OIL & GAS INDUSTRY - VALVE LUBRICATION

CLARE

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ASSET INTEGRITY

The integrity of wellhead pressure control valve equipment is a very important aspect of upstream field operations, ensuring the equipment works correctly, at all times. The selection & application of the correct gate valve cavity lubricant is proven to influence significantly the sustained integrity of gate valves, or regaining integrity when it has been lost. Furthermore, a specific valve lubricant selected on specific performance criteria can deliver operational cost savings, through increased component life, fewer maintenance interventions and extended preventative maintenance periods. Increased asset integrity delivers cost effective operation.

GATE VALVE LUBRICATION

RS Clare's range of advanced valve lubricants for the Oil & Gas Industry have been developed in conjunction with original equipment manufacturers (OEM) and field operators. Using laboratory R&D, valve testing and critical field trials, RS Clare's valve lubricants have been comprehensively proven to deliver increased integrity, valve functionality and 'cost effective' operation.

Produced chemicals such H_2S, CO_2, condensates, other hydrocarbon solvents, along with crude oil & natural gas and injected media such as frac acid and gas compositions can all have a major impact on the condition of the valve cavity lubricant. This can result in the lubricant being dissolved and displaced from the valve cavity, rendering the internal valve components dry, exposed to wear and damage from increased friction. A cavity devoid of lubricant will also permit the ingress and entrapment of contaminants in the valve cavity, such as corrosive fluids or sand.

This can cause severe valve operational problems, including damage to the component sealing surfaces, an increase in the required actuation torque or force, or worst case in seizure of the valve. Routine valve re-lubrication using a premium Clare valve lubricant is a highly important aspect of preventative maintenance and will ensure optimum valve protection.

The key functions of the gate valve lubricant are:

- to provide an integral lubricating film between the gate & seat and the threaded stem, where applicable. The lubricant film must withstand the high interfacial contact stress between gate & seat surfaces.
- to displace corrosive chemicals and fluids from the valve cavity and provide a barrier to prevent further ingress of these and contaminants such as sand.

A high performance valve lubricant may also deliver secondary benefits:

- Provide additional corrosion protection to the 'exposed' internal valve components, particularly if the metallurgy is underspecified.
- Restore valve integrity, by providing a sustained leak sealing capability.

Gate and seats have critical sealing surfaces.

Example of a wear on the gate's surface.

SEALING LEAKING GATE VALVES

Through many field trials, RS Clare's valve lubricants have been proven to seal leaking gate valves, for sustained periods, where other valve lubricants have been unsuccessful. It should be noted that in some cases, where the damage to sealing surfaces is high, the only solution is to replace damaged components, and then immediately employ a high performance cavity lubricant.

HYDROCARBON RESISTANCE

One fundamental requirement of the valve lubricant is resistance to liquid & gas phase hydrocarbons. For comparison, a standard lubricant **GP Valve Grease** is tested against **Clare Valve Lubricant 601**. A sample of each lubricant is applied to a glass plate, and then placed within a container of hydrocarbon fluid. The fluid breaks down the **GP Valve Grease** very quickly. In the valve, the grease will be washed out of the cavity when cycled just a few times. **Valve Lubricant 601** is unaffected by the hydrocarbon fluid, regardless of exposure time, thus providing long term cavity retention.

VALVE LUBRICANT 601

601 is a fully synthetic grease compound, delivering both lubricating and sealing performance within a temperature range of -20°F to 350°F. **601** is specially formulated to provide optimum resistance to aggressive produced fluids and gases and process chemicals. It is also proven to reduce valve failure in sand service.

The adhesive texture of **601** ensures maximum retention in the valve cavity and minimises the amount of lubricant removed from the cavity during cycling under high differential pressure. The use of **601** permits extended re-lubrication intervals when compared with many other valve lubricants.

Valve Lubricant 601 has been field proven as a **high performance sealant**. **601** may be injected into valves which require an operational sealant, such as the McEvoy gatevalve, where **601** will provide long term high pressure sealing properties without hardening.

A non hazardous, synthetic cleaning fluid, **601 Cleaner**, is available to remove hydrocarbon resistant lubricants during valve repair and refurbishment or to flush the valve during in-situ maintenance.

For lower ambient temperature environments, **601-WG** (Winter Grade), **601-AG** (Arctic Grade) and **501** are available.

