Upper Top Drive Valves

Maintenance, Disassembly, and Assembly Procedures

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SAFETY CONSIDERATIONS

- Safety glasses should be worn along with other protective clothing as required.
- Proper tools and restraining devices (vises, clamps, etc.) should be used to secure the valve in a safe manner.
- Valve maintenance should be performed in a safe and suitable work area as designated by your supervisor.
- Personnel performing these operations should be familiar with Global Upper Top Drive Valves and their uses.
- If unsure of any part of the operation, contact Global Manufacturing, Inc. before proceeding.

These instructions are intended for maintenance, disassembly, and assembly of Global Manufacturing, Inc. valves only.

VALVE MAINTENANCE

LUBRICATE THE VALVE ONCE A WEEK:

1. Fully open the valve.

2. Pump a small volume of fresh water through the valve to remove drilling mud residue from the I.D. bore of the valve. Safely reduce the pressure in the valve until there is no pressure remaining in the valve.

3. Remove the 1/4" NPT plug from the body.

4. Install a grease fitting into the 1/4" NPT grease port, and torque the grease fitting to approximately 15 to 20 ft-lbs.

5. With the ball in the open position, apply grease to the valve through the grease fitting with about 10 strokes from a manual grease gun. *Note: The grease pressure should not exceed 150 psi.*

6. Remove the grease fitting.

7. Reinstall the 1/4" NPT plug into the grease port, and torque to approximately 15 to 20 ft-lbs.

REPLACE THE SEALS EVERY 6 MONTHS:

1. Seals in valves operating under normal conditions are to be replaced every six months. While the valve is disassembled, inspect all parts and replace if damaged (see Valve Disassembly below.) Valves operating under more severe conditions (corrosive wellbore fluids such as salt water, H2S, CO2, and corrosive drilling fluids) are to be disassembled and inspected more frequently.

VALVE DISASSEMBLY

FIGURE 1

1. Remove the valve from the drillstring. Clean the outside and inside in preparation for disassembly. *Prior to disassembly, make sure that the ball can be moved freely from the closed to the opened position. Note: If the ball cannot be moved from the closed position to the open position, then there may be trapped pressure in the ball cavity. If the ball cannot be opened,* ***do not attempt to disassemble the valve****. The valve is to be sent to Global Manufacturing for disassembly and repair.*

