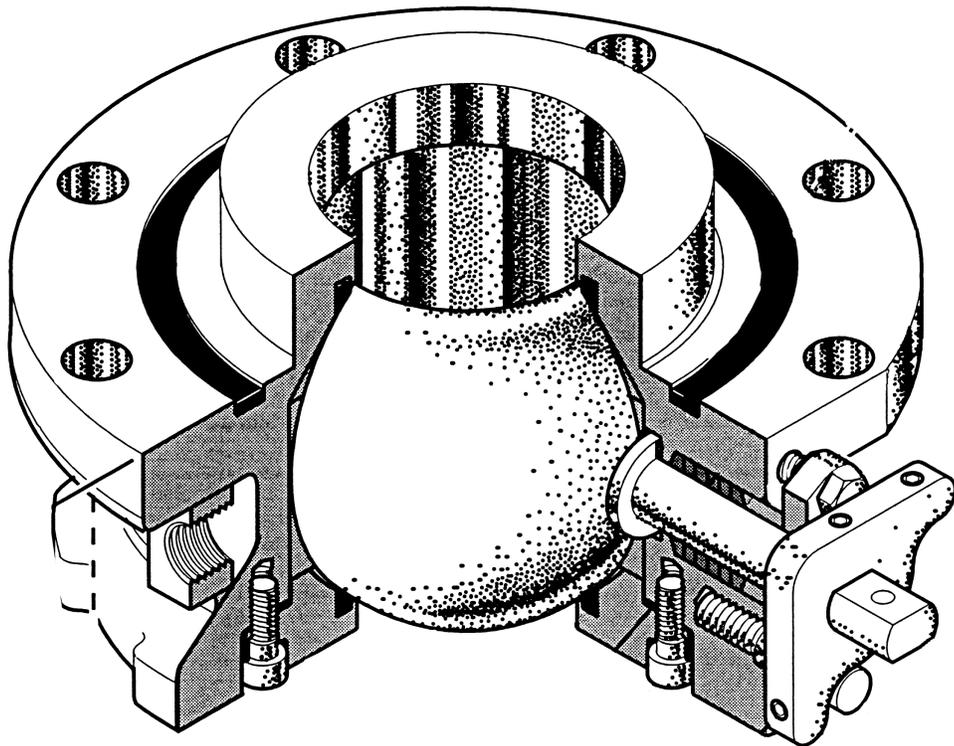




# ***INSPECTION & MAINTENANCE BULLETIN***

## ***ARI 2040 Bottom Outlet Ball Valve***



These instructions are applicable to the following model:  
ARI 2040

Only AAR class F facilities are certified to recondition, repair, retest and qualify tank car bottom outlet valves. Personnel performing inspection and test must be certified Level I per AAR Manual of Standards and Recommended Practices, M-1002, Appendix T, 1.4.3.

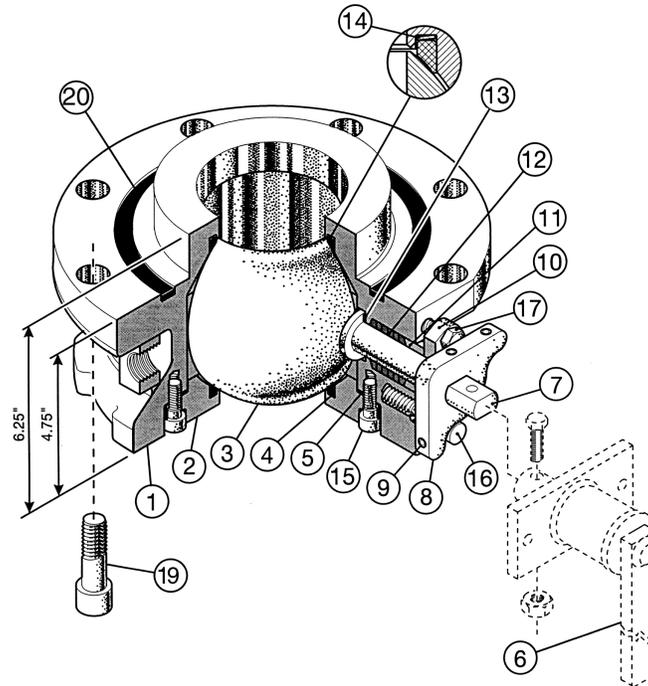
## New Valves for Replacement of Existing Equipment

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 Model 2040 Bottom Outlet Valve is 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. Clean the seat pockets with a light gauge wire brush.
3. Clean the ball, item #3 with a commercial cleaning solution, or in an ultrasonic bath to remove any product residue.
4. Inspect the spherical surface for discontinuities in the form of scratches or gouges. The severity of 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.
5. Clean the valve body item #1, the cover item #2, the stem item #7 and packing gland item #11 with a commercial cleaning solution, or in an ultrasonic bath.
6. 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 it could adversely affect the operation of the valve.
3. Slide the a 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 (crisscross) 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 (crisscross) tightening sequence to 30 +/- 2 ft/lbs.
2. Per the following procedure air tested the valve to 30 psi 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. Depressurize 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 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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