INSTALLATION, OPERATION, & MAINTENANCE OF BERIC GLOBE VALVES

WARNING

Improper installation, operation, and maintenance of the valve can be dangerous to personnel and the environment. It is recommended that the procedures described herein be performed by competent and trained personnel. For recommendations not addressed in this document, refer to API (American Petroleum Institute) or VRC (Valve Repair Council) documents.

Storage

Until installation, store all valves indoors and cover them with watertight sheets to prevent dust, rain water, and moisture. During storage, do not remove the flange facing cover or bevel end protector, and do not open valves.

Pre-Installation

Prior to installation, user should ensure compatibility between valve materials and media being used. Valve markings and nameplate should be verified to ensure that the valve is of the correct type and pressure class for the intended service.

Check the valve visually and operate the valve to check for damage due to shipping and handling. Particular attention should be paid to pipe threads and flanges, to make sure that no foreign materials, scratches, nicks, or dents are present. It will be necessary to remove the protective caps from the end connections for this inspection. If the valve is not to be installed immediately, the protective caps should be re-installed on the end connections.

INSTALLATION

Care should be taken not to drop the valve on the ground, and not to bump valve against anything. Be especially careful not to damage the flange surface.

When lifting the valve, never apply a lifting device to the handwheel and/or actuator.

Remove protective wrapping from stem and end protectors.

Remove any foreign materials inside the connecting piping, such as dirt, sand, scale, metal chips, burrs, and grit particles, which may damage the valve seat.

Install the valve in the connecting piping so that the arrow-head marked on the valve body coincides with the flow direction in the piping, in the event that there is an arrow-head marked on the body of valve.

It is extremely important to make certain that the valve and piping being installed are properly supported and that the valve and piping are properly aligned.

When installing flanged valves, the flange bolts should all be snugged tight using a "star" pattern. After snugging all bolts, each bolt should be tightened to the required torque, again using a "star" pattern. All bolts should then be re-checked for correct torque.

Butt-weld end or Socket-weld end type Valves

Upon installing of these valves with the connecting piping by welding, please take care of the following points:

1. Before welding, close the valve snuggly.
2. Ensure that the welder grounding cable is securely attached to the side of the valve being welded. Failure to do so may allow arcing across the disc-seat and/or between the stem threads-stem nut.
3. During welding, care should be taken not to leave the weld spatter inside the valve.
4. After welding, fully open the valve and clean the inside.

Once installation is complete, it is highly recommended that the entire system be pressurized and inspected for leakage. If leakage is detected, the valve and/or piping should be repaired or replaced prior to the system being placed into service.

OPERATION

For manually operated valves, turn the handwheel counterclockwise to open and clockwise to close.

Turn the handwheel slowly, especially in the initial opening. Never use too much force in either opening or closing. If the handwheel is tight and you want to use any tools, such as lever, spanner or pipe wrench, do not use one that is too long and places excess stress to the stem and yoke. Do not close the valve too tightly.

For automatically operated valves, use pushbuttons or operation switches for opening, closing and stopping.

Carefully check to ensure that no leakage occurs from the gaskets or gland packing. In the event of packing leakage, tighten the nut further in ¼ turn increments until leakage ceases. Continue tightening an addition ¼ turn. In the event of gasket leakage, tighten the body/bonnet bolts to the recommended torque.

MAINTENANCE

A good program of inspection and maintenance cannot be over stressed. Periodic inspection of critical leak-path areas such as; body/bonnet joint, end connections, seating surfaces, and around the stem packing should be a requirement. Lubrication of the stem threads and injecting grease into the grease nipple (when supplied) at the time of inspection is recommended. When any problems or defects are found, take the following measures:

Leakage from the packing area

The most common area for leakage is around the stem packing. This is usually due to wear and can normally be stopped by adjusting the packing. Tighten the eye-bolt nuts alternately in ¼ turn increments, keeping the gland plate level, until leakage stops. Continue tightening an additional ¼ turn. If the leakage cannot be stopped, add an additional packing ring under the packing gland and re-tighten. If leakage is still present, replace the packing with a new set as described in this manual. (See **PACKING REPLACEMENT**)

Leakage from the gasket area

Tighten the bonnet bolts and nuts to the torque values shown in Beric Valves **Bolt Torque Chart**. If leakage is still present, disassemble the valve, using the procedure shown in this manual, to inspect for damage and/or defects on the gasket seating surface. If damage is present on the gasket sealing surface, the valve will need to be replaced or the sealing surface re-machined. Re-machining of the sealing surface must be performed by a qualified valve repair shop and is beyond the scope of this manual. If no damage is present on the sealing surfaces, install a new gasket and reassemble the valve using the procedures shown in this manual and retest the valve.