2. Ensure that the valve is in the closed position before beginning disassembly.

FIGURE 2

3. Remove the spiral retainer ring and the solid retainer ring through the maintenance end of the valve.

4. Slide the four segments of the split ring toward the valve bore and remove.

5. Remove the spacer and upper seat.

6. Remove the ball from the body.

7. Rotate the valve stems 45° toward the open position and remove from body.

8. Remove the stop ring, lower seat, spring insert, and nested spring from the body.

9. Remove grease port plug.

10. Remove all seals and o-rings. Remove the Teflon anti-friction ring (if equipped; used only on Low Torque Valves).

11. Inspect the o-ring and seal ring grooves on the seats for burrs or scratches.

12. Inspect the ball and stems to ensure that there are no scratches or excessive wear.

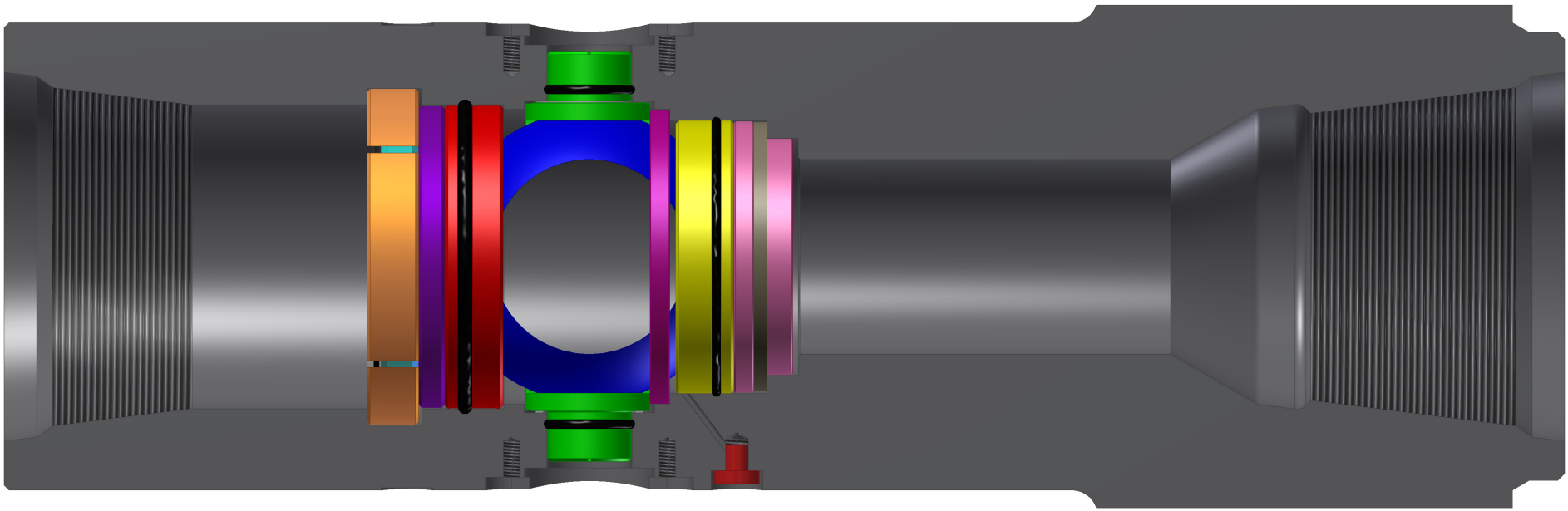

Figure 1

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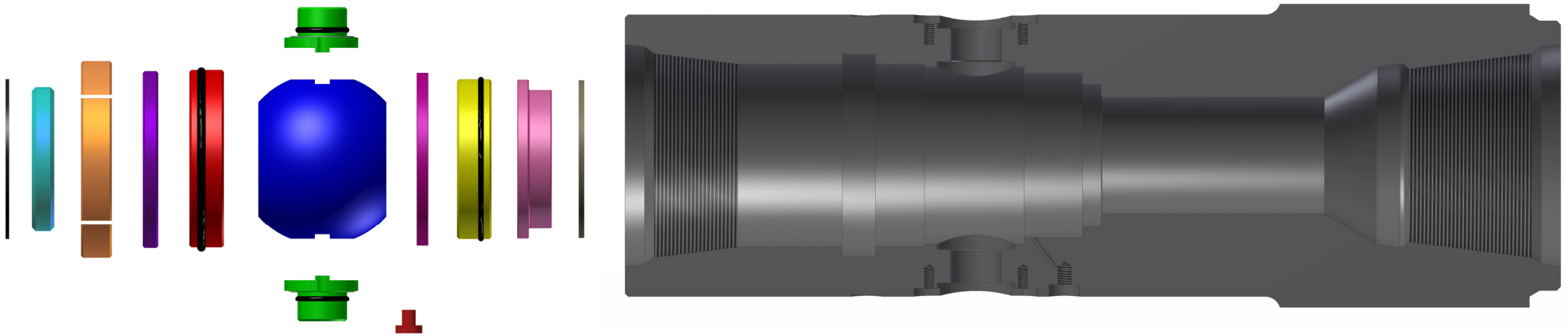

Figure 2

FIGURE 3

13. Thoroughly clean the inside of the valve including the stem counterbores, split ring groove and grease port.

14. Inspect the valve bore, seat bore, and stem bores to ensure that there are no internal scratches or excessive wear.

15. Inspect all seal areas on the ball, seats, stem, and valve body to ensure that there is no pitting (or other forms of corrosion damage), washing, rounded corners or mechanical damage. Any parts found with damage shall be replaced or sent to Global Manufacturing for repair.

16. Inspect the box threaded connections for excessive wear, galling damage, and shoulder damage. Any valves with connection damage shall be sent to Global Manufacturing for repair.

VALVE ASSEMBLY

1. Replace all seals, o-rings, and any worn or damaged parts (ball, seats, valve body, etc.).

2. As necessary, use emery cloth to remove any sharp edges from the operating stem holes.

FIGURE 4

3. Apply high-grade lithium based grease to the inside bore of the valve. Install nested spring on the shoulder inside the body. The spring should slide freely into bore.

4. Install spring insert into the body against the nested spring.

5. Apply grease to the lower seat, o-ring, and seal ring. Install the o-ring and Teflon seal ring on the seat.

6. Gently place the lower seat in the body (Teflon seal side out) and tap into place with a rubber mallet using caution not to damage the Teflon o-ring.

