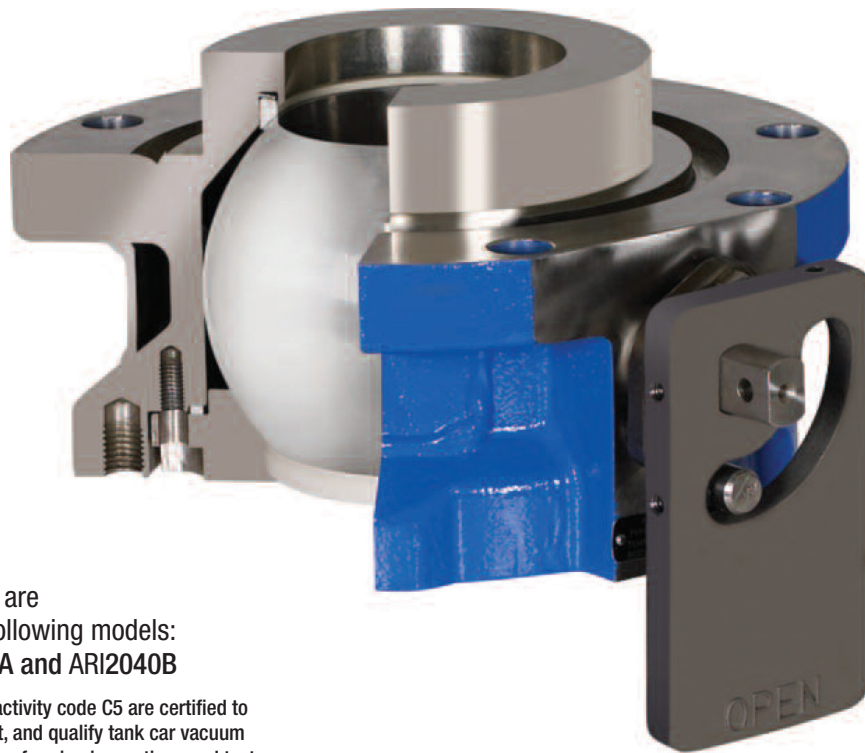


ARI2040 Bottom Outlet Ball Valve

INSPECTION & MAINTENANCE BULLETIN



These instructions are applicable to the following models:
ARI2040, ARI2040A and ARI2040B

Only facilities with AAR activity code C5 are certified to recondition, repair, retest, and qualify tank car vacuum relief valves. Personnel performing inspections and tests must be certified Level I per AAR Manual of Standards and Recommended Practices, M-1002, Appendix T, 1.4.3.

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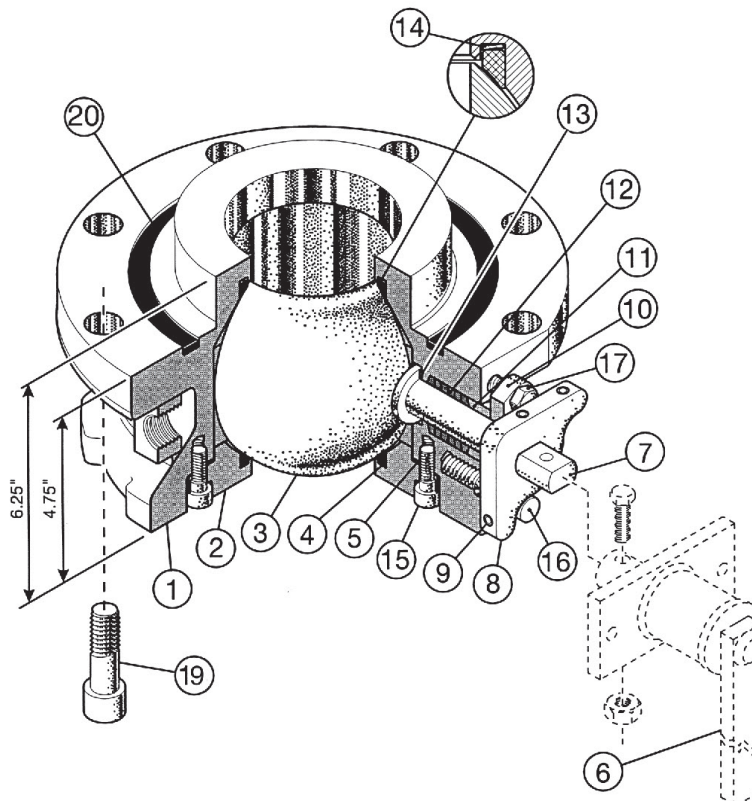
New Valves for Replacement of Existing Equipment

New valves are tested, sealed and packaged at the time of manufacture. A new valve can be applied provided it is still in its original packaging.

