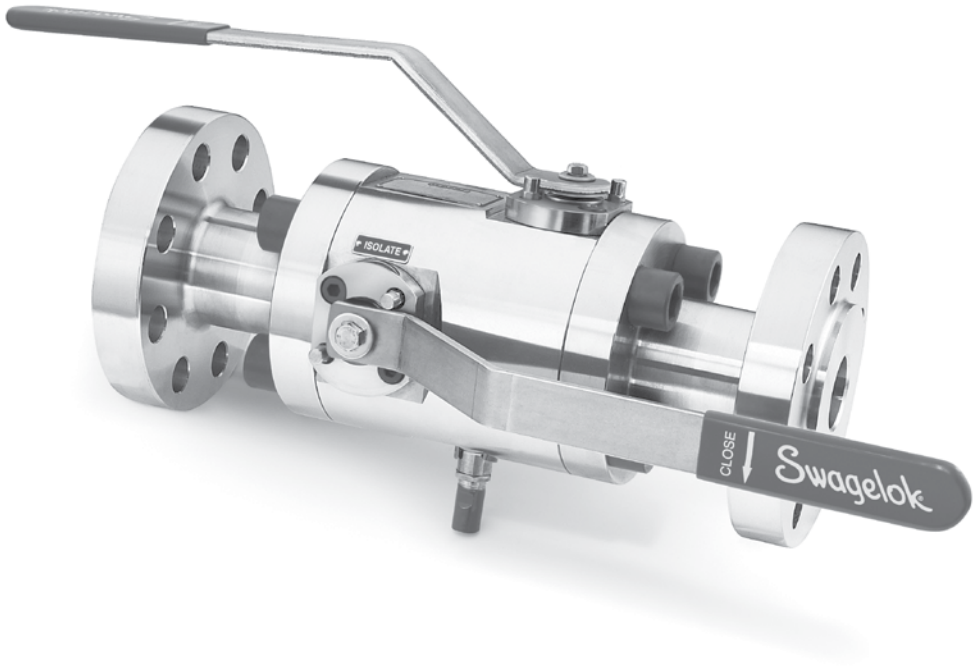
VB03 Series Process Interface Valve
Maintenance Instructions



Carefully read entire instruction before servicing valve.

Kit Contents (contents may vary by kit)


Stem seal


Seal retainer


Fire seal


Gland bushing


Wave spring
(25 mm and 38 mm)


Disc spring (2)

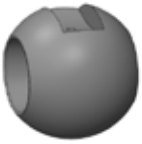

Gland bolt (2)


Slip ring

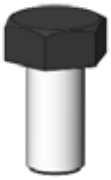

Stem


Seat (2)


Body seal


Ball


Washer


Hex head screw


Spring (50 mm) (2)

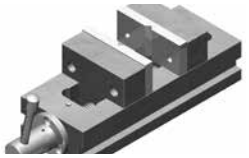

Handle sleeve


Handle
(type may vary)

