

OIL & GAS INDUSTRY - VALVE LUBRICATION



CLARE
PEOPLE • PARTNERSHIP • PROGRESS

The RS Clare range of advanced Valve Lubricants for the Oil & Gas Industry has been developed in conjunction with Original Equipment Manufacturers and Production, Drilling and Service Operators.

RS Clare's valve lubricants have been well proven in the field providing the user with 'failsafe' and 'cost effective' valve lubrication.

In the exploration and production of crude oil & natural gas, severe problems can be encountered due to the presence of H₂S, CO₂, condensates, hydrocarbon solvents, acids and other chemicals present in the well production system.

Such chemicals and compounds can breakdown conventional lubricants, resulting in the lubricant being 'leached out' of the valve cavity. This can render the internal valve components dry, exposed to wear and damage from increased friction and corrosion and will permit the build up of contaminants in the valve cavity.

This process can cause severe valve operational problems. Such problems include damage to the component sealing surfaces and an increase in the required actuation torque or ultimately in seizure of the valve.

Routine valve re-lubrication using a premium RS Clare valve lubricant is a highly important aspect of preventative maintenance and will ensure optimum operation.

GATE VALVE LUBRICATION



The function of the gate valve lubricant is to:

- Displace harmful chemicals and fluids from the valve cavity.
- Provide corrosion protection to the 'exposed' internal valve components.
- Provide a 'secondary seal', thus reducing the build up of contaminants in the valve cavity, such as sand, that may be deposited from the flow line.
- Provide an integral lubricating film between the gate & seat and to the gate stem thread, thus controlling friction and minimising component wear.
- The torque required to operate an un-lubricated valve at a specific pressure can be as high as twice the torque figure for an effectively lubricated valve.
- The lubricant must have high adhesion to the internal surfaces of the valve cavity and components to withstand the high cavity pressures and component contact stresses.

GATE AND SEAT COMPONENTS



GATE VALVE LUBRICANT PRODUCTS

The Standard Service lubricant, **GP Valve Grease**, is a mineral oil based grease with a concentration of solid lubricant. GP Valve Grease exhibits good metal adhesion and water resistance. However, field experience has demonstrated that the performance of Standard Service lubricants is limited by the aggressive production and process chemicals and also the hydrocarbon fractions within the crude itself.

In order to ensure optimum valve performance, a non-mineral oil based, premium RS Clare gate valve lubricant should be selected.

Valve Lubricant 601 is a fully synthetic product ensuring long term lubricating and sealing qualities within a temperature range of -20°F to 450°F. 601 is specially formulated to provide optimum resistance to aggressive produced fluids and gases and process chemicals.

The adhesive texture of 601 ensures maximum retention in the valve cavity during cycling. The use of 601 permits extended re-lubrication intervals when compared with Standard Service valve lubricants.

Valve Lubricant 501, an 'Extended Temperature Range' valve lubricant, has been developed to provide comparable performance to 601 within a temperature range of -75°F to 350°F.

Where Oil & Gas is produced in cold climate regions low temperature pumpability is important, similarly valve shutdown temperatures can be extremely low. 501 permits lubricant mobility within the valve cavity at such temperatures, ensuring the valve can be opened or cycled within the rated torque range. For production conditions, 501 remains stable at operating temperatures up to 350°F.

Resistance of valve lubricants to hydrocarbon fluid:



A sample of lubricant is applied to a glass plate which is then placed within a container of hydrocarbon fluid. The hydrocarbon fluid breaks down the GP Valve Grease Standard Service lubricant, leaving only the solid lubricant in the bottom of the container. In the field, high frequency re-lubrication is required to maintain a complete cavity fill of the Standard Service lubricant. Valve Lubricant 601 is unaffected by the hydrocarbon fluid.

Valve Lubricant 601 is used to lubricate gate valves that are installed in a large range of oilfield production and drilling equipment. This unique 'wide application' capability of 601 allows the operator to standardise on one gate valve lubricant whilst ensuring maximum operational protection.

Valve Lubricant 601 has been field proven as a high performance sealant. 601 may be injected into a leaking valve and will provide long term, high pressure sealing properties without hardening.

601 Cleaner is a non hazardous, synthetic cleaning fluid. It can be used to remove 601, 501 and all other Clare valve lubricants during valve repair and refurbishment or to flush the valve during in-situ maintenance.