Difficulty opening-closing the valve.

Inspect the drive train of the valve for foreign materials and remove any particulate found. Repack the grease fitting and stem threads with grease and operate the valve. If the valve is still difficult to operate, disassemble the valve, using the procedure shown in this manual, and inspect/clean the interior.

Leakage past the valve seat.

Disassemble the valve, using the procedure described in this manual, and repair the valve seat surface, by lapping, etc. Lapping of the sealing surfaces, must be performed by a qualified valve repair shop and is beyond the scope of this manual.

REPLACEMENT PARTS

We recommend using genuine BERIC VALVE replacement parts. These parts are generally available from stock and are manufactured to the same specifications as those parts that were originally supplied. When ordering spare parts or repair or replacement parts, please inform us of the valve type, size, class, parts name, and Beric's serial or shop order number. Most of the information can be found on the valve nameplate (model #, material, and trim specification) or on the valve body (size and class).

For automatically operated valves, please refer to Actuator Manufacturer's Instruction Manual for the maintenance of actuator. Before disassembling the valve, please ensure that the actuator operates correctly.

PACKING REPLACEMENT

All BERIC VALVES are equipped with backseats as standard and are tested before shipment. However, once the valve is put into service, corrosion and foreign material can affect the sealing of the backseat. Therefore, **REPACKING UNDER PRESSURE CAN BE HAZARDOUS**. BERIC VALVES recommends that the system and valve be depressurized before attempting any repair work. After removing all pressure from the valve and draining the system, the following procedure should be used to repack the valve.

1. Remove the eyebolt nuts.
2. Lift the gland and gland flange. The eyebolt can then be pulled out from the gland flange.
3. Remove the old packing entirely using care not to damage the stem or stuffing box. It is recommended to use special tools, such as a packing hook or the tip of piano wire, to dig up or scoop out the old packing in the interior of stuffing box.
4. Clean the stem and the inside of stuffing box.
5. New packing shall be prepared in accordance with the dimension, style number and quantity specified on our drawing or current list of packing. Die formed ring packing with top and bottom braided graphite wiper rings is recommended.
   If coil packing is being used, wind it around a round bar having the same diameter as the stem, and cut it with the sharp knife or razor blade (use extreme caution).
6. Apply packing paste on each packing.
   (Select the paste of the kind adequate to the type and condition of the fluid. For some types of fluid and packing, the paste is unnecessary.)
7. Place the packing, one after another, by means of wooden bushing, so that the packing rings are installed evenly in the stuffing box.
8. Arrange the packing rings so that the cut section of each ring rests at 90 degrees to that of the adjacent ring. When you fit the packing to the stem, open the ring axially or vertically. Never open horizontally.
9. After fitting all packing rings, re-install the gland, gland flange, eyebolts, and eyebolt nuts in their positions, and tighten the gland by turning the eyebolt nuts to the recommended torque.
10. Return the valve to service, checking for leakage. If leakage is present, tighten the eyebolt nuts alternately in ¼ turn increments, keeping the gland plate level, until leakage stops. Continue tightening an additional ¼ turn.

VALVE DISASSEMBLY

For interior valve inspection or repairing, please disassemble each valve by referring to the drawing.
Before disassembling, the following items must be performed:

1. Prepare all necessary spare packing rings and gaskets for replacement. In the case of valves with a Locking Device, unlock it by turning the key.
2. Check if the valve can be opened and closed smoothly.
3. Place the valve in the half open position and remove all pressure and drain the system. Make sure that leakage of any residual material will be caught in an appropriate container and disposed of properly.
4. Open the valve slightly by turning the handwheel counterclockwise and loosen the gland.
5. Put matched-markings on all valve body, bonnet, yoke and actuator, to avoid misplacing upon reassembling.
6. In the event that the bolts and nuts are tight, put deep penetrating oil for screw loosening (P.0.S., Penetrating Oil Spray).
   (BERIC can furnish you with this oil upon request)
7. If a stopper and indicator are provided on the top of the valve, remove them.