Symbols


Discard

Tools Required

<table>
<tr><th>Tool</th><th>Size</th><th>Component</th></tr>
<tr><td>Vise
  </td><td>—</td><td>Valve body</td></tr>
<tr><td>Open-ended wrench/socket
  </td><td>
<table>
<tr><th>Bore Size</th><th>Hex head screw</th><th>Gland Bolts</th><th>Flange Bolts</th></tr>
<tr><td>25 mm</td><td>13 mm</td><td>6 mm hex</td><td>14 mm hex</td></tr>
<tr><td>38 mm</td><td>13 mm</td><td>6 mm hex</td><td>14 mm hex</td></tr>
<tr><td>50 mm</td><td>17 mm</td><td>8 mm hex</td><td>17 mm hex</td></tr>
</table>
</td><td>Hex head screw, gland bolts, and flange bolts</td></tr>
<tr><td>Torque wrench
  </td><td>Capable of 1200 in·lb (135 N·m)</td><td>Hex head screw, gland bolts, and flange bolts</td></tr>
<tr><td>Plastic pick
  </td><td>—</td><td>Body seal, seat, ball, fire seal, seal retainer, and stem seal</td></tr>
<tr><td>Lubricants/fluids
  </td><td>
<table>
<tr><td>P-80® (or equivalent)</td><td>Seat and handle sleeve</td></tr>
<tr><td>Molykote® 1000</td><td>Flange bolt</td></tr>
<tr><td>Permanent thread-locking fluid</td><td>Gland bolt and hex head screw</td></tr>
<tr><td>Molykote 111</td><td>Stem, body, ID surface, and OD surface</td></tr>
<tr><td>Molykote G-Rapid Plus</td><td>Stem, seal retainer, and ID surface</td></tr>
</table>
</td><td></td></tr>
<tr><td>Stem seal assembly tools
  </td><td>
<table>
<tr><th>Bore</th><th>Kit Number</th></tr>
<tr><td rowspan="4">25 mm</td><td>K-VB25/38-STMSL-TOOL-KIT</td></tr>
<tr><td>K-VB25/38-ID-GUIDE-TOOL</td></tr>
<tr><td>K-VB25/38-OD-GUIDE-TOOL</td></tr>
<tr><td>K-VB25/38-PUSHER-TOOL</td></tr>
<tr><td rowspan="4">38 mm</td><td>K-VB25/38-STMSL-TOOL-KIT</td></tr>
<tr><td>K-VB25/38-ID-GUIDE-TOOL</td></tr>
<tr><td>K-VB25/38-OD-GUIDE-TOOL</td></tr>
<tr><td>K-VB25/38-PUSHER-TOOL</td></tr>
<tr><td rowspan="4">50 mm</td><td>K-VB50-STMSL-TOOL-KIT</td></tr>
<tr><td>K-VB50-ID-GUIDE-TOOL</td></tr>
<tr><td>K-VB50-OD-GUIDE-TOOL</td></tr>
<tr><td>K-VB50-PUSHER-TOOL</td></tr>
</table>
</td><td>Stem seal and stem</td></tr>
<tr><td>Rubber mallet,
Permanent marker</td><td>—</td><td>If applicable</td></tr>
</table>

