



ProOne Inc.
 1370 S. Acacia Ave.
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HP3 FRAC VALVE GREASE/SEALANT

EXTREME CHEMICAL & HIGH-PRESSURE HYDROLYTIC RESISTANCE

ProOne's Frac Valve Grease/Sealant HP-3 is the next evolution in grease technology for valves used in hydraulic fracturing for oil and natural gas well completions and applications where water and chemical resistance is critical.



HIGHLY RESISTANT TO HVFRs, H2S, SOUR GAS, ACIDS AND BRINE WATER

Formulated with the toughest additive packs to protect against frac fluids, biocides, acids, H2S & CO2, salt water, HVFR's and other contaminants. Outstanding rust & corrosion resistance.



WITHSTANDS 15,000 PSI HYDROSTATIC PRESSURE

With water washout at only 11%, the product displays tremendous resistance against erosion by both fresh and brine water.



TRUE #3 ALUMINUM COMPLEX FOR MAXIMUM ADHESION

Designed to bond to the metal and form a layer of protection to eliminate welding and scoring from shock loading. Outstanding rust & corrosion resistance.



WIDE TEMPERATURE RANGE

Aluminum complex thickener system is designed to handle extreme operating temperatures of 15°F - 400°F. Ideal for extreme thermal/oxidative environments.

TYPICAL PROPERTIES

TEST METHOD	PPL FRAC VALVE GREASE & SEALANT
NLGI Grade	3
Thickener Type	Aluminum Complex
Color	Black
Four-Ball Coefficient of Friction (COF)	0.09
Operating Temperature	+15°F to +400°F
ASTM D-217 Worked Penetration, 60 strokes at 25°C	220-250
ASTM D-2596 Four-Ball Extreme Pressure, Weld Load, kg	500
ASTM D-2266 Four-Ball Wear Test, mm	0.60
ASTM D-2265 Dropping Point, °F	>500
ASTM D-4049 Water Spray-off Removed	11%

FEATURES & BENEFITS:

- Resists HVFR
- Hydrocarbon compatible
- Frac chemical and acid resistant
- Extreme water washout performance
- Prevents leaks and reduces consumption
- Slows the wear process
- Extends service intervals and equipment life
- Very good sealing capability

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COMPATIBILITY WITH HVFR'S

HVFRs are mostly based on long-chain polyacrylamide- (PAM-) based polymers, acrylamido-methylpropane sulfonate polymer (AMPS), polyacrylic acid (PAAc), and hydrolyzed polyacrylamide (PHPA). Usually they are added to water-based fracturing fluids to hydrate “on the fly” as water in oil emulsions to change turbulent flow to laminar flow by reducing frictional loss by 70-80% while pumping frac fluids.

SUMMARY

Due to the chemical composition and the synergism of excellent chemical resistant properties, hydrocarbon compatibility and hydrolytic (water) resistance, HP-3 Valve Sealant is expected to undergo no or very minimal reaction when exposed to HVFRs.

The ability of the product to resist chemical deterioration against acid aqueous solutions and the outstanding hydrolytic stability against both fresh water and brine water are predictors for similar performance against aqueous HVFR solutions.

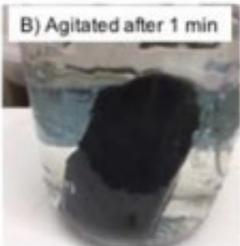
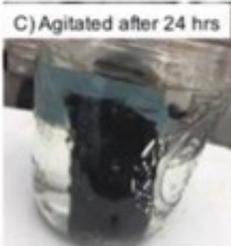
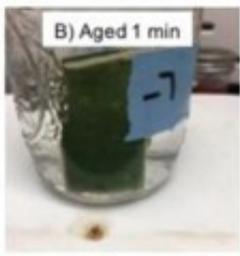
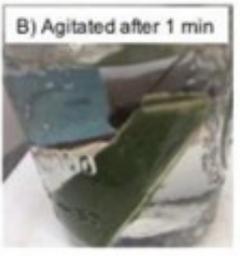
At most, some increase in grease viscosity may be expected upon prolonged exposure due to gelatinization and swelling characteristics of HVFRs.

RELEVANT TESTING

The conclusion is based on multiple tests which have been conducted, both directly with HVFRs and with strong acids (HCL) and weak acids (H2S), as well as hydrolytic testing with both fresh and brine water.

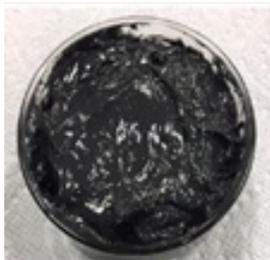
Slick water containing HVFR. The grease samples were applied in glass plates which were immersed in beakers containing slick water for up to 28 days, without any observations of deteriorating effects. All grease samples remained adherent on to the plates without any significant deterioration.

HCL acid. No cracking, flaking, dissolution, or any other signs of degradation from being exposed to HCl acid. Competitive products immediately dissolved on exposure.

ProOne FRAC VALVE SEALANT HP-3				<p>No cracking, flaking, dissolution, or any other signs of degradation from being exposed to HCl acid</p> <p>Immediate reaction with acid leading to dissolution after being exposed to HCl acid</p>
COMPETITOR				

SOUR GAS

Mixture of 20% H₂S, 15% CO₂ water to saturation, and CH₄ to balance at 260 bar and 400 °F for 24 hours. Retained tackiness and consistency without noticeable expansion, cracking, or separation. Competitive products showed separation of oil from the thickener matrix, as well as some surface cracking and expansion in volume.

<p>ProOne FRAC VALVE SEALANT HP-3</p>		<p>AFTER 24hr. @400°F</p>		<p>Compatible: retained tackiness and consistency without noticeable expansion, cracking, or separation</p>
<p>COMPETITOR</p>		<p>AFTER 24hr. @400°F</p>		<p>Deteriorating Reaction: Separation of oil from the thickener matrix, as well as some surface cracking and expansion in volume</p>

BRINE WATER RESISTANCE.

No visible signs of grease deterioration or metal corrosion after exposure to brine water. Steel samples were coated with grease before being exposed to saltwater, both via immersion and vapor phase, then submerged halfway in an 18,000-ppm sodium chloride brine for 12 days at 82 °C.

	<p>After exposure to Brine Water</p>		<p>After cleaning excess grease</p>		<p>No signs of grease deterioration from brine water and metal corrosion</p>
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Hydrolytic resistance. Only 11% water sprayoff rating.

<p>ProOne FRAC VALVE SEALANT HP-3</p> <p>High water resistance with water-spray off rating of 11% (% removal)</p>		<p>COMPETITOR</p>	
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