.

Step **T10** is where the problem may be experienced due to disc compression. Therefore, if the reading obtained in step **T10** is less than 1.0 psi, it is recommended to follow an additional procedure before the check valve is noted as holding low or leaking. Once the No. 2 test cock is opened disc compression of the No. 1 check valve could decrease the pressure in the region between the check valves. In certain assemblies, especially the larger sizes, the drop in pressure due to disc compression could be substantial (even dropping the pressure below atmospheric). Therefore, it is necessary to compensate for this disc compression before finally marking the check valve as low or leaking. If the tester does not properly compensate for disc compression, the tester could be obtaining false readings. Compensating for the disc compression is done through the following procedure:

First, close test cocks No. 2 and 4. Then repressurize the assembly by opening and closing the No. 1 shutoff valve. Once the No. 1 shutoff valve is closed, open the No. 2 test cock. This will compensate for any No. 1 shutoff valve leak and reduce the pressure

upstream of the No. 1 check valve to atmospheric. If there is disc compression the pressure in the region between the check valves

leaving an accurate reading on the gage for the closing point of the No. 2 check valve.



will drop. However, there should still be some pressure within the region between the check valves. At this point open the No. 4 test cock. Any backpressure leakage

If the tester does not properly compensate for disc compression, the tester could be obtaining false readings.

in the No. 2 shutoff valve will flow through the sight tube. The tester has compensated for the leakage through both shutoff valves. The remaining pressure in the region between the check valves will flow through the number two check valve, thus

It is recommended that if a reading obtained in step **T10** is less than the required 1.0 psi, run the additional procedure as detailed above. If the reading for the second check valve is still less than 1.0 psi, then the check valve can be failed. However, if the additional procedure changes the results from a failing to a passing reading, record the final acceptable reading for the second check valve. For those assemblies which do not have a significant disc compression reaction the test procedure as spelled out in Section 9 of the Manual will suffice. Should you have any questions on this test procedure, please contact a member of the Foundation's Engineering Staff. ♦

Applications of the SVB

Continued from page 1

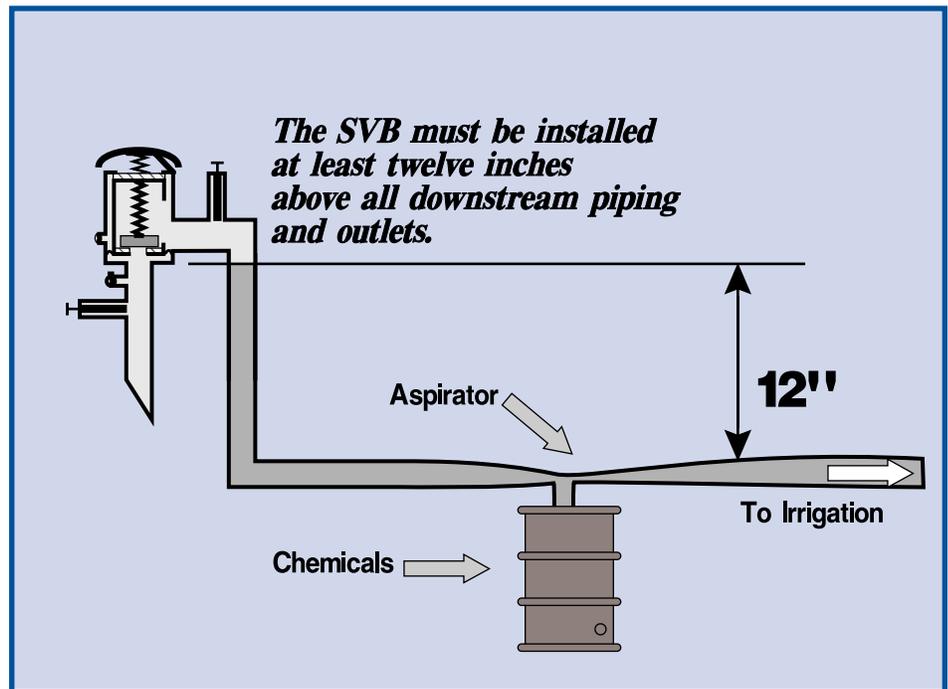
The SVB is designed to operate under the same circumstances as the Pressure Vacuum Breaker (PVB). It is designed to protect against backsiphonage only, like the PVB and Atmospheric Vacuum Breaker (AVB). The SVB, like the PVB, may be used under continuous pressure. Because it is considered acceptable for use under continuous pressure, the SVB must be installed with the same installation guidelines as the PVB. This means the SVB must be installed at least twelve inches above all downstream piping and outlets. The SVB may be installed with shutoff valves downstream.