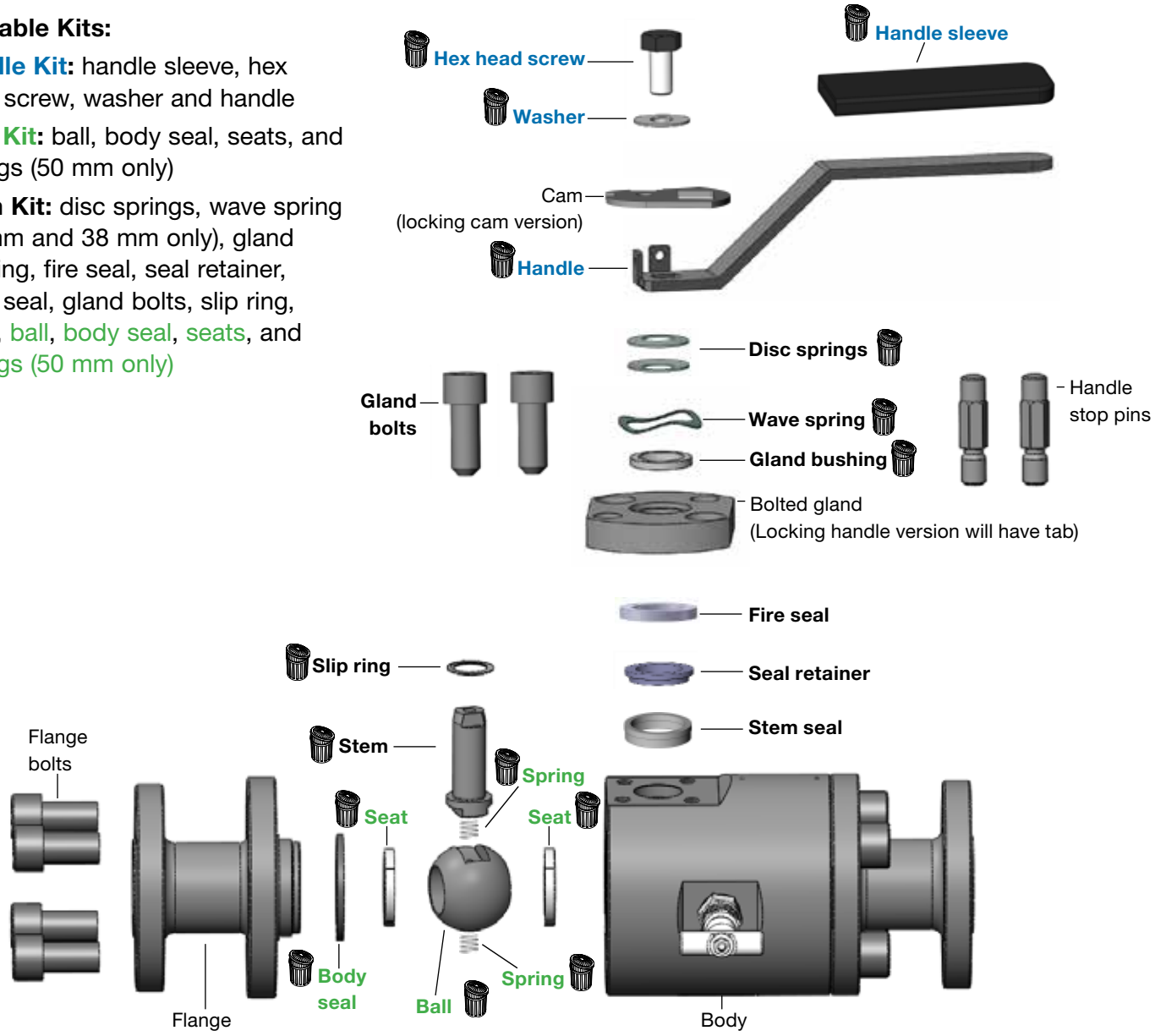
Exploded View

Available Kits:

Handle Kit: handle sleeve, hex head screw, washer and handle

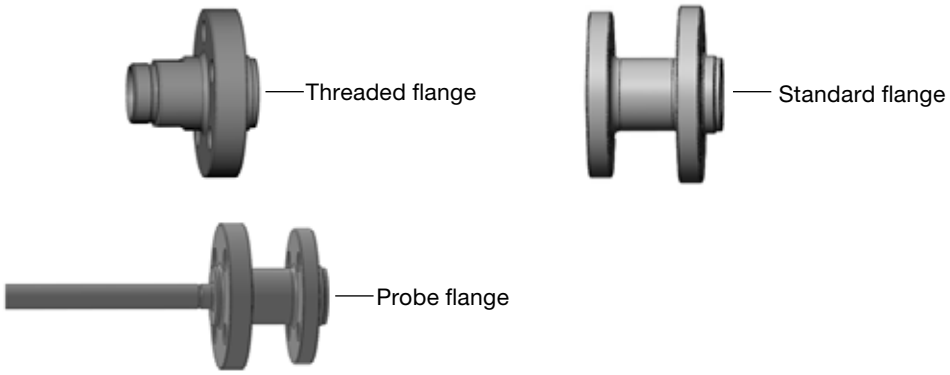
Seat Kit: ball, body seal, seats, and springs (50 mm only)

Stem Kit: disc springs, wave spring (25 mm and 38 mm only), gland bushing, fire seal, seal retainer, stem seal, gland bolts, slip ring, stem, ball, body seal, seats, and springs (50 mm only)