Valve Rating

The ARI2040, ARI2040A, and ARIs2040B Bottom Outlet Valves are rated to 100 psi and 300° F.

Disassembly Procedures



1. Remove the gasket (item #20) by inserting a flat screwdriver along the outer wall and prying underneath the gasket, taking care not to gouge or mar the metal surfaces.
2. The illustration above shows the valve open in the as installed position. Turn the entire valve assembly over to continue disassembly.
3. Loosen the set screw (item #9) and remove the stop (item #8) from the stem (item #7).
4. Remove the two packing retainer bolts (item #17) then remove the retainer (item #10) and the packing gland (item #11).
5. Remove the eight cap screws (item #15) from the cover (item #2). Then remove the cover.
6. Remove the cover gasket (item #5), taking care not to gouge or mar the metal surfaces.
7. Rotate the ball (item #3) to the closed position.
8. Lift the ball (item #3) out of the valve body (item #1), taking care not to gouge or mar the spherical surface.
9. Remove the stem (item #7) and the stem gasket (item #13) from the inside of the valve body. Remove the packing rings (item #12) from the outside of the valve body. The stem gasket and packing rings should be discarded and replaced with new components.

Inspection of Valve Components

1. Remove the seal rings (item #4) and the spring washer (item #14) by using either a thin screwdriver or other sharp instrument taking care not to gouge, or mar the metal surfaces.
2. If necessary, clean the internal and external valve body (item #1) and the cover seal pockets with a light gauge wire brush or light media blast.
3. Inspect the sealing surfaces on the body (item #1), cover (item #2), and stem (item #7) for signs of corrosion, voids, cracks, and scratches. These surfaces include the internal and external seal pockets of the body and cover, and the seal areas that the stem gasket (item #13) and packing rings (item #12) seal onto in the stem bore area. NO DEFECTS ARE ALLOWED.
4. Outside the sealing areas the defects must not exceed 1/16" in depth and 3/32" in width. Additionally, a maximum of one void per square inch is allowable, and the void area must not exceed 10% of total surface.
5. Clean the ball (item #3) with a commercial cleaning solution or in an ultrasonic bath to remove any residue.
6. Inspect the ball spherical surface for irregularities in the form of scratches or gouges. Scratches or gouges can be evaluated by sliding a fingernail over the affected area. If a fingernail "catches," the depth of the discontinuity could damage the ball seals (item #4) resulting in improper sealing of the valve. If any scratches fail the fingernail test, replace the ball (item #3) as it cannot be repaired.
7. Clean the valve body, cover, stem, and packing gland (item #11) with a commercial cleaning solution, or in an ultrasonic bath.
8. Bolts should be cleaned using a wire brush.

Reassembly

1. Insert a new spring washer (item #14) in the body (item #1) with the inside diameter edge facing upward toward the ball (item #3). Insert a seal (item #4) on top of the spring washer.
2. Slide the new stem gasket (item #13) over the stem (item #7) and insert the stem into the body (item #1). Orient the stem (item #7) so that the slot in the ball (item #3) will engage the stem when inserted.
3. Carefully lower the ball (item #3) into the body cavity.
4. Inspect the seal (item #4) to ensure it remained seated in the seal groove.
5. Slide the packing rings (item #12) over the stem followed by the packing gland (item #11) then the retainer (item #10). Apply a light coating of antiseize lubricant to the retainer bolts (item #17), apply the nuts and tighten evenly to 5-10 ft/lbs.
6. Apply a thin coating, not more than 1/32" of Nordstrom 555 sealant to the bottom surface of the second ball seal (item #4) then insert the seal into the cover (item #2) seat pocket. Do not apply excessive sealant as it could adversely affect the operation of the valve.
7. Install a new cover gasket (item #5).
8. Align the bolt holes in the cover (item #2) and valve body (item #1) then lower the cover into place taking care to ensure that the seal (item #4) does not slip out of position.
9. Apply a light coating of antiseize lubricant to the eight cap screws (item #15) and place them in the cover (item #2). Torque using a diametrically opposite (criss-cross) tightening sequence to 30 +/- 2 ft/lbs.
10. Slip the stem stop (item #8) over the stem (item #7) and tighten the set screw (item #9) to 11 ft/lbs.
11. Using an adjustable or open-end wrench, and avoiding quick or jerky movements, partially cycle the valve open and closed 6 to 8 times, then cycle fully open and closed 3 times to seat the seals. Some resistance to rotation is normal.
12. The opening in the ball should be concentric with the opening in the valve cover (item #2). If not, adjust the set screw (item #9) against the stop bolt (item #16) until the ball is concentric.
13. Leave valve in the open position and install protective caps into both ports.

