Legend™ LD-2250, LD-2350, and LD-2450 Salt Tolerant Friction Reducers

CUSTOM SOLUTIONS ENABLE USE OF FLOWBACK AND PRODUCED WATER IN HYDRAULIC FRACTURING, WITH NO NEED TO DILUTE

OVERVIEW
Legend™ salt tolerant friction reducer systems enable flowback and produced water to be used in hydraulic fracturing applications without dilution with fresh water. The systems are custom tailored based on the total dissolved solids (TDS) of the water, drawing from Legend LD-2250, LD-2350 and LD-2450 friction reducer systems, each designed to provide both rapid hydration and maintain friction reduction throughout the treatment period. The resulting Legend salt tolerant friction reducer systems approach near-fresh water performance, and deliver better friction reduction in super high TDS waters than traditionally possible, enabling these waters to be used in fracturing fluid systems.

Features
» Recommended pre-job testing – in the local field lab or at the production enhancement technology center – determines friction reduction potential
» Legend LD-2250, LD-2350 and LD-2450 friction reducer systems provide rapid hydration and maintain friction reduction throughout treatment
» Effective at low concentrations (0.25 to 1 gallon per 1,000 gallons) in clay control brines, and in water containing a variety of dissolved salt ions

Benefits
» Cationic systems yield superior performance compared to traditional anionic friction reducers
» Better friction reduction performance enables use of super high TDS water in fracturing fluid systems
» Custom tailored solutions with system selection based on TDS criteria

Specifications

<table>
<thead>
<tr>
<th>Friction Reducer</th>
<th>TDS (mg/L)</th>
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<tbody>
<tr>
<td>LD-2250</td>
<td>50,000 to 120,000</td>
</tr>
<tr>
<td>LD-2350</td>
<td>100,000 to 200,000</td>
</tr>
<tr>
<td>LD-2450</td>
<td>200,000 to 300,000</td>
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</tbody>
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The Legend™ salt tolerant friction reducer system (red) provides better performance than traditionally possible, enabling super high TDS water to be used in fracturing fluid systems. The traditional anionic friction reducer (blue) does not fully hydrate, which can lead to increased surface treating pressures.
APPLICATIONS

The Legend salt tolerant friction reducer systems are designed to work with flowback and produced water with high TDS levels. The systems can handle TDS levels greater than 200,000 mg/L and is effective in water containing a variety of dissolved salt ions including chlorides, sulfates, sodium, calcium, and magnesium, and can also tolerate a variety of unknown contaminants that may render traditional friction reducers ineffective. The service is effective at low concentrations (0.25 to 1 gallon per 1,000 gallons) in clay control brines and produced and flowback water sources.

COMPATIBILITIES

The Legend friction reducer systems are cationic and are very effective in water containing large amounts of dissolved solids. They can be used in low pH (<4) fluids and can be applied in a variety of pH ranges. These systems are not compatible with anionic polymers or surfactants, and should always be tested for compatibility with other materials.

For more information, contact your local Halliburton representative or visit us on the web at www.halliburton.com/multichem