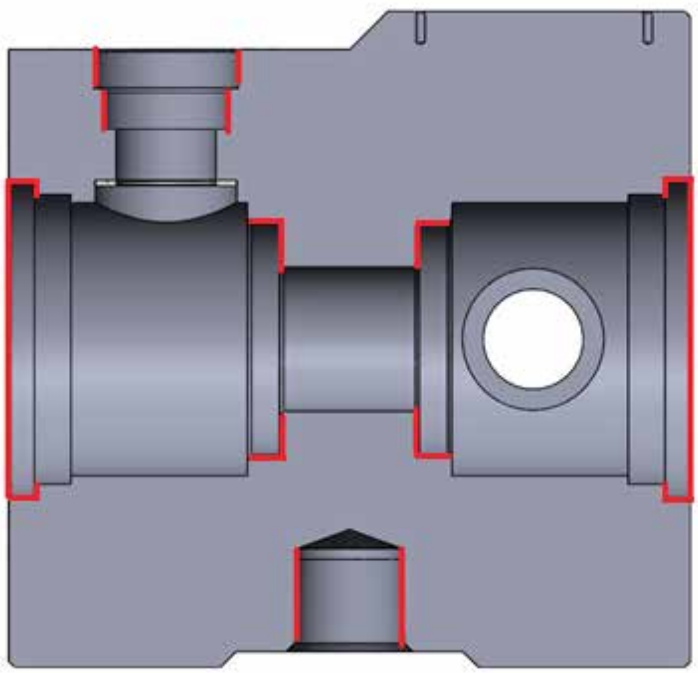
***Bold indicates kit component.**

Available Flanges:

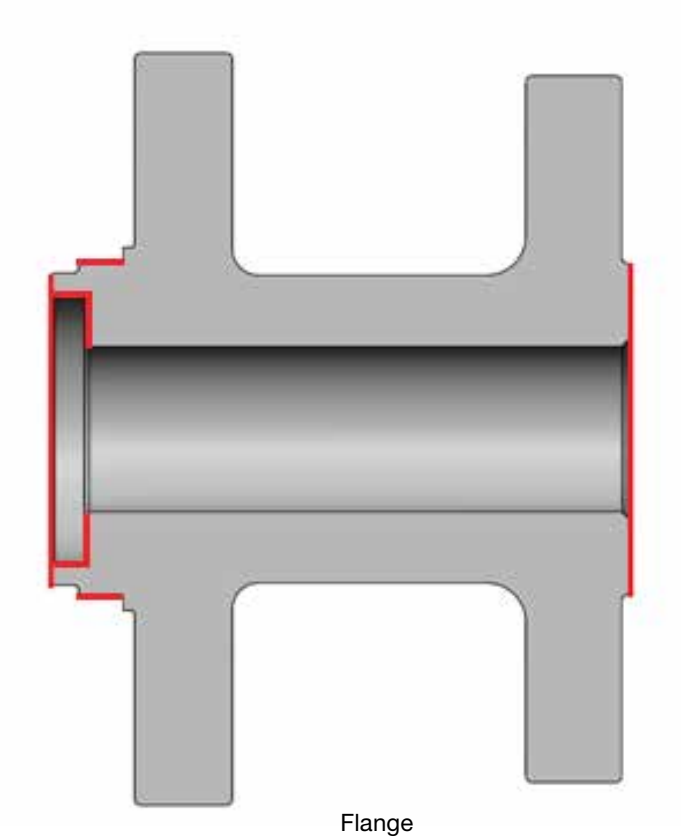


Critical Sealing Surfaces

The surfaces highlighted in red are the critical sealing surfaces. These surfaces must be free of scratches, dents, disfigurement, and debris to ensure successful maintenance and leak-free performance.

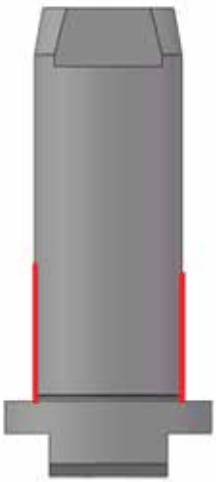


Body



Flange

Stem seal



Stem

⚠ WARNING

Before removing valve from system, to avoid personal injury, you must

- **Depressurize the valve**
- **Cycle the valve**
- **Purge the valve to remove any residual system media left in the valve**

