**Dril-Kleen II**

*Dril-Kleen* II detergent is a concentrated, low-toxicity drilling fluid additive formulated to aid in preventing bit and bottomhole assembly (BHA) balling in all water-base muds.

It coats drill cuttings and metal surfaces to reduce the sticking tendency of hydratable shales. When applied directly to the bit or BHA, and allowed to dry prior to being run in the hole, the product forms a tough lubricating film that resists gumbo balling. Preventing balling with *Dril-Kleen* II detergent promotes higher rates of penetration (ROP) and easier trips while reducing the risk of hole packoff. Because of its low toxicity, *Dril-Kleen* II detergent is applicable in all onshore and offshore water-base systems.

**Typical Physical Properties**

<table>
<thead>
<tr>
<th>Physical property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical appearance</td>
<td>Amber liquid</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>1.10</td>
</tr>
<tr>
<td>pH (1% solution)</td>
<td>9.3 – 9.5</td>
</tr>
<tr>
<td>Solubility in water @ 68°F (20°C)</td>
<td>100%</td>
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<tr>
<td>Flash point</td>
<td>&gt;200°F (93°C) (PMCC)</td>
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</tbody>
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**Applications**

*Dril-Kleen* II detergent is used to prevent bit, stabilizer and drillstring balling. It assists in reducing drag, enhancing ROP, and allowing mechanical solids-control equipment to remove drill cuttings more effectively. *Dril-Kleen* II detergent lowers the surface tension of water-base muds. Hydratable clays become less prone to adhere to steel surfaces, allowing more efficient drilling. It may be used in freshwater, seawater or brine systems, including dispersed muds and non-dispersed polymer fluids.

For best results, pre-treat mud systems with *Dril-Kleen* II detergent before drilling the formations that might cause balling. Normal treatments range from 0.2 to 0.5 lb/bbl (0.57 to 1.43 kg/m³). In situations where bit balling has occurred, higher concentrations are required, ranging from 0.5 to 1 lb/bbl (1.43 to 2.85 kg/m³).

*Dril-Kleen* II detergent is usually added directly to the suction pit or the active mud system. An optional field practice recommends adding 1 to 2.5 gal (5 to 9.5 L) into the drillpipe during connections as a high-concentration slug. For areas where balling is more severe, spraying or directly applying the product to the bit, tools, and BHA during trips or prior to running them in the hole has proven effective. Once the product dries, it leaves a persistent and lubricious coating on the tools. Although *Dril-Kleen* II detergent is a highly concentrated surface-active agent, it is specifically formulated to minimize foaming. Despite the reduced tendency to cause foaming, slight aeration or foaming may still occur, particularly if the product is added too rapidly to the mud system. Higher temperatures increase foaming tendencies. These instances might require small treatments with a product such as Defoam-X* defoamer.

**Advantages**

- Highly effective at preventing bit-balling
- Compatible with all water-base mud systems
- Safe to use in both onshore and offshore applications
- Contributes to improved ROP and assists in improving the efficiency of mechanical solids-control equipment
- Works at low concentrations, resulting in cost-effective treatments
Limitations

- May cause slight foaming or aeration. A defoamer may be required for some applications.
- Most effective when the total hardness is kept below 250 mg/L. Soda ash or sodium bicarbonate should be used to reduce the hardness to this level.

Toxicity and Handling

Bioassay information is available upon request.

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

Packaging and Storage

Dril-Kleen II detergent is packaged in 2.5-gal (9.5-L) jugs and 55-gal (208.2-L) drums.

In very cold climates, freeze-thaw may result in slight precipitation and sedimentation of the active material. Sufficient agitation will restore the original condition of the product, and performance will not be affected.