



Mechanical Double Block & Bleed Service Valve

Operation and Maintenance Manual

Metal Samples Company

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1. Introduction

The Metal Samples service valve is a high performance “floating ball ” valve designed for severe service applications. When closed, the upstream pressure forces the ball against the downstream seat and effects a seal. This design also has fewer parts than conventional trunnion valves, which reduces the cost of repair kits and simplifies repair.

2. Safety First

1. The rated working pressure is 6,000 psi. Exceeding the rated working pressure may result in failure, personal injury or death.
2. Valve choice must consider appropriate temperature ratings and materials for the intended service. Metal Samples service valves conform to the material requirements of NACE MR0175. Low temperature environments can lower the impact strength of ferrous materials. Use appropriate safety precautions when working with these materials at temperatures below freezing.
3. NEVER attempt to tighten or loosen valve components while the product is under pressure.
4. Personal safety is no accident! Always use proper safety equipment and procedures when working in high pressure, severe service or extreme temperature environments.

3. Service Valve Installation

Metal Samples service valves should be installed onto the access fitting and secured by tightening the hammer union.

CAUTION! The o-ring should be checked and lubricated prior to installation. The hammer union should be tightened by using a non-sparking hammer. Care should be taken not to over tighten the valve onto the fitting.

4. Ball Valve Operation

1. The Metal Samples service valve is designed for handle operation. The handle on the service valve is designed for several purposes:
 - The handle indicates the ball position at a glance. If the handle is in line with the piping, then the valve is in the open position. If the handle is transverse to the piping, then the valve is closed.
 - The handles easily accept the use of a “cheater” pipe. This is especially useful in higher working pressures.
2. Metal Samples service valves are lubricated at the factory with synthetic valve grease. This grease is a non-hydrocarbon base formula, and will resist dissolving into the line fluid. The Metal Samples service valve, like any other valve, should be placed on a routine valve lubrication schedule. If not, the valve should be lubricated any time the operating torque becomes noticeably higher.

CAUTION! Dried mud or cement can cause high operating torque and possible valve damage. If the valve is used in mud, cement, or acid service the valve should be flushed after each job. To flush the valve thoroughly, remove the travel stop plate and rotate the balls 45° in both directions while flushing, to wash behind both sides of the balls. Dried mud or cement can cause high torque on the valves possible resulting in failure in the stem or seat rings.

5. Service Valve Repair

CAUTION! The Metal Samples service valve MUST BE ISOLATED FROM LINE PRESSURE PRIOR TO REMOVAL. Also, rotate balls to mid-position before removal to insure that pressure is not trapped in body cavity.

1. Leaks can be repaired by removing the body from the line. The seat retainer, one seat and seat carrier, and ball can be removed without removing the stem. The non-retainer seat carrier can only be accessed after stem and ball removal. The stems can be removed by pushing them in to the body. If erosive action is present, we recommend that the seats, seat carriers, and balls be replaced. All soft seals should be replaced during the repair operation. The service valve seal kits come with a silicone-based lubricant that should be applied to all seals prior to installation. This will help in installation of the seals, and prevent them from drying out and cracking. All other internal valve parts should be greased prior to re-assembly, using Desco 955 by Chemola, or equivalent.

6. Service Valve Disassembly Procedure

1. Remove the upper seat assembly by unscrewing it with a pin face spanner wrench and remove ball from the body group. The stem will need to be removed to access the lower seat assembly.
2. If the stem has not already been removed, remove the handle and remove the stem by pushing it from outside of the valve into the body until it drops free.
3. Remove the stem seal from the stem.
4. Remove the lower seat by using an angled pick or small Allen (hex) wrench.

7. Service Valve Component Inspection & Replacement

1. Inspect the ball valve stem for evidence of any wear. The stem seal should be replaced unless the valve has seen limited service. Use anti-seize grease on the stem surfaces before re-assembly.
2. Clean and inspect all component parts, paying special attention to wear or corrosion. Inspect the body cavity, especially areas of the body where any seals contact the body.
3. Remove the seat seal rings from the seat carriers if they are damaged in any way. If the carriers are to be used again, care should be taken not to scratch any of its sealing surfaces. A nail or small Allen wrench may be used to pry and loosen the seat. Then, a nail head can be utilized as a pry tool if needed to fully dislodge the seat from the carrier. If the seal can't be removed with a pry tool it will have to be cut out.