Test Procedure

1. Per the following procedure, air test the valve in the valve closed, half-open and full open positions using an approved Level III bubble leak test process.
2. The first stage pressure is 50 psig. The second stage pressure is 100 psig.
3. Soak time, the amount of time allowed for the pressurizing medium to escape through leakage points prior to inspection, for each step must be a minimum of 30 seconds.
4. Dwell time, the amount of time the test solution is in contact with the surface being inspected for each step, must be a minimum of 30 seconds.
5. Any leakage is cause for rejection.

Preparation

1. Apply an appropriate adapter to test bench pod that will be used.
2. Select applicable gasket and attach the valve to test bench using the number and grade of fasteners as would be used to secure the valve to the tank car.

Valve in Closed Position

1. If applicable, cycle the valve from open to close three times to ensure valve is fully closed.
2. With the valve in the closed position, pressurize the valve to the first stage test pressure.
3. Hold: soak time.
4. Apply leak detection solution and inspect for entire dwell time at possible leak paths, such as, but not limited to:
 - a. Valve Cover to Valve Body Connections
 - b. Valve Stems and Packing
 - c. Ball Valve Seats
5. Observe for the formation of bubbles. Any continuous bubble formation within the allotted dwell time is cause for rejection.
6. If valve does not leak, then pressurize valve to the second stage pressure.
7. Hold: soak time.
8. Apply leak detection solution and inspect for the entire dwell time the same leak paths as completed during the first stage pressure test.
9. Observe for the formation of bubbles. Any continuous bubble formation within the allotted dwell time is cause for rejection.
10. Release pressure from the valve.

Valve in Half-Open Position

1. Secure a suitable plug or flange to the valve which will seal the discharge opening in the valve cover. The flange should not hinder observation of the cover attachment bolts.
2. With the valve in the half open position and the flange or plug applied, pressurize the valve to the first stage test pressure.
3. Hold: soak time.
4. Apply leak detection solution and inspect each potential leak path for the entire dwell time.
5. Observe for the formation of bubbles. Any continuous bubble formation within the allotted dwell time is cause for rejection.
6. If valve does not leak, then pressurize valve to the second stage pressure.
7. Hold: soak time.
8. Apply leak detection solution and inspect for the entire dwell time the same leak paths as completed during the first stage pressure test.
9. Observe for the formation of bubbles. Any continuous bubble formation within the allotted dwell time is cause for rejection.
10. Release pressure from the valve.

Valve in Open Position

1. Secure a suitable plug or flange to the valve which will seal the discharge opening in the valve cover. The flange should not hinder observation of the cover attachment bolts.
2. With the valve in the open position and the flange or plug applied, pressurize the valve to the first stage test pressure.
3. Hold: soak time.
4. Apply leak detection solution and inspect each potential leak path for the entire dwell time.
5. Observe for the formation of bubbles. Any continuous bubble formation within the allotted dwell time is cause for rejection.
6. If valve does not leak, then pressurize valve to the second stage pressure.
7. Hold: soak time.
8. Apply leak detection solution and inspect for the entire dwell time the same leak paths as completed during the first stage pressure test.
9. Observe for the formation of bubbles. Any continuous bubble formation within the allotted dwell time is cause for rejection.
10. Release pressure from the valve.

After Testing

1. Remove the plug or flange used to seal the discharge opening in the valve cover.
2. Blow the valve dry with compressed air.
3. Fully open the valve and install a protective cap in the exposed end.
4. Remove the valve from the test fixture.
5. Turn the valve over and install a protective cap.
6. Store the valve in a cardboard box or protective enclosure.
7. Record the results of the test on the appropriate form.
8. Mark and place the test item in the applicable areas.

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