The disassembly procedures for each type are as follows:
Section A - Bolted Bonnet Type Globe Valve
Section B - Seal-Welded Bonnet Type Globe Valve
Section C - Pressure Seal Bonnet Type Globe Valve of 6" diameter and larger
Section D - Pressure Seal Bonnet Type. Globe Valve of 4" diameter and smaller

SECTION - A

Bolted Bonnet Type Globe Valve

1. Loosen the bonnet bolts and nuts to disengage the bonnet assembly from the body.
2. Lift the bonnet assembly to disengage it from the body, use care so that the disc is not damaged.
3. Disengage the disc from the stem by removing the disc nut.
4. Turn the handwheel clockwise while holding the stem, and draw out the stem from bonnet.
5. Then, remove the gland flange, gland, gland packing, lantern ring, packing ring, and gasket as necessary.
6. Inspect the bearing and lube or replace as necessary.

SECTION - B

Seal-Welded Bonnet Type Globe Valve.

1. Chip/turn off the weld, and then, turn the bonnet assembly to disengage it from the body.
2. Disengage the disc from the stem by removing the disc nut.
3. Turn the handwheel clockwise while holding the stem, and draw out the stem from bonnet.
4. Then, remove the gland flange, gland, gland packing, lantern ring, and packing ring, as necessary.
5. Inspect the bearing and lube or replace as necessary.

SECTION - C

Pressure Seal Bonnet Type Globe Valve of 6" diameter and larger.

1. Disengage the yoke clamp by loosening bolts and nuts and turn the hand-wheel clockwise. The yoke assembly rises and can be disengaged from the stem.
2. Remove the gland flange, gland, eye-bolt and eye bolt clamp by loosening their bolts and nuts.
3. Remove the bonnet bolts and nuts and the bonnet clamp, and force the bonnet down by tapping it at its top with a hammer. Care should be taken not to damage the bonnet when tapping it with the hammer, applying some wooden pieces on the top of bonnet.
4. Strike out the retainer from the groove on body by inserting a steel bar into the holes and tapping its tip with a hammer, in the order as illustrated in the sketch on the right.
5. Assemble the bonnet bolt and set the bonnet clamp, and pull up the bonnet by tightening the nut.
6. After pulling up the bonnet as high as it goes, loosen the nut and adapt a wooden spacer beneath the bonnet clamp, and pull up the bonnet by tightening the nut again. Repeat this procedure until the adapted spacer and bonnet and gasket are taken off. Then, disassemble the bonnet from the body.

7. Fit the yoke assembly with the stem, and turn the handwheel counterclockwise. Then, the stem and the disc rise and the disc can be released from the body seat, and the yoke assembly with stem and disc can be disassembled from the body.
8. Disengage the disc from the stem by removing the disc nut.
9. Draw out the stem from yoke assembly, by turning the handwheel while holding the stem.
10. Disassemble the bonnet bolts and nuts, bonnet clamp, adapter ring, gasket, gland packing, lantern ring, and packing ring from the bonnet.
11. Inspect the bearing and lube or replace as necessary.

SECTION - D

Pressure Seal Bonnet Type Globe Valve of 4" diameter and smaller.

1. Loosen the nut on bonnet, and unscrew the yoke 2—3 times, and then, tighten the nut to pull up the bonnet. Repeat this several times until the gasket is released from the body. Then, you can disengage the yoke and bonnet assembly from the body.
2. Disengage the disc from the stem by removing the disc nut.
3. Turn the handwheel clockwise while holding the stem, and draw out the stem from bonnet.
4. Remove the gland flange and gland, and remove the nut and disassemble the bonnet from the yoke.
5. Remove the gland packing, lantern ring, packing ring and gasket from the bonnet.
6. Inspect the bearing and lube or replace as necessary.