Is there any advantage to using the SVB over the PVB? Since the SVB is a type of PVB there is no technical difference as far as application is concerned. However, the SVB, as is implied

The SVB is designed to operate under the same circumstances as the Pressure Vacuum Breaker (PVB). It is designed to protect against backsiphonage only, like the PVB and Atmospheric Vacuum Breaker (AVB).

by its name, is designed to resist spilling as the assembly is being pressurized.

The experienced tester is aware of the fact that water frequently spills rather freely when the PVB is being pressurized. The SVB is designed such that this



does not occur. As the assembly is pressurized, the air inlet valve slowly seats, much like the relief valve port closes when a reduced pressure principle assembly is

pressurized. This makes the SVB much less likely to spill water into the surrounding area, than a PVB. This is a great advantage for those

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SVB Installation Guidelines

For protection against backsiphonage only

May be subjected to continuous pressure, but not backpressure

Shutoff valves may be installed downstream of the assembly

Must be installed at least twelve inches above all downstream piping and outlets

Applications of the SVB

Continued from page 5

areas where it is important that water doesn't flood the surrounding areas. As many testers have seen, it is possible to supply water to a PVB from an upstream valve and have the water flow from the air inlet valve freely onto the surrounding area. There have been cases where the water to a property was turned on and water flowed continuously from a PVB without anyone noticing until an area was completely flooded. This type of occurrence is less likely to occur with the SVB. Should the check valve of an SVB become fouled, the air inlet valve will function the same as in a PVB; that is, a substantial water flow will be required to close the air inlet. This explains why the

SVB is spill "resistant" rather than spill "proof." The installation must still consider water discharging from the air inlet.

In summary, there are advantages to using the SVB, mainly the fact that the assembly is resistant

It is very important to understand the Spill-resistant Pressure Vacuum Breaker should be installed using the same guidelines as a Pressure Vacuum Breaker assembly.

to spilling. It is very important to understand the Spill-Resistant

Pressure Vacuum Breaker should be installed using the same guidelines as a Pressure Vacuum Breaker assembly. This means the assembly may be used to protect against backsiphonage only, may be subjected to continuous pressure, may have shutoff valves downstream of the assembly, and must be installed at least twelve inches above all downstream piping and outlets. ♦

Get the List on the Internet

Members can now access the latest edition of the *List of Approved Backflow Prevention Assemblies* on the World Wide Web. This electronic version of the List has several advantages. First of all the List shown on the Web will be updated as changes are made. This means you won't need to wait for the next issue of the List to see when products are Approved. The List is updated immediately, and Members are informed, by email, that an update has been made. Members may then access the List using a World Wide Web Browser, such as Netscape. Members will need a copy of the Adobe™ Acrobat™ Reader in order to access List which is in PDF format. Acrobat is available at no charge from Adobe™. Members will be able to access all they need from the Foundation's Web site for the List.

