Chapter 10

Valve Cleaners, Lubricants & Sealants

In order to avoid any confusion surrounding the use of the words grease, lubricant and sealant, all are words used to describe a grease-like substance. There are those who believe that the more viscous greases make better sealants. In truth, the best sealants are greases which are insoluble in the product flowing through the valve and have special additives to bridge off a leak path. Throughout most of this manual we describe all of these products as lubricant / sealants to avoid confusing the reader with terminology.

Body Filler Greases

Commonly used in wellhead gate valves and other larger gate valves where hydrates may be present. The body cavity is filled with this light grease to prevent the hydrates (which would otherwise collect in the valve's body cavity) from freezing when throttling or when the outdoor temperature drops below freezing. These greases also prevent other contaminants from collecting in the bottom of the valve body. Body filler greases will lubricate the metal seating surfaces and prevent galling. The grease should also prevent internal corrosion of unprotected metal surfaces and reduce torque required to cycle the valve. These light greases are made from petroleum oil and thickened with clay fillers; corrosion inhibiting agents are commonly added. These types of greases are often used by ball and gate valve manufacturers to keep internal components from rusting during shipment and storage. These light greases should be washed out of the seat sealant system or displaced through the injection of the proper lubricant / sealant prior to installation.

Gate Valve Body Filler Grease in (10) ten pound pail - Part Number S-GV-10

Valve Cleaning Compounds

Were developed to serve many functions. The dry nature of dehydrated natural gas can rob most lubricant / sealants of much of their lubricating ability. When left too long in the valve, some types of lubricant / sealants will completely break down and leave behind the solid fillers which had been used to thicken the base oil into a grease-like compound. In this instance, the valve cleaner must re-moisturize the dried lubricant / sealant in order for it to flow out of the sealant channel system. It is not unusual to have a varnish-like build-up on critical seal faces on valves in gas service. Valve cleaners must also include solvents which can remove this build-up and detergents which will help carry away the dissolved material. A good quality cleaner should include a dry lubricant such as graphite so that when critical seal faces are cleaned, the metal surfaces do not gall or score by cycling the valve in a dry condition. It is extremely important that the cleaning agents be compatible with gaskets, packings and O-rings in the valve body or stem. Improper cleaners may cause O-rings to swell or crack and lead to seat and body leakage. Sealweld® Valve Cleaner Plus is approved for use in all types of valves.

*Valve Cleaner Plus in (10) ten pound pail - Part Number **S-VC-10***

Valve Lubricants

Are made from materials which are insoluble in whatever gas, or liquid is inside the valve. Modified vegetable oils are often blended with synthetic oils, special corrosion inhibiting agents and other additives to give the lubricant its sticky texture. These viscous and sticky lubricants will provide some sealing ability and are generally recommended for new valves or valves with very little wear. It is very important that a good quality valve lubricant be resistant to breakdown or shearing of the gel structure under high-pressure injection and the enormous load forces commonly seen across seal faces. It must also be stable over a broad temperature range and not break down or harden when pumped at freezing temperatures and in higher temperature service such as may be seen in compressor discharge applications.

*Sealweld® Equa-Lube Eighty in (10) ten pound pail - Part Number **S-EQ-10***

Valve Lubricants / Sealants

Are generally formulated with much of the same ingredients as valve lubricants. Special additives are blended in which enhance the sealing characteristics of the compound. Lubricant / sealants are generally more viscous. Many manufacturers add finely powdered PTFE or P.T.F.E. flakes. These have been found to seal minor scratches and shallow corrosion pits. Some manufacturers of valve sealants use finely ground mica or asbestos as bridging agents. EXTREME CARE must be taken to ensure large PTFE particles are not introduced that can plug the sealant injection fittings and passages.

The Sealweld® paper Theory, History, and Results of Sealant for Subsea Service explains in greater detail some of our earlier investigations into valve sealant testing. Offshore Technology Conference Paper # 6697 is also available on request; this paper details our further research into valve sealant testing.