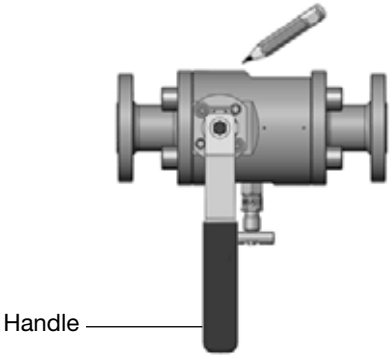
Disassembly

1. Clamp the valve body vertically in a vise.

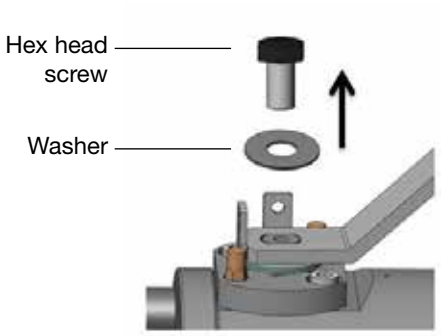
NOTICE

Be careful not to scratch the critical sealing surfaces. Leakage could result.

2. Close the valve against the handle stop.
3. Document on the body the **handle** orientation relative to the body, using a marker, for proper reassembly.



4. Remove the **hex head screw** and the **washer.**



5. Remove the handle and cam (locking cam version only).

   Refer to Step 44 of **Reassembly** when replacing handle only.

NOTICE

Note the location and orientation of each cam for proper reassembly. They will lock into each other when reassembled. The handle will not function properly if assembled incorrectly.

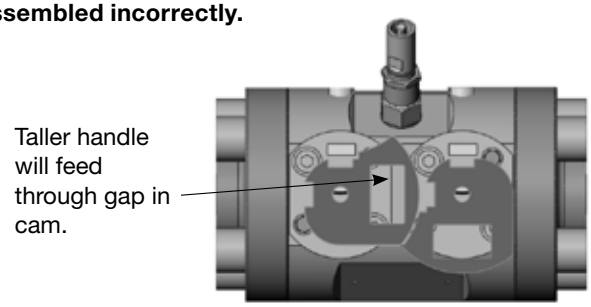
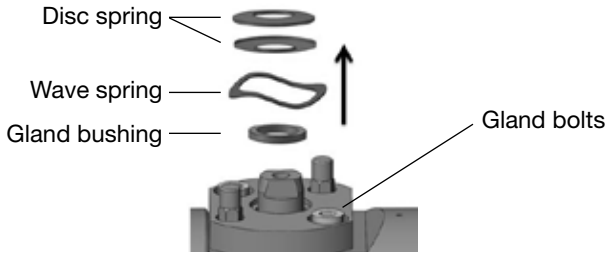
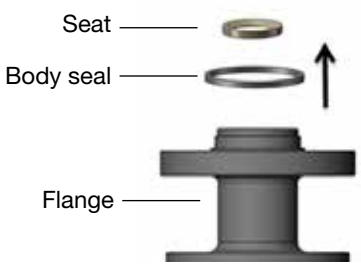


Image shown without handles for clarity.

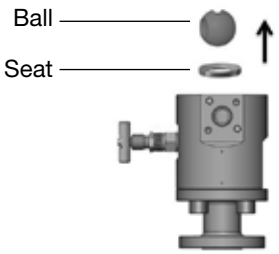
6. Remove both **disc springs,** the **wave spring** (25 mm and 38 mm bore only), the **gland bushing,** and both **gland bolts**.



7. Remove the bolted gland.
8. Remove the flange bolts.
9. Remove the **flange** with the **seat**. Tap with a rubber mallet if it is difficult to remove. Remove the **body seal** and **seat** with a plastic pic.



10. Remove the **ball** and second **seat** with a plastic pic.

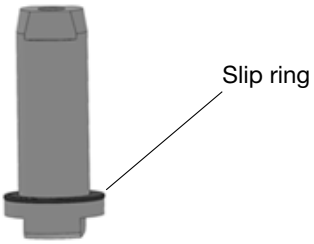


11. Remove both of the springs (50 mm bore only).
12. Push the stem down through the stem seal.
13. Remove the fire seal and seal retainer with a plastic pic.

NOTICE

Be careful not to scratch the critical sealing surfaces. Leakage could result.

