LUBE-100 lubricant reduces torque, drag and the potential for differential sticking by reducing the coefficient of friction of water-base muds.

It can also provide additional wellbore stability and inhibition, reduce bit-balling and improve high-temperature filtration control. LUBE-100 lubricant is only slightly water soluble under most conditions but is readily dispersible in water-base muds. It is acceptable for most situations specifying a low-toxicity lubricant.

Typical Physical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical appearance</td>
<td>Black liquid</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>0.98-1.04</td>
</tr>
<tr>
<td>pH</td>
<td>8-9.5</td>
</tr>
<tr>
<td>Solubility in water</td>
<td>Slight</td>
</tr>
<tr>
<td>Flash point</td>
<td>430° F (221° C) (PMCC)</td>
</tr>
</tbody>
</table>

Applications

LUBE-100 lubricant should be specified for those situations where torque, drag and/or the potential for differential sticking are likely, such as when drilling highly deviated or high-differential-pressure wells. This additive is especially useful for preventing the "stick-slip" condition in directional drilling when using the "slide" method without rotation.

Normal concentrations of LUBE-100 lubricant range from 2 to 4% or 7 to 17.5 lb/bbl (20 to 50 kg/m³), depending on the mud density, desired reduction in coefficient of friction and the mud system. After the initial treatment, periodic treatments should be made to maintain the desired concentration. Higher concentrations may be needed for pills and special applications. Treatment levels and product usage will depend on the rate of penetration, solids-control equipment and dilution rates. Due to the potential for an increase in viscosity when added to lightly-treated, high-bentonite systems or to systems with high solids, heavy treatments of LUBE-100 lubricant should be added slowly. If high viscosity occurs, circulation time and temperature cycling will restore the fluid to near-original conditions. While LUBE-100 lubricant does not affect the rheology of most mud systems, pilot testing is recommended as a precautionary measure for all initial applications and large treatments.

LUBE-100 lubricant should be added slowly, directly to the mud system wherever there is good agitation or through the mixing hopper. One suggested application method consists of maintaining a small, constant stream, added directly into the suction pit.

LUBE-100 lubricant does not "grease," is resistant to contamination and is compatible with common water-base mud additives. Because the product has very low foaming potential, it will not cause foaming problems in the mud system. For offshore applications with LUBE-100 lubricant concentrations approaching 4%, the LC50 should be monitored closely.
Advantages

- Highly effective down hole lubricant for reducing torque and drag
- Reduces the potential for, and the severity of, differential sticking
- Ideal for minimizing the "stick-slip" condition when "sliding" in directional drilling
- Resists contamination and is compatible with other water-base additives
- Chemically stable down hole under pressure and at temperatures of more than 450° F (232 °C)
- Reduces the tendency for bit and stabilizer balling when drilling gumbo clays
- Can improve wellbore stability and inhibition, and help obtain more gauge holes
- Helps improve high-temperature filtration control
- Helps maximize rate of penetration
- Environmentally acceptable for offshore use
- Does not sheen

Limitations

- May cause high viscosity when added to non-dispersed, lightly-treated bentonite or high-solids fluids

Toxicity and Handling

Bioassay information is available upon request.

Handle as an industrial chemical, wearing protective equipment and observing the precautions described in the Material Safety Data Sheet (MSDS).

LUBE-100 lubricant is a low toxicity product. For offshore applications with LUBE-100 lubricant concentrations approaching 4%, the LC50 should be closely monitored.

Packaging and Storage

LUBE-100 additive is packaged in 55 gal (208 l) drums and is available in bulk.

Store in a dry, well-ventilated area. Keep container closed. Keep away from heat, sparks and flames. Store away from incompatibles. Follow safe warehousing practices regarding palletizing, banding, shrink-wrapping and/or stacking.