INSPECTION, CLEANING AND REPAIRING

1. Clean all parts with soft cloth.
2. Check the following points for wear and damage:
   a. Gasket seating surfaces.
   b. Backseat.
   c. Stem surface where it contacts the packing.
   d. Loosening of disc and body seat rings.
   e. Slide contact surface of the disc.
   f. The corrosion and erosion of the disc, body and bonnet.
   g. The flaw and wearing of disc seat surface.
   h. The flaw and wearing of body seat surface.
3. Repairing for the above six points:
   a. Replace all the gasket and packing. If there are any serious flaws or wearing on their seating surfaces, lap them or deposit metal on them according as their condition.
   b. Replace the backseat bushing and/or the stem as necessary.
   c. Replace the stem as necessary.
   d. For loosened seat rings of 2 — (2) above, take out the loosened seat ring, clean up their contact surfaces to be free of any dust, and tighten them securely.
   e. For any serious wearing of the disc slide contact surface, lap the worn surface or deposit metal on it according as its condition.
   f. Deposit metal in the appropriate area and re-machine as necessary. If the corrosion and erosion is serious, replace the component and/or valve.
   g. For light damage and wearing, make repairs by lapping. For serious flaw or wearing on the disc surface or seat rings, replace the disc or seat rings with new ones.
   h. For light damage and wearing, make repairs by lapping the seat surface. For serious damage and wearing, replace the body seat rings with the new ones.

Note: The procedures required to perform many of the above repairs should be performed by a qualified valve repair shop and are beyond the scope of this manual.

Note: Valves that are to be used for services of liquid oxygen, beverage, vegetable oil, and materials for food (which should be entirely free of oil and grease inside the valve), clean all components in the following way:

1. Clean and grease free tools, gloves must be worn.
2. Dip them in the bath of trichloroethylene solution for 5 minutes or longer.
3. Wipe with nylon brush.
4. Remove the trichloroethylene solution from their surfaces by steam jet.
5. Leave them in a clean place to dry.
6. Inspect for oils by holding under a black light. If grease/oil residue is indicated, repeat this procedure.

REASSEMBLY

Before re-assembly, carry out the following procedures:

a. Assure that no foreign materials are left on the seat surfaces.
b. Apply coatings on each gasket and gland packing as necessary or instructed.
c. Apply graphite or MOLYKOTE (molybdenum disulfide) on all threaded and sliding parts of bolts, nuts and bonnet to prevent their galling or seizing.
d. Apply grease to the stem.

Note: Valves that are to be used for services of liquid oxygen, beverage, vegetable oil, and materials for food (which should be entirely free of oil and grease inside the valve), a lubricant that is compatible with the intended service must be used.

The reassembly procedures for each type of valve are as follows:

Section E - Bolted Bonnet Type Globe Valve
Section F - Seal-Welded Bonnet Type Globe Valve
Section G - Pressure Seal Bonnet Type Globe Valve of 6" diameter and larger
Section H - Pressure Seal Bonnet Type Globe Valve of 4' diameter and smaller

SECTION – E

Bolted Bonnet Type Globe Valve

1. Fit the packing rings, gland, and gland flange in their positions, in this order.
2. Insert the stem into the bonnet, and engage it with the sleeve or stem nut.
3. Place the gasket on the body
4. Assemble the disc to the stem with the disc nut. Stake or tack weld disc nut to disc to prevent loosening.
5. Place the bonnet assembly onto the valve body, after confirming the matched-markings are correctly aligned.
6. Secure the bonnet and body by snugging the bolt and nut. (Do not tighten at this time.). Close the valve fully by turning the handwheel to "Closed" ("Shut") position. Tighten each bolt and nut lightly, and turn the handwheel counterclockwise about two times. 7. Tighten each bolt and nut fully to the recommended torque.
8. Tighten the gland to the recommended torque.
9. Place the stopper and indicator in their positions.
10. Ensure that all bolts, nuts and threaded parts tightened to the recommended torque.
11. Turn the handwheel to the full "Open" position and "Closed" ("Shut") positions to ensure that the valve operates smoothly.
12. Lubricate the stem threaded area and grease nipple, before starting operation.
13. Check to ensure that there is no leakage at the area of gasket and gland.