*Sealweld® Total-Lube # 911 Lubricant / Sealant in (10) ten pound pail - Part Number **S-TL-10***

*Sealweld® # 5050 Sealant in (10) ten pound pail - Part Number **S-VS-10***

Extra Heavy Sealants

Are heavier sealants which have an extra quantity of PTFE particles and often feature much larger PTFE particles and flakes. These types of materials should only be used in an emergency as a last chance alternative to removing the valve from the pipeline. Sealweld® Extra Heavy # 5050 and Double Extra Heavy # 5050 would fall into this category.

Emergency Sealants

*Sealweld® XH # 5050 Sealant in (10) ten pound pail - Part Number **S-XS-10***

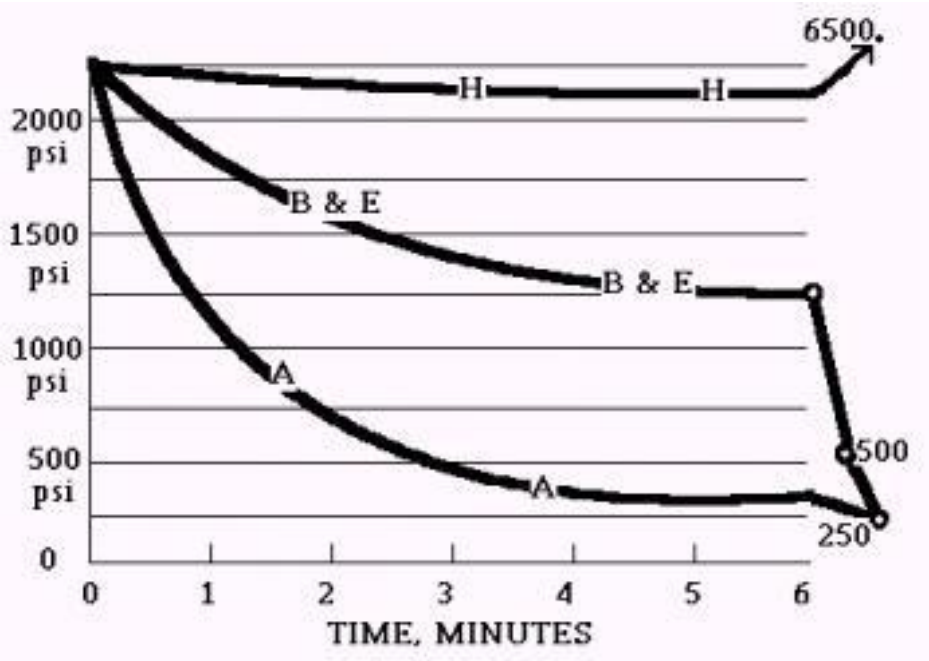
*Sealweld® XXH # 5050 Sealant in (10) ten pound pail - Part Number **S-XXS-10***

When using the heavier emergency sealants, ALWAYS open the valves body vent fitting (if possible) in order to draw the sealant over the damaged seal face.

<u>Remember to wait</u> (10 - 20) ten or twenty minutes with the body vent open to ensure the seal is holding.

DO NOT be fooled by the viscosity of the sealant. Heavy and / or cold sealants will take time to extrude through the tiny leak paths before the valve starts to leak again. Watch the injection gauge very closely to see if the sealant is pushing into the valve or if the seal is holding.

Once a reliable seal is achieved, leave the gun hooked up and under pressure. Remember to check the gauge periodically. Leave the valve alone; DO NOT cycle the valve or the seal will be lost. Leave the body vent fitting open, otherwise pressure will build-up in the valve's body cavity and there is a risk that the gas or liquid will escape downstream. By watching and / or listening to the leakage through the body vent fitting you are able to judge how the seal is holding.



Gap Bridging Ability of Sealants

We draw your attention to the graph illustrated above and on the last page of Offshore Technology Conference Paper # 6697. Notice that sealants "B" and "E" demonstrated some initial sealing ability then failed abruptly after approximately (6) six minutes. This would indicate that the valve technician should always wait some time before assuming it is safe to work downstream of any valve in which sealant has been injected.

"H" is Sealweld® # 5050 Ball Valve Sealant

Knowing when to stop injecting sealant is an important part of being successful. Quite often that one more stroke that you think will get you a perfect seal will cause the seat ring to lift off the seal face and the seal will be lost.