14. Remove the stem through the body bore.
15. Remove the **slip ring** from the stem.



16. Remove the stem seal from the body with a plastic pic.

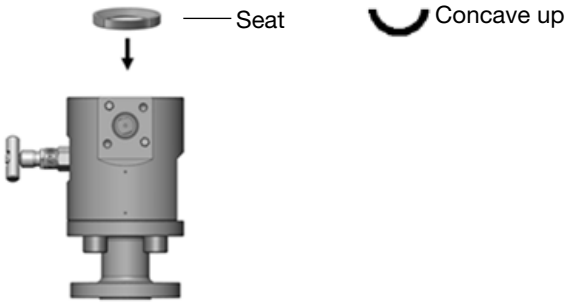
Reassembly

1. Clean the valve, components, and all critical sealing surfaces.

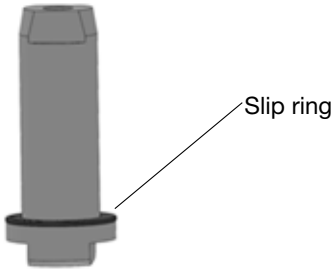
NOTICE

Do not use abrasive cleaners on critical sealing surfaces. Leakage could result.

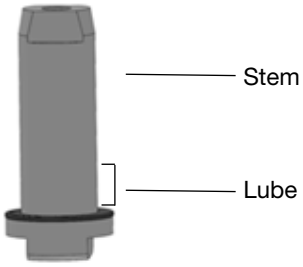
2. Secure the valve body vertically in a vise.
3. Apply a light coat of P-80 to the back of the seat. Assemble the **seat** into body, concave face up.



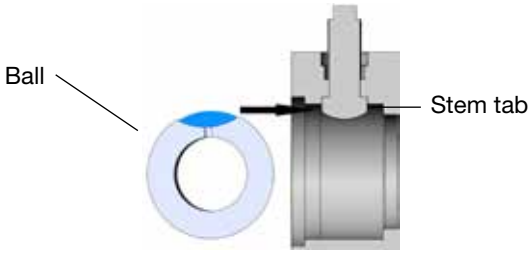
4. Assemble the **slip ring** onto the stem with the spiral groove facing up.



5. Apply a heavy coat of Molykote G-Rapid Plus on the lower **stem** neck above the slip ring.



6. Assemble the stem through the body into the stem bore.
7. Assemble the spring into the bottom of the stem (50 mm bore only).
8. Assemble the spring into bottom of the ball (50 mm bore only).
9. Orient the **ball** slot with the **stem tab**.

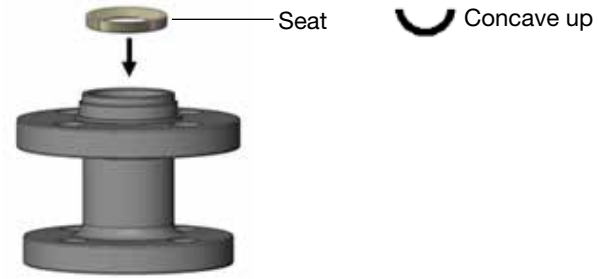


10. Push the lower spring into the ball while pivoting the ball to engage the stem spring (50 mm bore only).
11. Assemble the ball into body and engage with the stem.

NOTICE

Ensure the ball does not fall into the body or the ball could be scratched. Leakage could result.

12. Ensure both springs are seated in the spring pockets (50 mm bore only).
13. Apply a light coat of P-80 on back of the seat.
14. Assemble the **seat** into the flange, concave face up.

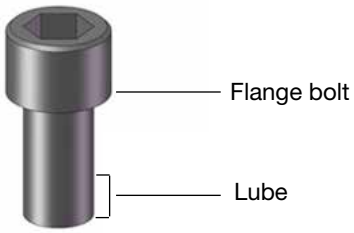


15. Assemble the body seal into the body.
16. Clamp the valve body in a vise.
17. Assemble the flange into the body.

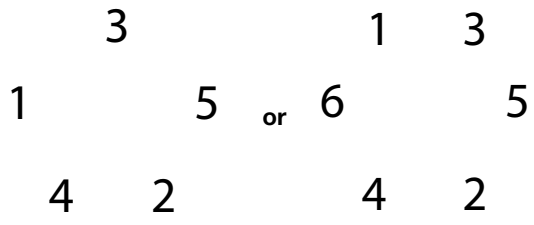
NOTICE

Take care not to pinch the body seal. Leakage could result from the graphite seal. Ensure the seat remains seated in the flange before torquing to prevent damage to the seat.