SECTION - F

Seal-Welded Bonnet Type Globe Valve.

1. Fit the packing rings, gland, and gland flange in their positions, in this order.
2. Insert the stem into the bonnet, and engage it with the sleeve or stem nut.
3. Assemble the disc to the stem with the disc nut. Stake or tack weld disc nut to disc to prevent loosening.
4. Screw the bonnet assembly into the valve body tightly.

5. Tighten each bolt and nut fully to the recommended torque
6. Place the stopper and indicator in their positions.
7. Turn the handwheel to the full “Open” position and “Closed” (“Shut”) positions to ensure that the valve operates smoothly.
8. Clean the surface area to be seal-welded, ensuring that it is free of oil and water.
9. Seal-weld along the periphery of the contact surface of bonnet and valve body.
10. Lubricate the stem threaded area and grease nipple, before starting operation.
11. Tighten the packing gland to the recommended torque
12. Check to ensure that there is no leakage at the area of gasket and gland.

SECTION - G

Pressure Seal Bonnet Type Globe Valve of 6” diameter and larger

1. Assemble the disc to the stem with the disc nut. Stake or tack weld disc nut to disc to prevent loosening.
2. Insert the bonnet into the body, taking care that the bonnet does not scratch the gasket contact surface of valve body.
3. Place the gasket in its position, and then, the adapter ring between the body and the bonnet. Ensure that there is no damage to the gasket.
4. Insert the retainer into the body.
5. Insert the bonnet bolts in the bonnet.
6. Attach the bonnet clamp to the body and tighten the bonnet bolts and nuts to the recommended torque.
7. Attach the eye-bolts and eye-bolt clamps to the bonnet by means of bolts and nuts.
8. Fit the packing rings, gland, and gland flange in their positions, in this order.
9. Tighten the packing gland to the recommended torque.
10. Attach the yoke assembly to the stem, by turning the handwheel while holding the yoke.
11. After confirming the matched-marking, assemble the yoke and body with the yoke clamp by means of bolts and nuts.
12. Lubricate the stem thread area.
13. Place the stopper and indicator in their positions.
14. Ensure that all bolts, nuts and threaded parts tightened to the recommended torque.
15. Turn the handwheel to the full “Open” position and “Closed” (“Shut”) positions to ensure that the valve operates smoothly.
16. Lubricate the stem threaded area and grease nipple, before starting operation.
17. Check to ensure that there is no leakage at the area of gasket and gland.
18. After putting the valve into service again, check to ensure that the bonnet nuts are still tight. In the event that it was loosened by the fluid working pressure, retighten it securely to the recommended torque.

SECTION - H

Pressure Seal Bonnet Type Globe Valve of 4” diameter and smaller.

1. Assemble the disc to the stem with the disc nut. Stake or tack weld disc nut to disc to prevent loosening.
2. Insert the bonnet into the body, taking care that the bonnet does not scratch the gasket contact surface of valve body.
3. Ensure that the gasket is not damaged, and place the gasket into position.
4. Fit the packing rings, gland, and gland flange in their positions, in this order.
5. Attach the yoke assembly, washer, nut and gland flange to the stem. Turn the yoke until it touches the valve body.
6. Turn the handwheel counterclockwise and fully open the valve.
7. Screw the yoke down. When it stops, fully open the valve by turning the handwheel and screw the yoke down again. Repeat this 2-3 times until the markings on the yoke and body get united as before disassembly. Fit the bonnet nut and washer to the bonnet and tighten it to pull up the bonnet.
8. Fit the gland flange to the eyebolt, and tighten the gland.
9. Place the stopper and indicator in their positions.
10. Turn the handwheel to the full “Open” position and “Closed” (“Shut”) positions to ensure that the valve operates smoothly.
11. Lubricate the stem threaded area and grease nipple, before starting operation.
12. Check to ensure that there is no leakage at the area of gasket and gland.
13. After putting the valve into service again, check to ensure that the bonnet nuts are still tight. In the event that they were loosened by the fluid working pressure, retighten securely to the recommended torque.

TYPICAL GLOBE VALVE NOMENCLATURE