The emergency sealing compounds (Sealweld® XH # 5050 and Sealweld® XXH # 5050) should always be displaced from the seat sealant system after use to eliminate the possibility of future plugging problems. This is done by injecting equal amounts of a lighter lubricant / sealant, such as Sealweld® Total-Lube # 911 and cycling the valve a few times. If it is not possible to cycle the valve completely, we recommend that the ball, gate or plug be rocked off the closed or open position to accomplish the cleaning or purging operation.

Recommended Valve Care Products

Sealweld® Valve Cleaner Plus Specifications

Base Oil:	Mineral Oil
Color:	Black
Temperature Range:	-73° C to +121° C or -100° F to +250° F
Texture:	Thin Paste
Pressure:	10,000 PSI
ASTM Penetration:	270 - 320
Dropping Point:	None
Solvent Resistance:	N/A
Special Additive:	Graphite
Compatibility:	Dispersant
Particle Size:	Micronized
Composition:	Semi-liquid
Application:	Used as an internal valve cleaning compound for use in ball, gate and plug valves as well as orifice fittings. Use in wellhead valves, at pump and compressor stations and distribution systems. Ideal for use on valves with plugged sealant fittings, seat leakage problems or valves which are hard to turn. Leave in valve for at least (30) thirty minutes. Purge from system with regular lubricant / sealant after use.

Sealweld® Equa-Lube Eighty Specifications

Base Oil:	Synthetic
Color:	Natural / Opaque
Temperature Range:	-37° C to +148° C or -35° F to +300° F
Texture:	Tacky
Pressure:	<10,000 PSI
ASTM Penetration:	220 - 250
Dropping Point:	None
Solvent Resistance:	Excellent
Special Additive:	No TFE Fluorocarbon
Compatibility:	Excellent
Particle Size:	N/A
Composition:	Semi-Liquid
Application:	Used as an all purpose synthetic valve seat lubricating compound. Ideal for use in new ball, gate and plug valves for reducing torque, preventing galling of mated seating surfaces and keeping contaminants from entering the valve sealant system. Insoluble in oil, natural gas and water related services. Use in wellhead valves, pump and compressor stations and distribution systems.

Sealweld® Total-Lube # 911 Specifications

Base Oil:	Synthetic
Color:	White
Temperature Range:	-28° C to +232° C or -20° F to +450° F
Texture:	Tacky
Pressure:	10,000 PSI
ASTM Penetration:	165 - 195
Dropping Point:	None
Solvent Resistance:	Excellent
Special Additive:	PTFE Fluorocarbon
Compatibility:	Excellent
Particle Size:	Micronized
Composition:	Semi-Liquid
Application:	Used as a premium grade synthetic lubricant / sealant for ball, gate and plug valves as well as orifice fittings. Insoluble in oil, natural gas and water. Use in wellhead valves, at pump and compressor stations and distribution systems. Proven to reliably seal a leak path of up to 0.10". Ideal for sealing damage to O-rings, chevron seals and U-Cups. Designed specifically as a premium grade synthetic valve lubricant / sealant to provide the longest service life for valves that cannot be serviced frequently. Valves serviced with Total-Lube # 911, require less frequent maintenance than valves serviced with conventional lubricants.

Sealweld® Total-Lube # 911 - 12 (light) Specifications

Base Oil:	Synthetic
Color:	White
Temperature Range:	-31° C to +232° C or -25° F to +450° F
Texture:	Tacky
Pressure:	10,000 PSI
ASTM Penetration:	200 - 225
Dropping Point:	None
Solvent Resistance:	Excellent
Special Additive:	PTFE Fluorocarbon
Compatibility:	Excellent
Particle Size:	Micronized
Composition:	Semi-Liquid
Application:	A slightly less viscous formulation than regular # 911 ideal for outdoor applications, block valves and automatic lubricators on suction and discharge valves.