7. Install the stop ring on the shoulder inside the body. The stop ring should slide freely into the bore.

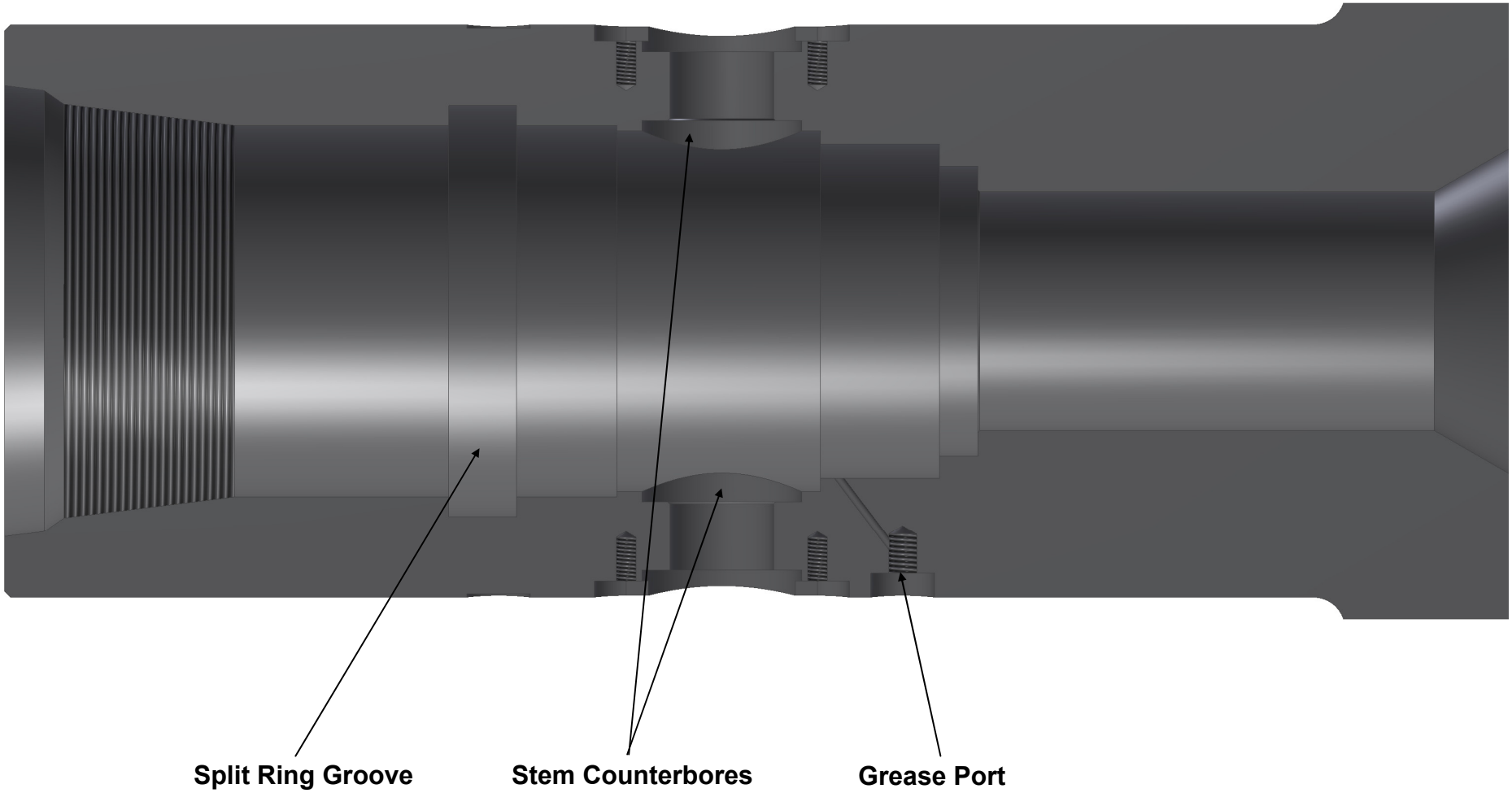

Figure 3

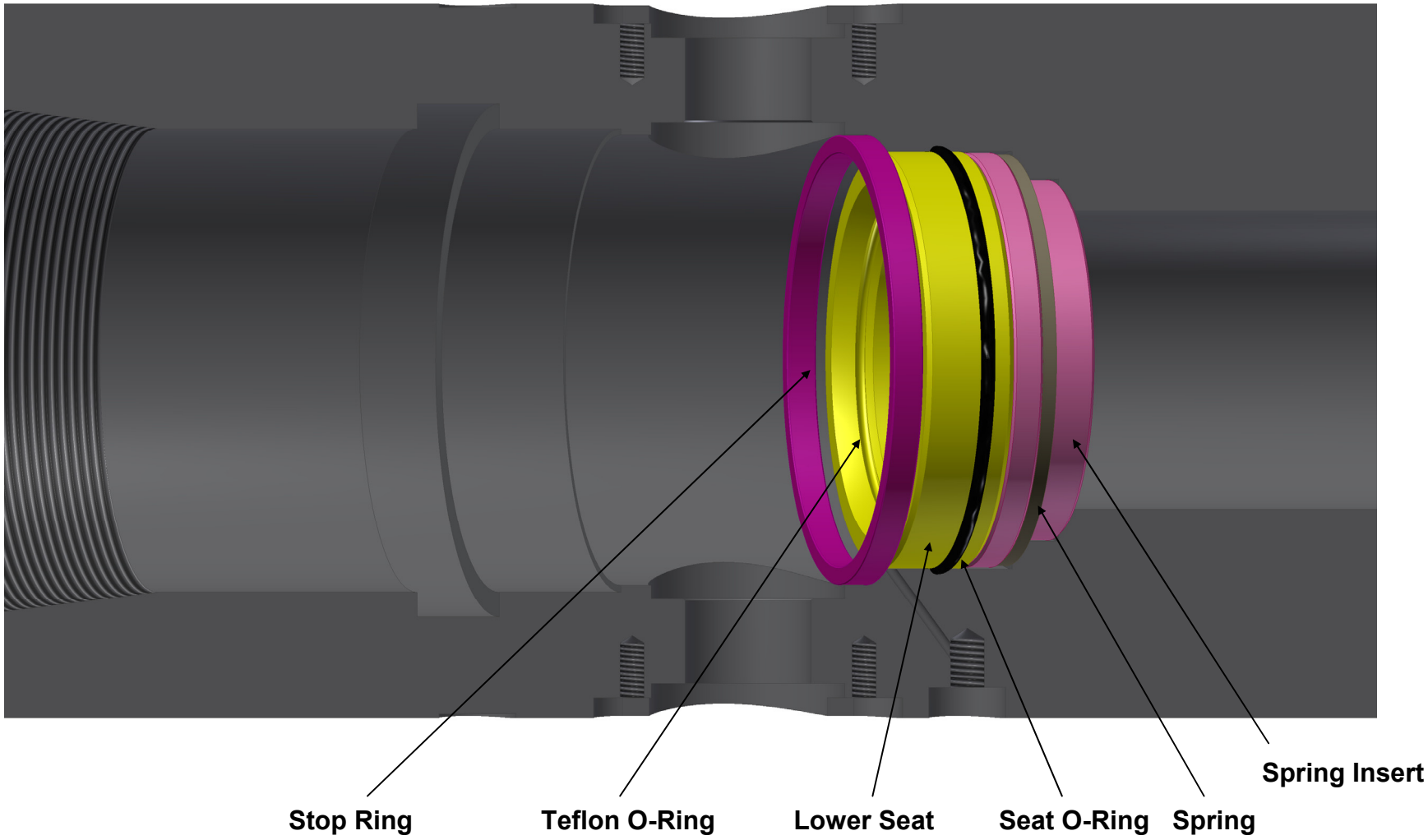

Figure 4

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FIGURE 5

8. Apply grease to the operating stems, o-rings and Teflon anti-friction rings. Install the o-rings and the Teflon anti-friction rings on the stems.

9. Install the stems using caution to properly orient cam flats to allow the valve to fully open and close.

FIGURE 6

10. Note the proper orientation for the valve stems in the closed position.

FIGURE 7

11. Apply grease to the ball. Insert until resting on the seat with the operating stem keys in the ball grooves.

12. Apply grease to the upper seat, o-ring, and seal ring. Install the o-ring and Teflon seal ring on the seat.

13. Gently place upper seat in the body (Teflon seal side in) and tap into place with a rubber mallet, using caution not to damage Teflon seal ring.

FIGURE 8

14. Install the spacer ring. Open the valve and use a pulling tool to pull the spacer ring to the bottom of the split ring groove.

