Legend™ LD-2800 Cationic Liquid Friction Reducer

**OVERVIEW**

Legend™ LD-2800 cationic liquid friction reducer (FR) is designed to help reduce pipe friction pressures generated during hydraulic fracturing treatments using fresh water and moderate brines. LD-2800 FR is a single-stream oil-external emulsion which is easily inverted with a minimal amount of shear. It is effective at concentrations between 0.25 gallons per 1,000 gallons in fresh water, and has equivalent performance with concentrations up to 1.0 gallons per 1,000 gallons in brines up to 100,000 mg/L. Higher salt and TDS level waters sometimes will require higher loadings of LD-2800 FR, as seen with other FRs.

**APPLICATIONS**

LD-2800 is a single-stream cationic friction reducer specially designed to rapidly hydrate and maintain friction reduction throughout the treatment. This feature of LD-2800 friction reducer is maintained in brackish or high TDS waters, which can interfere with hydration of FRs. Oxidizing breakers, such as LD-4550, are recommended to break FR polymer chains and aid in fracturing treatment cleanup. Core regained permeability studies showed an increase of 59% on average in regained permeability of fluids containing 1 gal/Mgal FR and 1 lb/Mgal LD-4550 oxidizing breaker as compared to FR fluids with no breaker.

**FEATURES**

» Cationic liquid friction reducer  
» Oil-external emulsion single-stream friction reducer  
» Used with low to mid-range TDS water  
» Compatible with many stimulation chemicals

**BENEFITS**

» Reduces pipe friction pressure while pumping during hydraulic fracturing  
» Effective at low concentrations (0.25 to 1.0 gallons per 1,000 gallons) in fresh water  
» Works in brines with TDS up to 100,000 mg/L  
» Mixes on-the-fly without lumping associated with dry powder materials  
» Can be foamed using nitrogen

---

![Friction Reduction Vs. Time, 1/2" 0.5 gpt, 10 GPM, Freshwater, 70° F](image-url)
FIELD APPLICATIONS

When non-fresh water is used in hydraulic fracturing treatments, the base fluid typically contains produced water, whether in entirety or in part, which contains various ions that can interfere with typical fracturing additives designed for fresh water use. In one particular example, an operator in Texas used a base fluid comprised of a blend of 70% fresh water and 30% produced water. LD-2800 FR was selected based on performance in the blended 30,000 ppm TDS water as well as compatibility with the other fracturing fluid additives. At a dosage of 1 gpt, LD-2800 helped maintain an average wellhead treating pressure of 8790 psi at an average rate of 67 bpm. During this hydraulic fracturing treatment, over 17,000,000 pounds of sand was placed utilizing 13,700,000 gallons of LD-2800 FR treated water.

COMPATIBILITIES

LD-2800 friction reducer is compatible with most stimulation chemicals. Because compatibility depends on chemical concentrations, LD-2800 should always be tested for compatibility when used with other materials, and particularly, with anionic materials.

Product Specifications

<table>
<thead>
<tr>
<th>Form</th>
<th>Opaque, white to off-white liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Gravity</td>
<td>1.07 - 1.09</td>
</tr>
<tr>
<td>Density, 60 °F</td>
<td>8.91 - 9.11 lb/gal</td>
</tr>
<tr>
<td>Flash Point</td>
<td>&gt;200°F (93.3°C)</td>
</tr>
<tr>
<td>Ionic Charge</td>
<td>Cationic</td>
</tr>
</tbody>
</table>

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