8. Service Valve Lubricant Selection

Valve lubricants can be grouped into several categories depending upon their basic materials of manufacture.

- **Caster Oil base lubricants.** These have been developed specifically as a valve grease to minimize washout and serve well as a ball and seat lubricant. We recommend two brands:
 - Desco 955
 - VAL-TEX 972
- **Petroleum base lubricants.** These are acceptable for assembly purposes, but are not generally recommended in hydrocarbon service because of limited life due to “wash out”.
- **Silicone based lubricants.** These are very stable in many fluid stream components. Resists “washout”, but they are very expensive compared to Caster Oil based lubricants. Silicone lubricants also resist oxidation, which is an advantage over Caster Oil based greases in applications exposed to atmosphere such as the stem. Dow Corning 111 Silicone lubricant is often specified for valve lubrication.

9. Service Valve Assembly Procedure

1. Install the new seats into the seat carriers.
2. Insert the downstream seats into the lower/upper valve bodies. The seat of the downstream seat should be facing you. Note: the downstream seat cannot be installed into the valve body unless the stem is removed. All valve components should be lubricated with a light grease prior to installation.
3. Apply a liberal amount of anti-sieze grease to the stem assembly. Install the stem assembly into the body from the inside of the valve by pushing it into the stem bore. Be careful not to damage the stem o-ring. The key of the stem should be rotated until it is in line with the axis of the body.
4. Apply a light film of Desco 955 to the balls and insert in the lower and upper valve bodies. Care should be taken to make sure the stem groove on the balls line up with the key of the stem or the ball will not install.
5. Apply a film of grease onto all of the o-rings.
6. Insert the upstream seat carriers, with the seat ring facing the ball, into the upper valve body/top flange by screwing them in using a pin face spanner wrench.
7. Install the o-rings into the lower and upper valve bodies.
8. Insert upper valve body into the the lower valve body, making sure that the o-ring is not damaged.
9. Insert the upper flange into the upper valve body, making sure the o-ring is not damaged.
10. Rotate upper valve body and/or top flange to orient bleed valves and handles to an optimal position. (You can use the drawing at the back of the manual as a guide.)
11. Apply anti-seize grease to bolt threads and under bolt heads. Be sure to torque the bolts to their proper make-up torque (110 ft-lbs -- 150 Nm). Make up all bolts "hand tight" first to ensure that the two flanges are mated flush, tightening bolts that are 180 degrees apart while moving in a clock-wise direction. Failure to torque bolts properly may result in seal extrusion and ultimate failure.

IMPORTANT: If the bolts for the the valve body are to be replaced, always replace them with new original bolts from Metal Samples.

10. Service Valve Long-Term Storage

For long-term storage of one year or more, Metal Samples service valves should be stored in the full open position. It is preferable, but not necessary, that they be filled with an inert gas or a non-corrosive, non-freezing liquid when installed in a piping system. Once every 12 months the valves should have several pumps of one of the recommended lubricants and should be operated from the full open position to the full close position and back to the full open position.

11. Spare Parts

Under normal operating conditions, the following spare parts are sufficient to keep the Double Block and Bleed Valve in good operating condition.

Item	Spare Part	Part	Material
1	Seal kit for double block & bleed valve	KR1014	Viton / PTFE
2	Repair kit for double block & bleed valve	C/MS*	-
3	Ball for service valve	C/MS*	17-4 PH

(Note: 2 pieces for each double valve)

Item 1 - Seal Kit - includes all elastomer seals and other items that are used in the Double Block & Bleed Valve as per list below:

- O-Ring 59,5x3,00
- O-Ring -210
- O-Ring 79,5x3,00
- O-Ring 84,5x3,00
- O-Ring -139
- O-Ring -008
- Ball Seat
- Main Seal

Note: The quantity is two for each item except for O-Ring 59,5x3,00 that remains one.

Item 2 - Repair Kit - add to the Seal Kit the components that usually will require replacement after the retrieval tool has been used for a while, such as ball valve, needle valve, etc., as follows:

- 2" Ball Valve
- Needle Bleed Valve
- Seal Carrier
- By-Pass Valve Stem
- Pin 5x50

Note: The quantity is two for each item.

Item 3 - Balls - might need replacement if the Service Valve is used on systems with large amounts of sand or other particles that might cause scratches or other damages to the surface of the ball(s). Such damages might cause minor leaks when the Valve is used on gas systems. Please note that the balls are also included in the Repair Kit.

*C/MS - Call Metal Samples