15. Install the split ring segments into the groove.

FIGURE 9

16. Release the pulling tool. Install the retainer ring into the bore of the split ring.

17. Install the spiral retainer ring.

18. Check for smooth operation of the valve by opening and closing the valve with the operating stems.

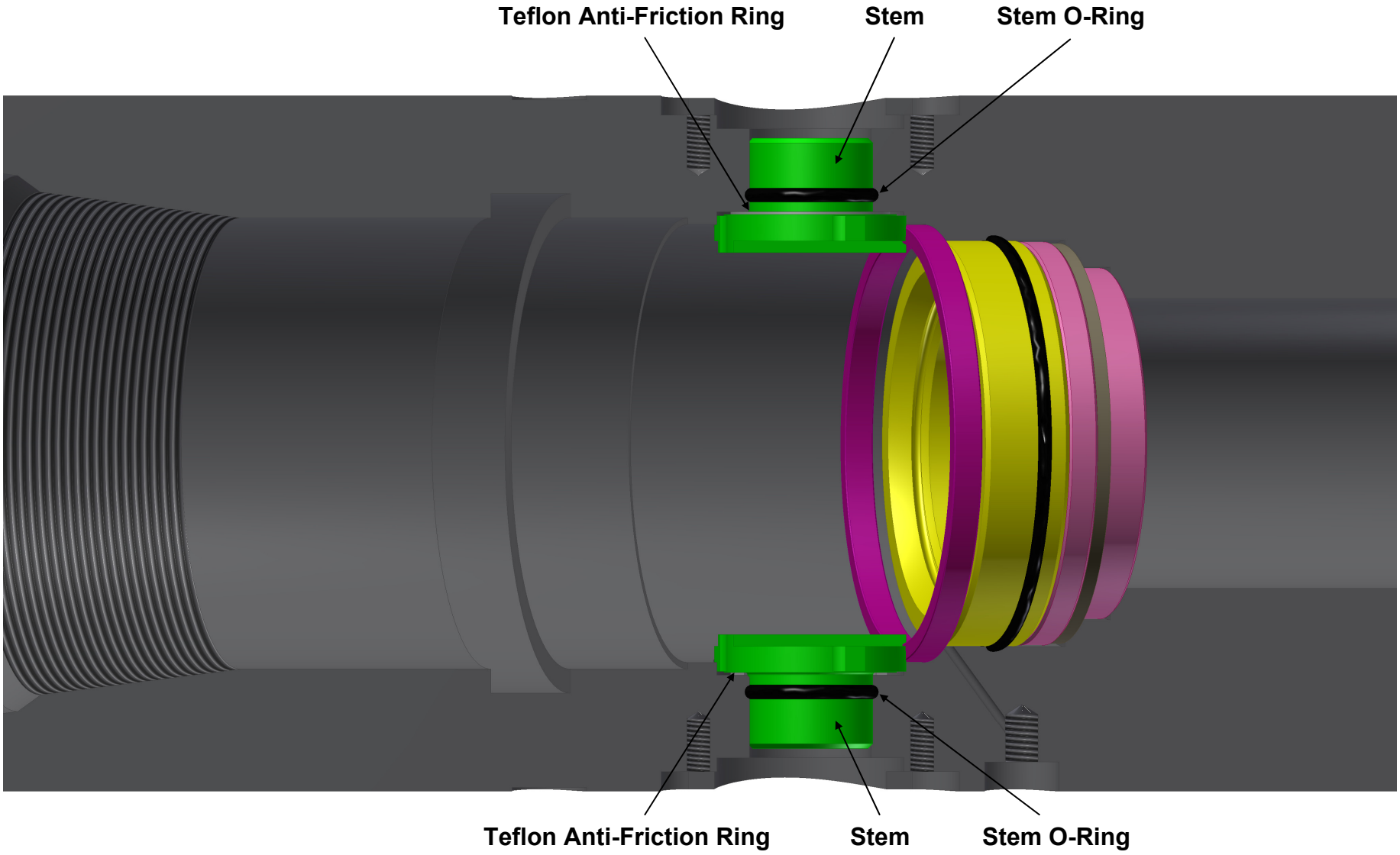
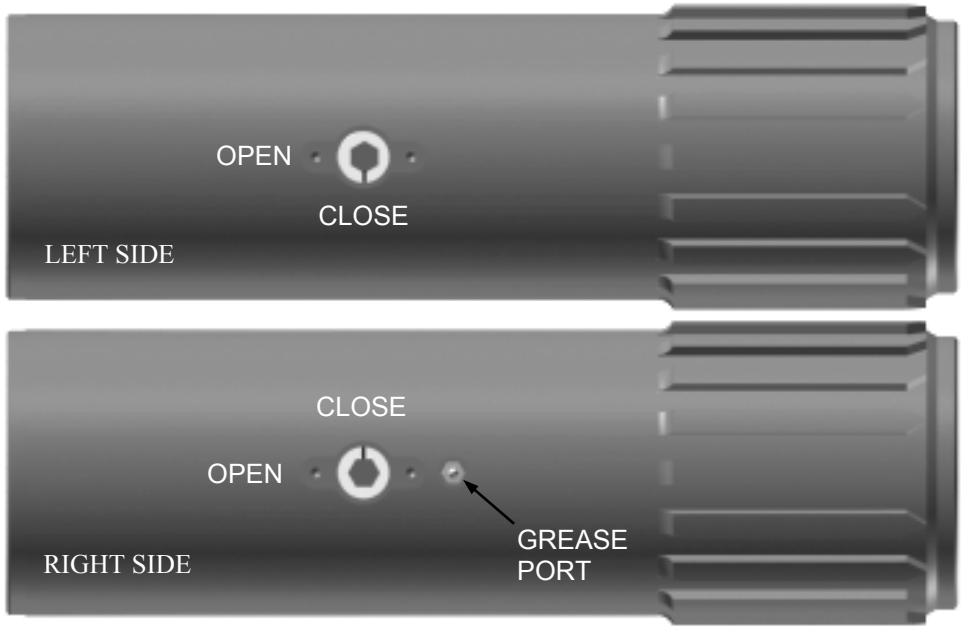
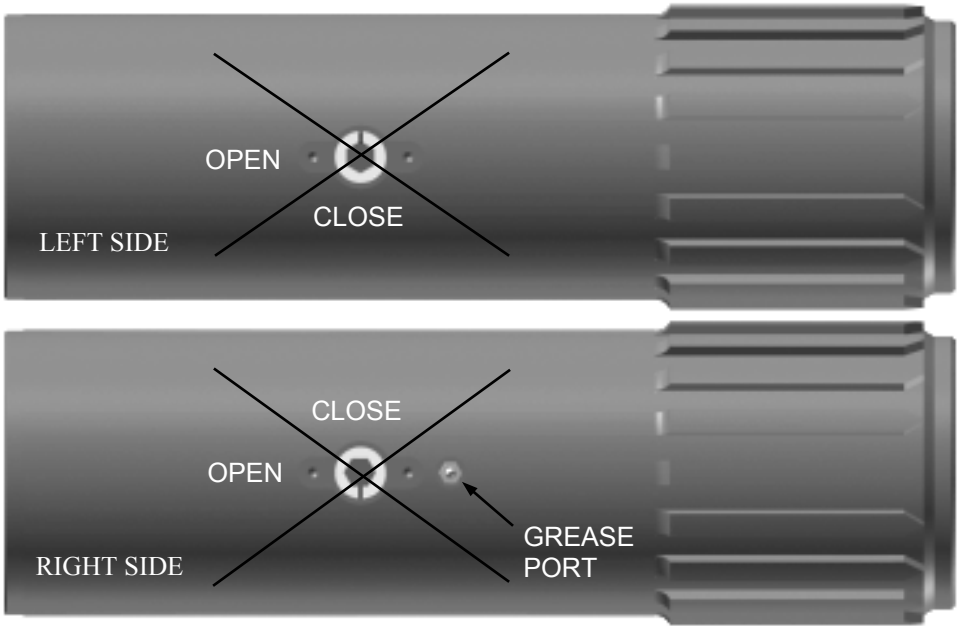