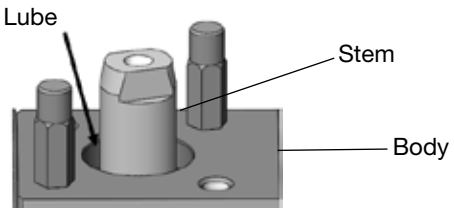
18. Apply a heavy coat of Molykote 1000 to the first half of the **flange bolt** threads.



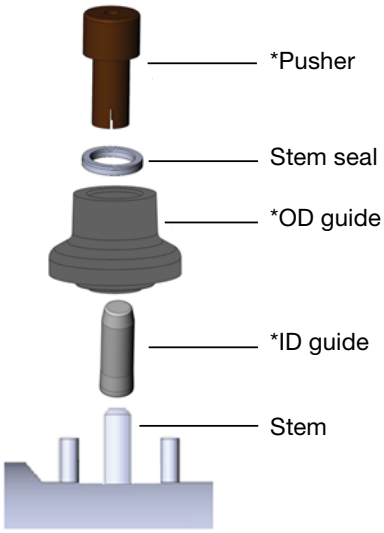
19. Assemble the flange bolts and finger-tighten.
20. Set the ball to a fully open position using the unassembled handle.
21. Remove the unassembled handle.
22. Torque the flange bolts to 1200 in·lb (135 N·m) in an alternating pattern of 200 in·lb (22.6 N·m) increments.



23. Apply a heavy coat of Molykote 111 in the gap between the **stem** and **body**.

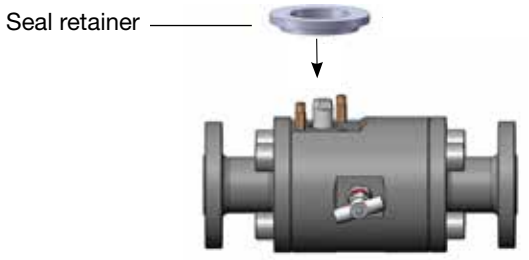


24. Assemble the **stem seals** using the stem seal assembly tools.
    a. Thread the **ID guide** onto the stem and finger-tighten.
    b. Insert the **OD guide** over the ID guide into the stem pocket.
    c. Apply a light coat of Molykote 111 to the OD and ID of the **stem seal**.
    d. Assemble the **stem seal** onto the ID guide spring side (metal side) down.
    e. While pressing the OD guide down, press the stem seal completely into place with the **pusher**.
    f. Remove the stem insertion tools.

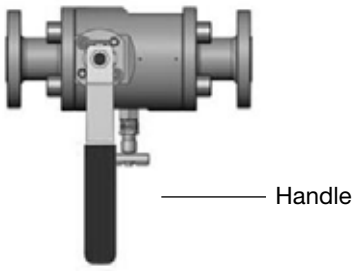


*Stem seal insertion tools

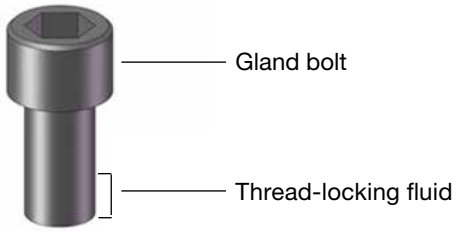
31. Apply a light coat of Molykote G-Rapid Plus to the ID of the seal retainer.
32. Assemble the **seal retainer** over the stem with the shoulder facing down.



33. Assemble the fire seal onto the stem.
34. Orient the stem to the closed position using the unassembled **handle**.



35. Remove the unassembled handle.
36. Assemble the bolted gland.
37. Apply a heavy coat of permanent thread-locking fluid to first half of the threads on the **gland bolts**.



