VFT Lubrication Guide

Instrumentation Products Division

General Information:

For reliable operation and long life of hand valves, air valves, relief valves, check valves and safety heads, Autoclave Engineers strongly recommends proper lubrication of all components that are subject to friction dur-ing assembly and /or operation. This is especially important where metal to metal contact occurs such as on connection gland threads, pack-ing gland threads and stem threads. Without proper lubrication, the high loads imposed on these threads may cause the parts to weld (or gall) together from the high metal to metal contact forces and friction heat. Lubrication is also essential for the effective sealing and long life of o-rings, especially those that are used in dynamic sealing applications. The per-formance of metal to metal seals will be improved with lubrication but, they do not absolutely require it.

Lubricant selection is strongly dependent on the application of the given component. Process fluids, fluid tem-perature, ambient environment temperature, materials and other factors are important in selecting a lubricant. This manual gives some basic guidelines in the proper selection and application of lubricants. The end user must ultimately determine the suitability of a lubricant based on process requirements.

Note: Parker Autoclave Engineers assumes no liability in selecting lubricant for customer applications. Parker Autoclave Engineers reserves the right to alter the specifications given in this publication in line with our policy of continuous improvement. All general terms and conditions of sale, including limitations of our liability, apply to all products and services sold.

Caution: While testing has shown o-rings to provide satisfactory service life, both cyclic and shelf life may vary widely with differing service conditions, properties of reactants, pressure and temperature cycling, and age of the o-ring. Frequent inspection should be made to detect any deterioration and o-rings replaced as required.

Lubrication Sites:

1. **Speedbite, Slimline and High Pressure Connections in all valves and fittings**
   Prior to assembly, the connection gland should be lubri-cated on the threads and on the area that is in contact with the sleeve or collar. AE provides as standard a dry mo-lybdenum disulfide lubricant on Speedbite glands unless specified otherwise. If process tolerable, a small amount of any lubricant (or process fluid) on the end of the tube cone or connection sleeve will help to maximize the met-al-to-metal sealing process. This inherently provides for better sealing of gases.

2. **Hand Valves**
   Ideally, the non-rotating stem should be lubricated along the shank that fits into the threaded stem sleeve as well as on the surfaces that are in contact with the stem washers. The threaded stem sleeve should be lubricated on the stem threads and at the ends (**see Figure 1)**. The packing gland should be lubricated on the external threads and on the end that is in contact with the packing washer.
   For valves with replacement seats, the external threads on the seat retainer and the portion of the seat retainer in contact with the seat should be lubricated.

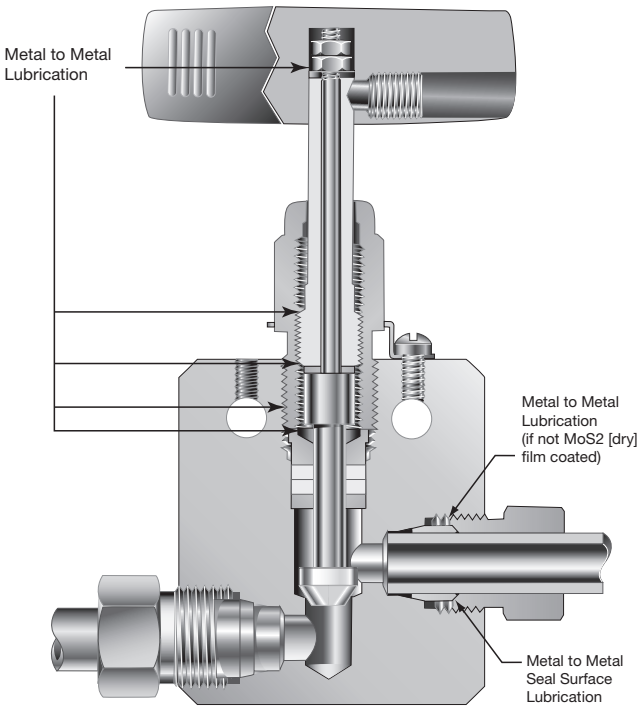

Figure 1
Hand Valve Lubrication Sites

3. Air Valves

The packing gland and seat retainer (if the valve has a replaceable seat) should be lubricated in the same manner as the hand valve. Threads should also be lubricated on all of the yoke screws (for yoke style valves) and on the retainer insert (on other air operated valves). For piston type air operators, o-ring lubricant should be applied to the inside of the operator housing, on the center rod and on all the o-rings, on the pistons and divider plates. On air-to-open diaphragm operators, the o-ring on the stem should be lubricated. The threads and end of the spring adjustment screw should be lubricated on all air-to-open valves. Refer to **Figure 2** for lubrication sites on piston style operators.