Teflon Anti-Friction Ring
Stem
Stem O-Ring
Teflon Anti-Friction Ring
Stem
Stem O-Ring

Figure 5



CORRECT



INCORRECT

Figure 6

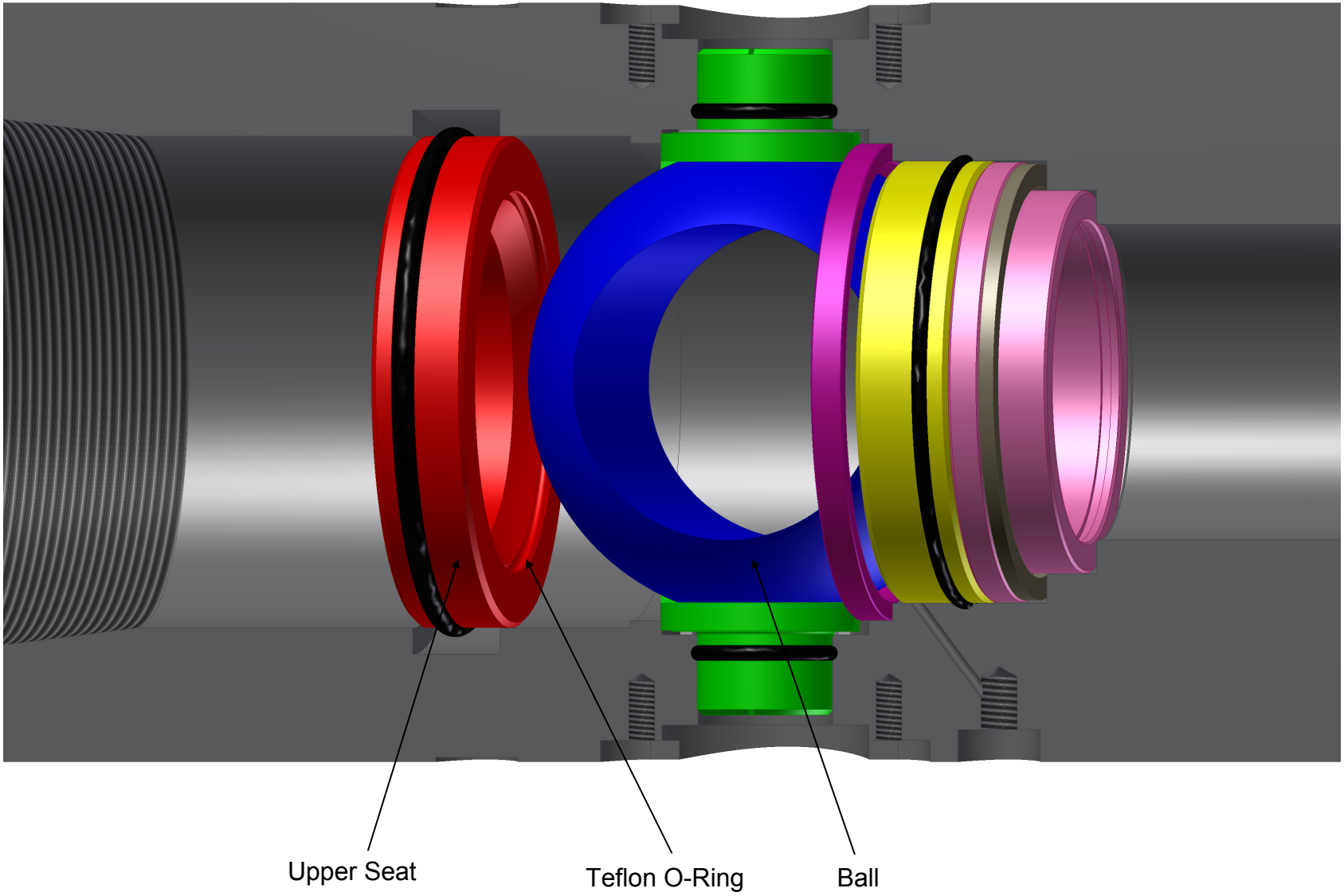


Figure 7

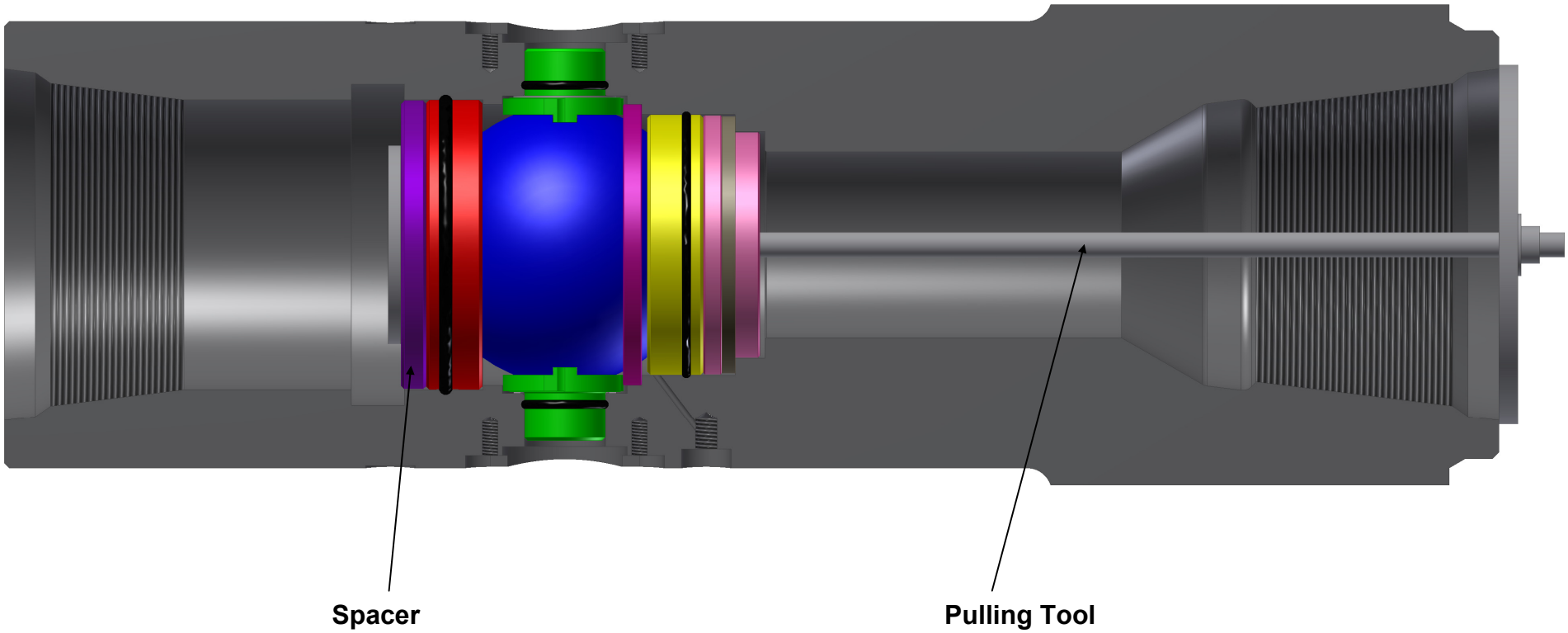


Figure 8

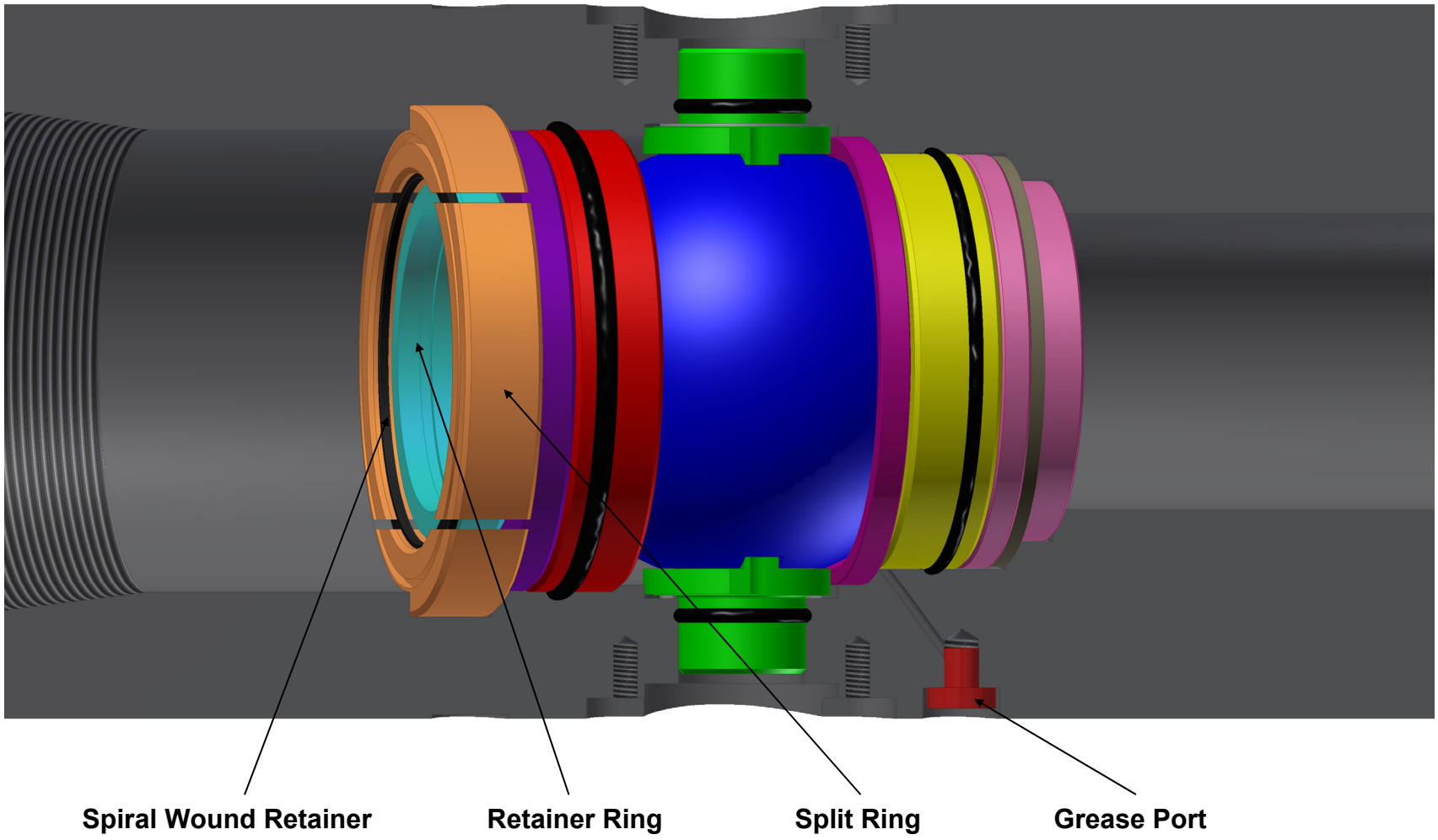


Figure 9

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FIGURE 10