Examples of equipment for product application:

1. BOP STACK - GATE VALVES



2. SURFACE PRODUCTION TREE - GATE VALVES



5. CHOKE MANIFOLD - GATE VALVES



3. SUBSEA PRODUCTION TREE - GATE VALVES



6. HEAT EXCHANGER - GATE VALVES



4. SAND FILTER - GATE & PLUG VALVES



7. SEPARATOR EQUIPMENT - GATE & PLUG VALVES



PLUG VALVE LUBRICATION

As detailed in the application photographs, plug valves are used as compact, shut-off valves in a range of production equipment downstream of the production tree. Plug valves are designed to operate with a sealant type lubricant.

When the lubricant is applied to the valve, it is distributed between the seating faces of the valve body and plug. The lubricant provides an integral sealing and corrosion preventative film. As the plug is covered by the lubricant over all surfaces, a smooth, controlled actuation is achieved over extended maintenance periods.

Valve Lubricant 601 is used for the lubrication and sealing of plug valves. 601 has been field proven to remain cohesive within the valve whilst providing the necessary sealing. This is unlike other sealants which may harden, resulting in leakage and exceptionally high actuation torques that can damage the valve stem.

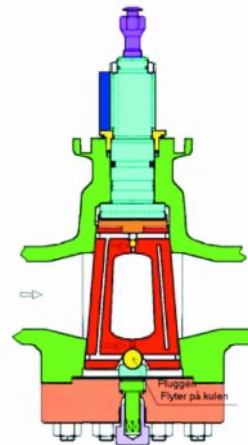
The use of 601 in plug valves has allowed operators to standardise on one lubricant product on all wellhead and downstream equipment for the lubrication of gate and plug valves.

For operational temperatures to -75°F or at low ambient temperatures where pumpability is a problem, **Valve Lubricant 501** should be used.

PLUG VALVE INSTALLED IN A SAND FILTER SYSTEM



TAPER PLUG VALVE CROSS-SECTION



BALL VALVE LUBRICATION

The lubrication of a ball valve requires a different practice to the lubrication of either a gate valve or plug valve.

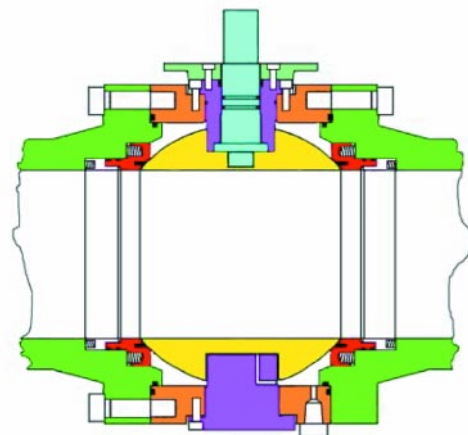
Field experience has shown that greases and sealants can cause severe problems with the seat arrangement. If a non-leaking ball valve is lubricated with an adhesive grease or sealant, the floating spring loaded seats can become stuck within their seat pockets. When the ball floats due to a pressure differential across the valve, the seats cannot track the ball and leakage can occur.

A fluid type lubricant such as **B70** or **B70S** should be used to routinely flush and lubricate the valve. The fluid does not disrupt the operation of the seat and seal arrangement.

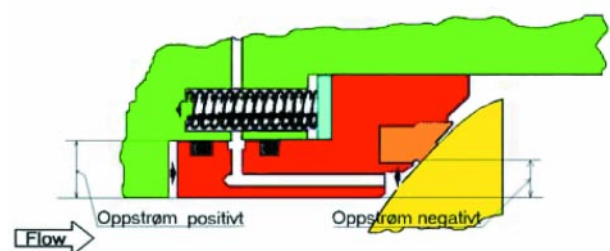
B70 is a Standard Service ball valve lubricant. **B70S** is a synthetic ball valve lubricant designed to provide enhanced resistance to hydrocarbon fluids and gases, sour service, CO_2 , acids and completion fluids.

For leaking ball valves, 601 should be injected, which acts as a high pressure sealing compound without hardening within the seal arrangement.