Clare premium valve lubricants are currently used to lubricate gate valves that are installed in a large range of oilfield pressure control equipment used in the following operations:

- Production
- Drilling
- Well Testing
- Well Intervention & Workover
- Subsea

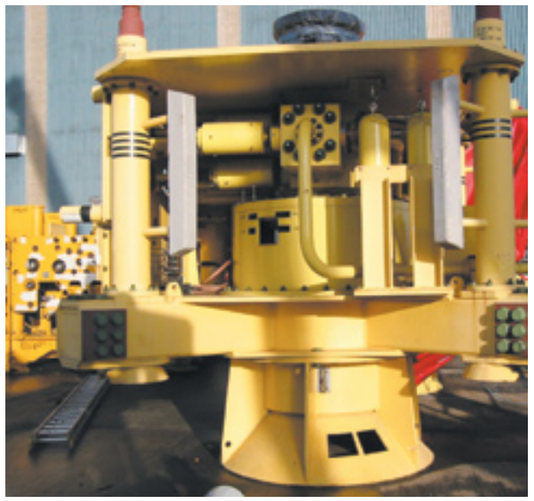
This unique 'wide application' capability allows field operators to standardise on one gate valve lubricant whilst ensuring maximum operational protection.

Examples of equipment for product application:

1. Kill line valves on a bop stack

2. Surface production tree – gate valves

3. Subsea production tree – gate valves



4. Sand filter – gate & plug vales

5. Choke manifold – gate valves

6. Heat exchanger – gate 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. Such plug valves are designed to operate with a lubricant / sealant.

When the lubricant is applied to the valve, it is distributed between the sealing 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 suitable for the lubrication and sealing of plug valves. **601** has been field proven to remain cohesive within the plug 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 on all wellhead and downstream flow control equipment with both gate and plug valves installed.

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 may cause severe problems with the seat and arrangement if used regularly during preventative maintenance. If a non-leaking ball valve is lubricated with an adhesive grease / 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 seals cannot track the ball and leakage can occur.

601 Fluid is a viscous, fluid type version of **601**.

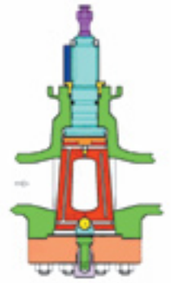
It can be injected routinely to flush and lubricate the ball valve. The fluid does not dry out or form a gum, when used within its application temperature range. Therefore it does not disrupt the operation of the seat and seal arrangement.

601 Fluid is a synthetic ball valve lubricant designed to provide enhanced resistance to hydrocarbon fluids and gases, sour service, CO_2, acids and completion fluids.

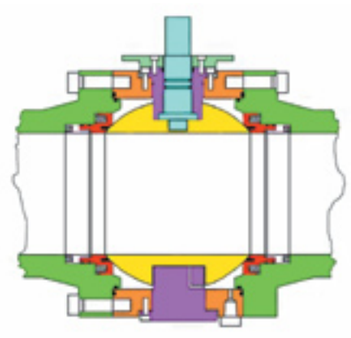
For leaking ball valves, **Valve Lubricant 601** should be injected, which acts as a high pressure sealing compound without hardening within the seal arrangement.

High pressure hand gun, 601 cartridges for plug valve lubrication

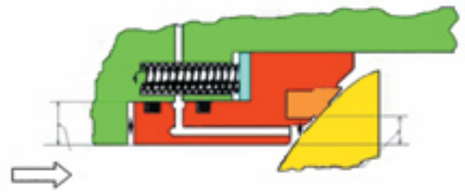
Taper plug valve cross-section



Ball valve cross-section



Seat and seal arrangement cross-section



PRODUCT RANGE - APPLICATION & SERVICE CHART

Product	Application	Temp Range	Service									
			Standard Crude Oil	Natural Gas	Steam & Hot Water	Sand Ingress	H_2S - Sour Crude & Gas	High CO_2	Gas Well Condensate	Diesel Completion Fluid	Frac Acid (HCL)	Methanol
Valve Lubricant 601	Gate & Plug Valve	-20°F to 350°F										
Valve Lubricant 601 - WG	Gate & Plug Valve	-35°F to 300°F										
Valve Lubricant 601 - AG	Gate & Plug Valve	-60°F to 250°F										
Valve Lubricant 501	Gate Valve	-75°F to 250°F										
601 Fluid	Ball Valve	-20°F to 300°F										

High Compatibility

Limited Compatibility*

*Refer to RS Clare field engineer

LUBRICANT INJECTION EQUIPMENT

RS Clare's premium valve lubricants are adhesive, viscous lubricants designed for severe operational service 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.

RS Clare offers a comprehensive range of air operated, hydraulically operated and manual pump equipment. These systems are specially configured with the correct connection fittings for optimum lubricant injection and covering all container sizes from cartridges to large drums.

Bespoke systems can also be designed and built, with self contained power units, for use where a central air or hydraulic power supply is not available.

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 lubricant 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 Traffic Safety Division, making and applying antiskid surfaces and markings, and our Industrial Lubricants Division has built on our long experience in grease making 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 9001:2008 Quality Assurance** and **ISO 14001:2004 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.

CLARE
ADVANCED LUBRITECTION

CLARE
ADVANCED SURFACE COATINGS

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