19. Fully open the valve and ensure that there is no offset between the bore and the open ball.

20. Install the grease fitting into the 1/4" NPT grease port, and torque the grease fitting to approximately 15 to 20 ft-lbs.

21. With the ball in the open position, apply grease to the valve through the grease port until grease extrudes into the inner diameter of the valve. *Note: The grease pressure should not exceed 150 psi.*

22. Remove the grease fitting.

23. Install a 1/4” NPT plug into the grease port and torque to approximately 15 to 20 ft-lbs.

24. Test the valve to manufacturer’s specifications to ensure no leakage.

25. Store the valve in the full open position until installed in the drill string.

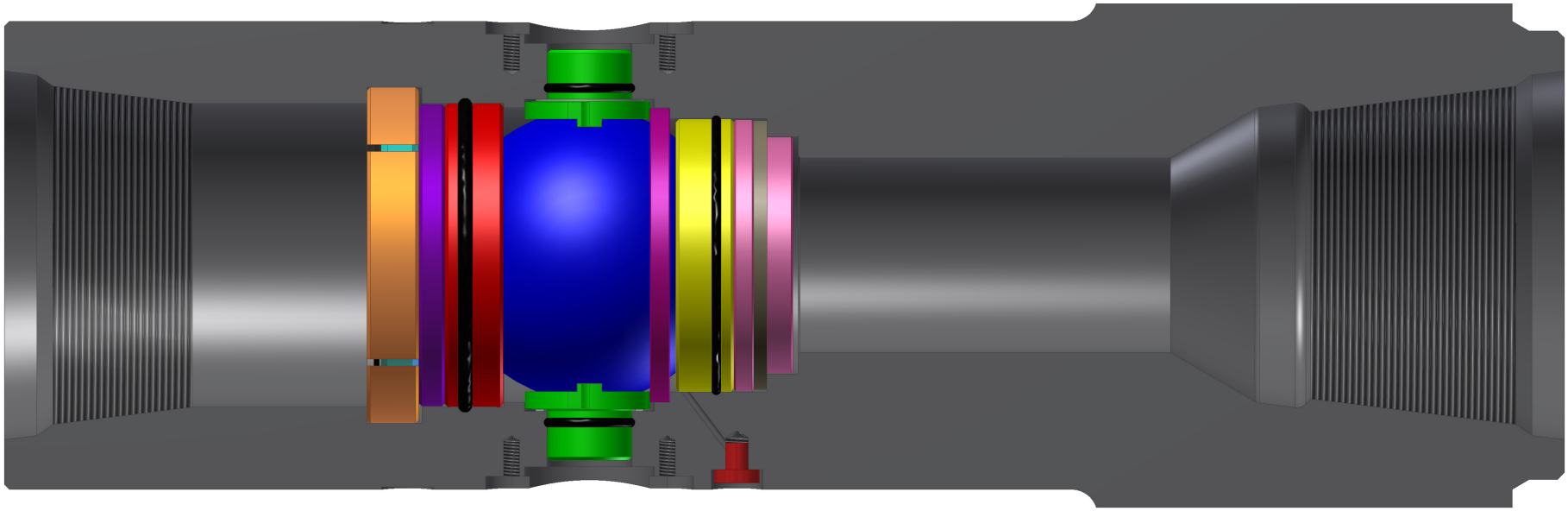

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Figure 10