



INSPECTION & MAINTENANCE BULLETIN

ARI 2040 Bottom Outlet Ball Valve



These instructions are applicable to the following model:
ARI 2040 and 2040A

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.

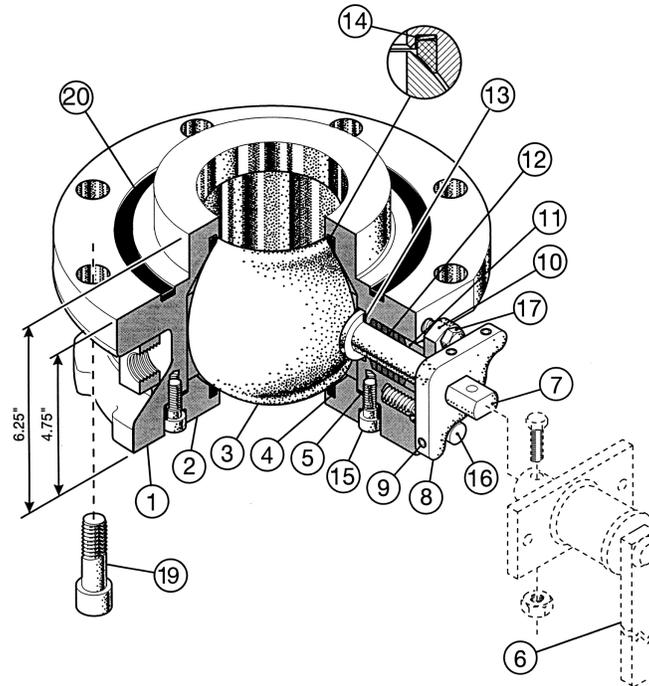
New Valves for Replacement of Existing Equipment

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 ARI Models 2040 and 2040A Bottom Outlet Valves are rated to 100 psi and 300° F.

Disassembly Procedure



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).
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 (item 32) with a light gauge wire brush.
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 plastic washer (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. 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 if could adversely affect the operation of the valve.
3. 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.
4. Carefully lower the ball (item #3) into the body cavity.
5. Inspect the seal (item #4) to ensure it remained seated in the seal groove.
6. 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 Bostik "NeverSeez" regular grade lubricant to the retainer bolts (item #17), apply the nuts and tighten evenly to 2 ft/lbs.
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 Bostik "NeverSeez" regular grade 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.
14. Store the valve prior to testing for a minimum of 12 hours at room temperature (68°-77° F) to allow the ball seals to properly seat.

Testing

1. Torque the eight cover cap screws (item #15) using a diametrically opposite (criss-cross) tightening sequence to 30 +/- 2 ft/lbs.
2. Per the following procedure, air test the valve to 30 psi and then 100 psi using an approved Level III bubble leak test process. Any leakage is cause for rejection.

30 psi Seal Test

1. Remove the protective caps and place valve on a test fixture. The valve should be tested as a directional valve with the flange end being the upstream side.
2. Close the valve using an adjustable or open-end wrench until the set screw (item #9) in the stop (item #8) contacts the stop bolt (item #16).
3. Apply 30 psi air pressure to the valve and monitor the pressure gauge for a period of 30 seconds to ensure the pressure has stabilized.
4. Apply leak detection fluid to the surface of the ball and into the circumferential joint between the body (item #1) and the cover (item #2).
5. Observe these areas for 5 minutes. No bubbles are allowed. If any bubbles appear during this period, the valve must be disassembled and inspected to determine the source of the leak.
6. De-pressurize the valve.

100 psi Seal Test

1. If the 30 psi test is successful, increase the air pressure to 100 psi and the monitor the pressure gauge for a period of 30 seconds to ensure the pressure has stabilized.
2. Apply leak detection fluid to the surface of the ball and into the circumferential joint between the body (item #1) and the cover (item #2).
3. Observe the inspection area for a period of 2 minutes. No bubbles are allowed. If any bubbles appear during this period, the valve must be disassembled and inspected to determine the source of the leak.
4. Release pressure from the valve.
5. Wipe out the test solution then blow dry with compressed air.

Stem Test

1. A steel test plate with an 8-3/8" x 6-3/8" x 1/8" soft rubber flat gasket will be required to seal the valve. The test plate should be 1/2" thick, 10-1/2" diameter with four 3/4" holes drilled on a 9" bolt circle. As an alternative an existing bottom outlet chamber may be used.
2. Apply the test plate and gasket over the valve cover, and attach with four 5/8" – 11 bolts torque to 25 ft-lbs.
3. Open the valve to the half-open position.
4. Apply 100 psi and monitor the pressure gauge for a period of 30 seconds to ensure the pressure has stabilized.
5. Apply leak detection fluid around the packing gland (item #11) at the body (item #1) then around the stem (item #7) in front of the retainer (item #10).
6. Observe the inspection area for a period of 2 minutes. If a leak is detected the packing gland bolts can be tightened up to 5 ft-lbs. No bubbles are allowed. If any bubbles appear during this period, the valve must be disassembled and inspected to determine the source of the leak.
7. Release pressure from the valve.
8. Blow the valve dry with compressed air.
9. Fully open valve and install a protective cap in the exposed end. Remove the test plate then remove the valve from the test fixture.
10. Turn the valve over and install a protective cap.
11. Spray the exterior surfaces with WD-40, or an equivalent lubricant to avoid oxidation.
12. Store the valve in a cardboard box or protective enclosure.

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