To gain electronic access to the List, email the Foundation at fcchr@usc.edu with your Membership Name, Member Contact and email address. Instructions will be sent to you via email once we receive your information. ♦

Tester Course

Los Angeles, CA
22-26 January 1996
13-17 May 1996
15-19 July 1996

Owensboro, KY
4-8 December 1995

Las Vegas, NV
26 February-1 March 1996
23-27 September 1996

Incline Village, NV
5-9 August 1996

Non-Members \$750.00
Members \$600.00

Program Specialist Course

USC Campus
29 Jan-2 Feb 1996
22-26 July 1996

Incline Village, NV
18-22 March 1996

Non-Members \$800.00
Members \$640.00

Please contact the Foundation office for information on courses in your area or for an application for the next USC Training Course. You may also send a hard copy of a purchase order or a check to the Foundation office to reserve a space. Please be advised that some of these courses fill six to eight weeks in advance.

A Purchase Order may be sent via FAX to the Foundation office at (213) 740-8399. Call (213) 740-2032 or Email fcchr@usc.edu for more information.

Acceptable Gages for Field Testing Backflow Prevention Assemblies

The Foundation does not currently have Specifications for the Approval of testing equipment for backflow prevention assemblies. Therefore, the Foundation CANNOT issue an Approval for any gage equipment. However, there are some general guidelines found in the Ninth Edition of the *Manual of Cross-Connection Control*. The Foundation has reviewed several gages to see if they do comply with the generalized guidelines found in Section 9 field test procedures. These gages are listed below along with the Manufacturer's address and phone number. The only gages listed below are differential pressure gages. The use of the duplex gage is no longer needed for following the Foundation's Field Test Procedures as included in the *Manual of Cross-Connection Control*, Ninth Edition.

Manufacturer

ITT Barton

1304 John Reed Court
City of Industry, CA 91745
Phone: (818) 336-4502
FAX: (818) 968-9807

Duke

P. O. Box 16007
Irvine, CA 92713
Phone: (714) 581-7200
FAX: (714) 552-9368
Model EZ900

Meriam Instrument

10920 Madison Avenue
Cleveland, OH 44102
Phone: (216) 281-1100
FAX: (216) 281-0228

Mid-West Instrument

6500 Dobry Drive
Sterling Heights, MI 48314
Phone: (810) 254-6500
FAX: (810) 254-6509

Astra

P. O. Box 888
3525 Old Conejho Road, Ste. 104
Newbury Park, CA 91320
Phone: (800) 776-1464
FAX: (805) 499-9084

Watts Regulator Company

815 Chestnut Street
North Andover, MA 01845
Phone: (508) 688-1811
FAX: (508) 794-1848

Differential Gage

Model 226 (head only)
Model 246
Model 247

Model 75
Model 75B
Model 100
Model 1000

Model 1124

Model 830

ProMaster - Model ASRP-4

Model TKDR
Model TKDP
Model TK99D

Private Labeling

From time to time a backflow prevention assembly manufacturer will private label a product or several products under another name. This means that a product which has been Approved under one name will be marketed and sold under another manufacturer's name as well. The product itself does not change, other than the nameplate of the product. This is a fairly common procedure among various manufactures of any type of equipment.

Private labeling was recently initiated between Febco and Cla-Val. Some of the Febco products are now sold under the Cla-Val name. Since this was arranged by the manufacturers and notice was sent to the Foundation, the Approved Febco assemblies bearing the Cla-Val name are Approved. These assemblies are technically no different than their respective Febco assemblies, however, they should be treated as Cla-Val backflow preventers and they are listed on the Approved List as such.

Calendar of Events

This Calendar shows some the activities in which the Foundation is currently planning on participating. For more information, contact the Foundation Office.

28-29 November 1995 - American Backflow Prevention Association, Hawaii Chapter, Honolulu, HI

4-8 December 1995 - Tester Training Course, Owensboro, KY

22-26 January 1996 - Tester Training Course, Los Angeles, CA

29 January-2 February 1996 - Program Specialist Training Course, Los Angeles, CA

26 February-1 March 1996 - Tester Training Course, Las Vegas, NV

18-22 March 1996 - Program Specialist Training Course, Incline Village, NV