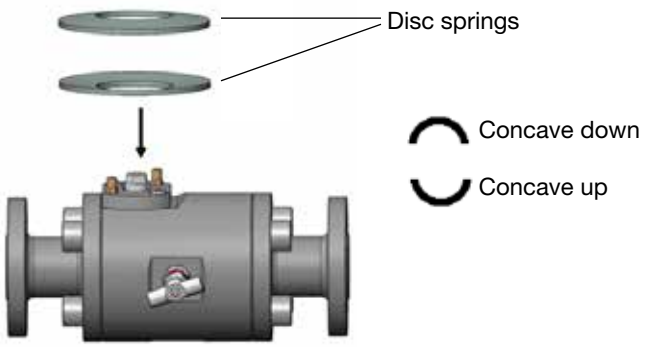
38. Assemble the gland bolts into the bolted gland.
39. Torque the gland bolts 60 to 120 in·lb (6.8 to 13.6 N·m) in alternating 1/4 turns. Ensure the bolted gland sits level on the valve.

NOTICE

Gap between bolted gland and valve must be even. Distance of the bolted gland corners must not vary more than 0.04 inch from each other. Failure to maintain the correct distance could result in increased torque.

40. Apply a light coat of Molykote G-Rapid Plus to the ID of the bolted gland.
41. Assemble the gland bushing over the stem.
42. Assemble the wave spring over the stem (25 mm and 38 mm bore only).

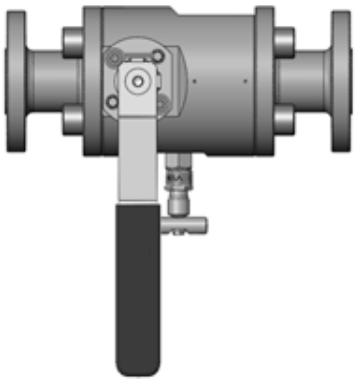
43. Assemble the **disc springs** one concave up and then one concave down.



44. Assemble the handle sleeve on the handle. Apply P-80 if difficult to assemble.
45. Assemble the proper cam (from **Disassembly** step #5) and handle onto the stem oriented with the mark (from **Disassembly** step #3).

NOTICE

Ensure the valve is in the closed position. Leakage could result.



46. Ensure the cam is in the correct location and orientation (from **Disassembly** Step #5) - locking cam version only.

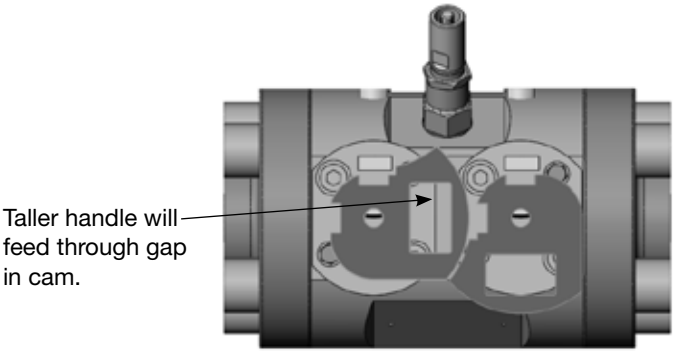
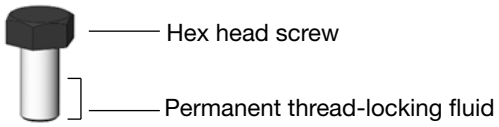


Image shown without handles for clarity.

47. Assemble the **washer.**
48. Apply a heavy coat of permanent thread-locking fluid to the first half of the **hex head screw.**



49. Assemble the hex head screw.
50. Torque the hex head screw to 120 to 180 in·lb (13.6 to 20.3 N·m).
51. Open and close the valve several times to inspect for smooth actuation.
52. Test each valve for proper operation and leak-tight integrity.

NOTICE

Allow thread-locking fluid 24 hours to cure before installing the valve. Failure to do so could result in leakage.

*For additional information, see **www.swagelok.com**.*

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