Understanding Detector Assemblies

The Double Check Detector Assembly (DCDA) and the Double Check Detector Assembly-Type II (DCDA-II) along with the Reduced Pressure Principle Detector Assembly (RPDA) and the Reduced Pressure Principle Detector Assembly-Type II (RPDA-II) are backflow prevention assemblies that include a bypass arrangement, which incorporates a water meter and either a backflow prevention assembly or a single check valve assembly. These detector assemblies are typically used on fire sprinkler systems as a means of backflow prevention and to record unauthorized usage of water. Since these types of assemblies include additional components, many may not know how to treat the bypass arrangement or how to record its field test results.

Detector backflow prevention assemblies are comprised of detector assemblies: DCDA and RPDA; and Type-II detector assemblies: DCDA-II and RPDA-II. The DCDA and RPDA include a mainline assembly with a bypass arrangement, which incorporates a water meter and a backflow prevention assembly. The DCDA-II and RPDA-II include a mainline assembly with a bypass arrangement, which incorporates a water meter and a single check valve assembly.

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New Members

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

ABPA- Indiana Chapter
Adam Rotherham
Automatic Sprinkler Controls, Inc.
Backflow Education Group
Edward Ruiz
Fire Ace
Francis Walling
Isle of Wight Public Utilities
Jacobi Williams
Los Angeles County Parks & Recreation
Perfect Lawns
PGF
PHD, LLC.
Philip Harrigan
Reliable Plumbing & Drain Cleaning, Inc.
Robert Waddell
Saflow Testing
Sonoma County Water Agency

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Email notifications of new updates to the USC List of Approved Backflow Prevention Assemblies
Special Notices mailed exclusively to members as published

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Installing a backflow prevention assembly may not be an easy task. Factors an installer may take into account include available spacing and accessibility to the assembly. In some instances, an installer may decide that rotating an assembly on its axis solves these types of problems. But, installing an assembly in an orientation other than what is listed on the USC List of Approved Backflow Prevention Assemblies invalidates the approval.

All assemblies found on the USC List are evaluated for a specific orientation. That orientation is requested by the manufacturer when the assembly is submitted for USC Approval. So, rotating an assembly on its axis invalidates the approval since the assembly was not evaluated in that orientation.

For example, if an assembly is tested in the horizontal orientation, then the assembly is approved in the horizontal orientation and it may only be installed in that orientation to maintain USC Approval.

The USC List includes an orientation legend that illustrates the different orientations in which an approved assembly may be installed. The orientation of each approved assembly on the USC List is designated by an acronym that corresponds with an illustration on the legend. The USC List includes a ‘Notices’ page that also explains the USC Foundation’s position on rotating approved assemblies on their axes.

If space is an issue when installing an approved assembly, the Foundation has determined that it is possible to rotate flanged shut-off valves (i.e., NRS or OS&Y Gate Valves) of the 2.5-inch size and larger one bolt hole. This will not affect the operation of the assembly or the shutoff valve. Neither will it affect the approval of the assembly. Rotating a flanged shutoff valve may help an installer with spacing or accessibility of an assembly.

In all cases, an assembly must be installed in the orientation in which it was evaluated and approved. An assembly may not be rotated on its axis and maintain USC Approval.

For any additional questions about USC Approval or rotating flanged shutoff valves please contact the Foundation office.
Larger backflow prevention assemblies may take up too much space, so installers choose to install the assemblies in a vertical orientation to fit in the space available. The standard found in the Manual of Cross-Connection Control, Tenth Edition allows for assemblies to be installed in orientations other than horizontal, if so approved. An assembly’s approved orientation is noted on the USC List of Approved Backflow Prevention Assemblies. While the field test principle assemblies (RP) are also approved in the vertical orientation. All of them, regardless of orientation, are field tested as instructed in the manual.

Since the RP uses a two hose method for its field test, the field test procedure is exactly the same for an RP regardless of orientation because the elevation of the field test kit is not critical. As for the DC, the field test procedure is also the same regardless of orientation but visually it may appear different.

Minor visual differences in the field test procedure for a vertically installed DC have to do with the level of the field test kit and the height of the vertical tube throughout the procedure.

The Tenth Edition manual states in Chapter 9.3.3.1:

\textit{During this field test it is important to keep the field test kit and unused hoses at the appropriate elevation. A visible downstream reference point is needed for this field test. If the downstream test cock is at the highest point of the body, then this can be used as the reference point. However, if the downstream test cock is below the top of the body, then a vertical pipe or tube must be attached to the downstream test cock so that it rises above the top of the body.}

When testing the tightness of the first check of a vertically installed DC with the flow upward, it is only necessary for the tube to be extended above the highest portion of the region between the check valves. If it is difficult to determine where this is, the tester should simply...
make sure the tube extends to the elevation of the number four test cock. This will ensure that the tube is above the highest point between the check valves.

While testing the second check valve, the tube is located on the number four test cock and the water level should be at the elevation of the number two shutoff valve.