Sealweld® # 5050 Sealant Specifications

Base Oil:	Synthetic
Color:	Green
Temperature Range:	-34° C to +232° C or -30° F to +450° F
Texture:	Tacky
Pressure:	10,000 PSI
ASTM Penetration:	165 - 195
Dropping Point:	None
Solvent Resistance:	Excellent
Special Additive:	PTFE Fluorocarbon
Compatibility:	Excellent
Particle Size:	Micronized
Composition:	Semi-Liquid
Application:	Used as a synthetic sealant for ball, gate and plug valves. Insoluble in oil, natural gas and water related services. Use in wellhead valves, at pump and compressor stations and distribution systems. Proven to reliably seal a leak path of up to 0.30". Ideal for scratches, scarring or pitting on critical seal faces. Use for sealing stem and seat seal damage when Total-Lube # 911 fails to hold a reliable seal.

Sealweld® Extra Heavy # 5050 Sealant Specifications

Base Oil:	Synthetic
Color:	Green
Temperature Range:	-31° C to +232° C or -25° F to +450° F
Texture:	Tacky
Pressure:	10,000 PSI
ASTM Penetration:	200 - 220
Dropping Point:	None
Solvent Resistance:	Excellent
Special Additive:	PTFE Fluorocarbon
Compatibility:	Excellent
Particle Size:	Micronized
Composition:	Semi-Liquid
Application:	Used as an emergency sealant for ball and gate valves Insoluble in oil, natural gas and water related services. Use in wellhead valves, at pump and compressor stations and distribution systems. Not recommended for use in plug valves except in an emergency. The excellent sealing ability of this compound may restrict internal sealant passages and / or plug them completely. Purge from system after use.

Sealweld® XXH (Double Extra Heavy) # 5050 Sealant Specifications

Application:	Hydrocarbon - Natural Gas, Oil, Related By-Products Use in ball and gate valves with EXTREME leakage problems.

Chameleon Emergency Sealant Specifications

Application:	Emergency Sealant - Designed for application by professional valve maintenance technicians only. Call Sealweld® for assistance. Use only in valves with severe leakage as a last alternative to draining the pipeline for valve replacement. Provides a reliable temporary seal in ball and gate valves.

Sealweld® Slick Sticks Specifications

Temperature Range:	-40° C to +260° C or -40° F to +500° F
Texture:	Moldable
Dropping Point:	None
Solvent Resistance:	Excellent
Special Additive:	PTFE Fluorocarbon
Composition:	Putty
Application:	Injectable valve stem packing for gate valves and plug valves in hydrocarbon service.

Sealweld® D-1014 Sealant Specifications

Also available without PTFE as a low temperature lubricant.

Base Oil:	Synthetic
Color:	Gray
Temperature Range:	-59° C to +204° C or -75° F to +400° F
Texture:	Tacky
Pressure:	10,000 PSI
ASTM Penetration:	310 - 340
Dropping Point:	None
Solvent Resistance:	Excellent
Special Additive:	PTFE Fluorocarbon
Compatibility:	Excellent
Particle Size:	Micronized
Composition:	Semi-Liquid
Application:	Lubricant / sealant - Use in all sizes of ball and gate valves with minor seat leakage. Use in plug valves larger than 6", as well as in orifice fittings. Designed for use in LPG / NGL, low temperature service.

XH (Extra Heavy) D-1014 Sealant Specifications

Application:	Emergency Sealant - Use in ball and gate valves with SEVERE leakage problems. Call Sealweld® for assistance. Do not use in small diameter plug valves.

Sealweld® Eterna-Lube 1000 Lubricant Specifications

Base Oil:	Synthetic
Color:	Silver
Temperature Range:	-40° C to +1093° C or -40° F to +2000° F
Texture:	Tacky
NLGI:	1
ASTM Penetration:	295 - 320
Dropping Point:	None
Solvent Resistance:	N/A
Special Additive:	Proprietary blend
Compatibility:	Excellent
Particle Size:	< 4 microns
Composition:	Semi-Liquid
Application:	Use in valve stems and gearboxes to prevent corrosion, extend bearing life and reduce torque. Use in ball, gate and plug valves in high-temperature service.

Sealweld® Gate Valve Body Filler Grease Specifications

Base Oil:	Synthetic
Color:	Blue
Texture:	Buttery
Dropping Point:	None
Application:	Used as a lubricant for gate valve bodies. Fill the body with this inexpensive lubricating grease. Contains corrosion inhibitors and antioxidizing ingredients.

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