4. Check Valves

The gland nut should be lubricated on the external threads and at the end where it contacts the cover. The cover should be lubricated at the sealing surface where it contacts the body. For o-ring check valves, a small amount of o-ring lubricant on the o-ring will help swell the elas-tomer and aid sealing. Refer to **Figure 3** for lubrication sites on check valves.

5. Relief Valves

Threads should be lubricated on the cap, spring cylinder, adjustment bolt and on the seat gland. Refer to **Figure 4** for lubrication sites on the relief valve.

6. Safety Heads

The threads and end of the hold down nut should be lubricated. Refer to **Figure 5** for lubrication sites on the safety head.

For any part not covered in the above statements, the general rule is that parts that will move against each other during assembly or operation should be lubricated at the points/areas of contact.

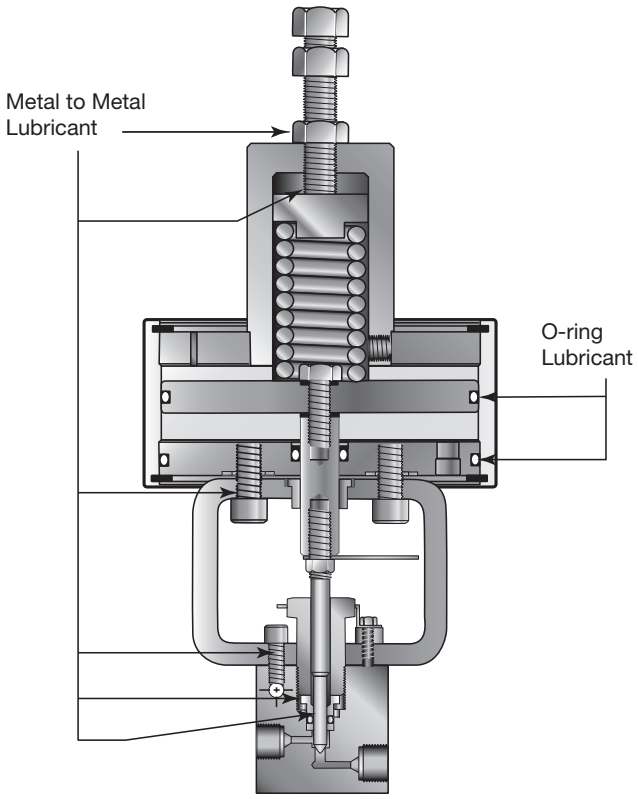

Figure 2

Air Valve Piston
Lubrication Sites

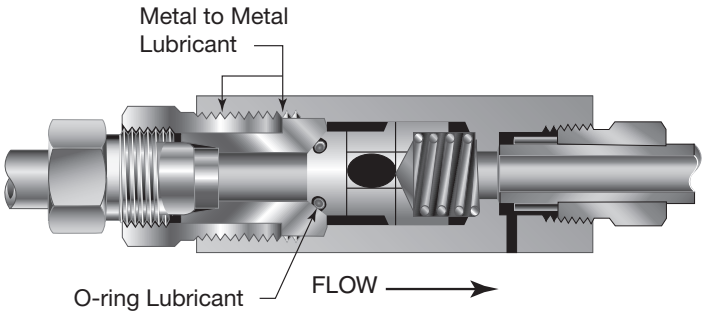

Figure 3

Check Valve
Lubrication Sites

Recommended Lubricants:

Note: This information is provided for reference only. The manufacture of the lubricant should be contacted for specific information based on your application. Refer to the material safety data sheets for information on safe usage and storage methods for these lubricants.

1. **DuPont Krytox 240AC2**
   Krytox is a non-flammable fluorinated grease used for metal to metallubrication in valves that are cleaned and designated for oxygen service. It comes in the form of a white grease and has a recommended absolute service temperature range of -15 to 500ºF.

2. **Hallocarbon 25-5S**
   This is a silica thickened chlorotrifluorethylene grease that is recommended for use on check valve balls and o-rings. *It is not recommended for use on magnesium and aluminum alloys and in contact with sodium potassium, amines, liquid flurine and liquid chlorine trifluoride.* It has a recommended absolute service temperature range of 0 to 350ºF.