BALL VALVE CROSS-SECTION



SEAT AND SEAL ARRANGEMENT CROSS-SECTION



PRODUCT RANGE - APPLICATION & SERVICE CHART

Product	Application	Temperature Range	Service									
			Standard Crude Oil	Natural Gas	Steam & Hot Water	Sand Ingress	H ₂ S - Sour Crude & Gas	High CO ₂	Gas Well Condensate	Diesel Completion Fluid	Acid	
Valve Lubricant 601	Gate / Plug Valve	-20°F to 450°F -29°C to 232°C	High	High	High	High	High	High	High	High	High	High
Valve Lubricant 501	Gate / Plug Valve	-75°F to 350°F -59°C to 177°C	High	High	High	High	High	High	High	High	High	High
LT Valve Lubricant	Gate Valve	-75°F to 250°F -59°C to 121°C	High	High	High	Limited	Limited	Limited	Limited	Limited	Limited	Limited
HL Lubricant	Gate Valve	0°F to 500°F -18°C to 260°C	High	High	High	Limited	Limited	Limited	No	No	No	No
GP Valve Grease	Gate Valve	0°F to 250°F -18°C to 121°C	Limited	Limited	High	No	No	No	No	No	No	No
B70 Ball Valve Oil	Ball Valve	0°F to 250°F -18°C to 121°C	Limited	Limited	High	No	No	No	No	No	No	No
B70S Ball Valve Oil	Ball Valve	-20°F to 350°F -29°C to 177°C	High	High	High	Limited	High	High	High	High	High	High

Key

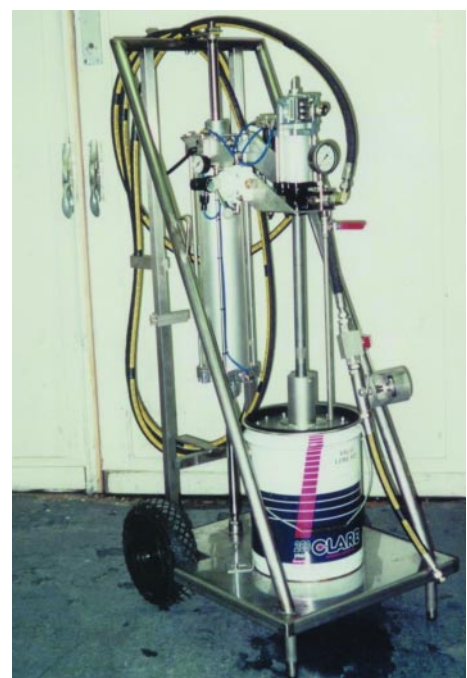
■ High Compatibility
 ■ Limited Compatibility
 ■ No Compatibility

LUBRICANT APPLICATION EQUIPMENT

RS Clare's premium valve lubricants are adhesive, viscous lubricants designed for severe operational conditions. The ability of conventional air operated pumping equipment is limited when used with such lubricants, particularly in cold temperatures or when the lubricant is to be pumped over a long distance.

Field experience has proven that high pressure pump systems incorporating a positive priming follower plate and a high ratio air pump are required to overcome such problems.

RS Clare's Technical Field Personnel can provide assistance to operators in the selection of suitable pumping equipment.



R.S. Clare & Co. Ltd. was founded in Liverpool in 1748 by Richard Clare at the start of the Industrial Revolution. We are the longest established company manufacturing lubricants in the United Kingdom.

Our origins lay in distillation of turpentine, and 'paint oil and colour' became our business. Throughout the 19th and 20th Centuries we distilled tar, invented thermoplastic road markings, pioneered the application of cationic slurryseal and we hid our light under a bushel by manufacturing lubricating greases for major oil companies.

Today we operate a Surface Coatings Division, making and applying antiskid surfaces and markings, and our Industrial Lubricants Division has built on our long experience in greasemaking by carving out niche markets for specialist lubricants in Rail, Upstream Oil & Gas, Steel, Marine and Automotive industries throughout the world.

We have survived for over two and half centuries because we know people will only stay as customers if we continue to satisfy their needs. We have done so with several Major Oil Companies and end users of specialist lubricants, road markings and surface treatments for a very long time - and many competitors envy our reputation.

The pursuit of excellence is taken very seriously by R.S. Clare. We operate to the Internationally recognised standards of **ISO 9001:2000 Quality Assurance** and **ISO 14001:1996 Environmental Management**.

The company's motto explains our beliefs:

PEOPLE ● PARTNERSHIP ● PROGRESS

Our people matter, our customers are our partners, as are our suppliers and all stakeholders, and together our aim is to make mutual progress. Be it ISO 9001 or ISO 14001, we at R.S. Clare believe in the pursuit of excellence and endeavour to strive for high standards in all that we do.



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