For testing purposes, the tube should be higher than the level of the seal in the downstream shutoff valve. However, this may be difficult to determine. The tester should consider having the elevation of the end of the tube above the downstream side of the number two shutoff valve to ensure the level of the tube extends beyond the sealing surface in the shutoff valve.

In some cases, the tester will need a longer tube than the tube used in testing horizontal assemblies to obtain a good reference point. As with testing the DC in the horizontal orientation, it is important for the tester to hold the field test kit at the same level as the water in the tube.

If the field test kit is not held at the same level as the water in the tube, erroneous readings may be recorded. It has been observed that some testers hold the field test kit level with

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The backflow prevention assembly found on the bypass arrangement of a DCDA and RPDA must be a USC approved assembly per Chapter 10.1.2.6.1 (DCDA) and Chapter 10.1.2.7.1 (RPDA) of the Manual of Cross-Connection Control, Tenth Edition. So, a backflow prevention assembly found on the bypass of a DCDA or RPDA will be found on the USC List of Approved Backflow Prevention Assemblies as a standalone USC approved assembly. However, the same is not true with the DCDA-II and RPDA-II.

The bypass arrangement of a DCDA-II and RPDA-II includes a single check valve assembly. Unlike the DCDA and RPDA, the single check valve assembly, which is required in the bypass arrangement, is not USC approved. The USC Foundation does not have a standard for single check valve assemblies. A single check valve assembly separate from the main line assembly of a DCDA-II or RDPA-II is not considered a sufficient means of backflow prevention. A single check valve assembly in combination with a USC approved mainline assembly and a water meter make up a USC approved DCDA-II or RPDA-II.

Anyone may look up any type of USC approved detector assembly on the USC List to determine which components of the bypass arrangement are required for individual detector assemblies. The model numbers for water meters, bypass backflow prevention assemblies and single check valve assemblies that are required with specific detector assemblies are designated on the List. So, when a tester needs to replace a component of a detector assembly, the USC List includes all the information needed to maintain the detector assembly’s approval.

Some may notice that a backflow prevention assembly that is part of the bypass arrangement is listed as a standalone USC approved assembly since the standard referenced above requires all backflow prevention assemblies used in the bypass arrangement to be USC approved. On the other hand, a single check valve assembly that is included in the bypass arrangement for Type II detector assemblies will not be listed as a standalone USC approved assembly since the Foundation does not have a standard for a single check valve assembly.

Although some have been concerned that the single check valve assembly is not listed elsewhere on the USC List as a standalone approved assembly, there is no reason for concern. Single check valve assemblies, exactly like water meters, are listed by model number so the end user may determine if the appropriate single check valve assembly is being used or which one should use, if a replacement is needed.

Many testers may not know how to record the field test results of detector backflow prevention assemblies, all of which include a bypass arrangement. Typically, a field test form does not include fields for the bypass arrangements.

Many administrative authorities may require a tester to record field test results on two forms for the DCDA or RPDA. Since the detector assemblies include two backflow prevention assemblies, filling out two forms that include all the required fields may help the tester. And, when using two forms to record the results for
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the end of the tube, not with the level of the water in the tube. When the test cock is opened to the tube, air bubbles may come out and displace some of the water, causing the water level to stabilize below the end of the tube. The tester must carefully observe the level of the water. Following these instructions while testing vertical assemblies with upward water flow will produce correct results.

Even though adjusting the height of the field test kit and the addition of a longer tube may seem like an entirely different procedure when testing a DC vertically, it is important to understand that the field test procedure is the same. For more information, please contact the Foundation office.

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one detector assembly, it is critical to include all identifying information on both forms. Some administrative authorities may have a form that includes fields for four check valves for these types of detector assemblies. Nevertheless, contacting the administrative authority may be necessary for the tester to determine the proper steps for recording DCDA and RPDA results in their jurisdiction.

Recording the results for a DCDA-II or RPDA-II may not be as straightforward, since these types of detector assemblies include a single check valve assembly in the bypass arrangement. So, a field test form for a DCDA-II and RPDA-II may include fields for three check valves. Please note, a single check valve assembly is field tested independently of the mainline assembly. The tester should contact the local administrative authority for field test recording procedures for a DCDA-II and RPDA-II.

When performing a field test or recording results in a jurisdiction where the tester is not familiar with the reporting procedures, it is always important to contact the local administrative authority before commencing. Field test recording may vary from one administrative authority to another. In all cases it is important to understand that detector backflow prevention assemblies are USC approved as one unit and should be recorded as one unit. And, in no circumstances is a single check valve assembly of a DCDA-II or RPDA-II be suitable for backflow protection independent of the entire assembly.
Upcoming Training Courses
all courses in Los Angeles, CA

Tester
11-15 July
3-7 October

Specialist
25-29 July

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11 August
Cross-Connection Control Surveys
15 November
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Contact Us
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Upcoming Events

California Environmental Health Association Conference
Long Beach, CA
1-2 September 2016

ABPA Western Region Backflow Conference
Las Vegas, NV
26-27 September 2016

Western Washington Cross-Connection Prevention Professionals Group
Tacoma, WA
19 October 2016

CA/NV Section AWWA Annual Fall Conference
San Diego, CA
24-27 October 2016

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