3. **Neolube DAG 1563**
   This is a dry film lubricant for valves used in Navy Nuclear service. It consists of graphite particles in a thermoplastic resin and ispropanol and meets Military Specification MIL-L-24131B. The dry film form allows tight control of impurities that are required for these applications. It has an absolute service temperature of -100 to 400ºF.

4. **Dow Corning Molycoat 55M4**
   This grease is used for dynamic lubrication between rubber and metal parts in pneumatic systems such as piston style air operators. It is a silicone based lubricant and meets Military Specifications MIL-G-4343. *It is not recommended for use on silicone rubber o-rings and seals.* It has a recommended absolute service temperature range of -85 to 350ºF.

5. **Jet Lube SS-301**
   This lubricant consists of pure copper flakes that are homogenized into a non-melting, nonvolatile viscous carrier. It is fortified with anti-oxidants, rust and corrosion inhibitors. Jet Lube SS-30 is the standard lubricant for Parker Autoclave VFT components with sliding metal to metal contact surfaces. The surfaces are copper coated and prevents seizure, galling and heat freeze. SS-30 comes in the form of a thick oil that can be easily brushed on the surfaces to be lubricated. The absolute service temperature range is form 0 to 1800ºF. *Jet Lube SS-30 is not recommended for extreme low temperature applications or processes that will not tolerate the presence of copper.*

2. **Jet Lube MP-50 Moly Paste1**
   This is a thick paste that contains molybdenum disulfide (MoS). This lubricant is suitable for preventing seizure and galling of parts at absolute temperatures of -300ºF to 750ºF. It is recommended for metal to metal components that are exposed to temperatures of less than 0ºF. Other lubricants may solidify under these conditions and prevent the effective operation of dynamic components.

Services:

For service, contact the Parker Autocalve Engineers' Representative in you area, or Parker Autoclave Engineers' Customer Support Services at 1-800-458-0409 or email us at ipduscct@parker.com.

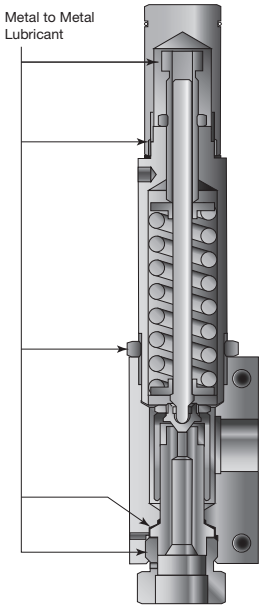

Figure 4

Relief Valve
Lubrication Sites

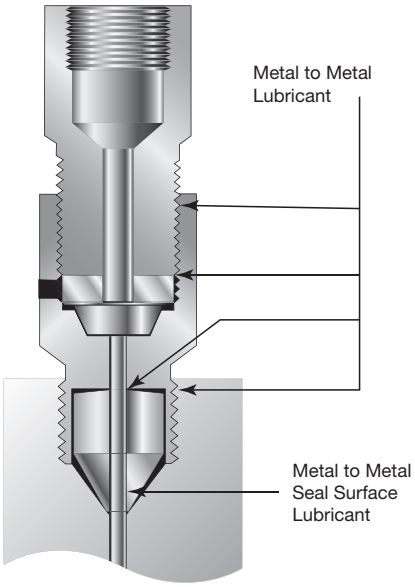

Figure 5

Safety Head
Lubrication Sites

Lubrication Service Chart:

Lubricant	Application	Absolute Service Temperature Range
Jet-Lube SS-30	Metal to Metal, Standard Application	0°F to 1800°F (-18°C to 982°C)
Jet-Lube Moly Paste MP-50	Metal to Metal, Low Temperature Application	-300°F to 750°F (-185°C to 398°C)
Krytox 240 AC	Metal to Metal, Oxygen Clean Components	-15°F to 500°F (-26°C to 260°C)
Hallocarbon 25-5S	Check Valve Ball and Poppet Lubricant	0°F to 350°F (-18°C to 177°C)
Neolube DAG156	Metal to Metal, Nuclear Service	-100°F to 400°F (-73°C to 204°C)
Dow Corning M55	Dynamic O-ring Seals	-85°F to 350°F (-65°C to 177°C)

Notes: Specific applications may require other service temperature ranges.

[1] SS-30 and MP-50 Moly Paste are registered trademarks of Jet Lube Inc.
[2] Krytox is a registered trademark of E.I.duPont de Nemours & Co., Inc.
[3] DAG is a registered trademark of Acheson Industries, Inc.
[4] Molycoat and Dow Corning are registered trademarks of Dow Corning Corp.

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