Legend™ LD-2975 Anionic Liquid Friction Reducer

OIL-EXTERNAL EMULSION REDUCES PIPE FRICTION PRESSURES DURING FRACTURING WITH FRESH WATER AND MODERATE BRINES

OVERVIEW
Legend™ LD-2975 anionic liquid friction reducer (FR) is designed to help reduce pipe friction pressures generated during hydraulic fracturing treatments using fresh water and moderate brines. LD-2975 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 150,000 mg/L. Higher salt and TDS level waters sometimes will require higher loadings of LD-2975 FR, as seen with other FRs.

APPLICATIONS
LD-2975 is a single-stream anionic friction reducer specially designed to rapidly hydrate and maintain friction reduction throughout the treatment. This feature of LD-2975 friction reducer is maintained in brackish or moderate 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
» Anionic 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 150,000 mg/L
» Mixes on-the-fly without the characteristic lumping associated with dry powder materials
COMPATIBILITIES
LD-2975 friction reducer is compatible with most stimulation chemicals. Because compatibility depends on chemical concentrations, LD-2975 should always be tested for compatibility when used with other materials, and particularly, with cationic materials.

Product Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<tbody>
<tr>
<td>Form</td>
<td>White to off-white emulsion</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>1.03 - 1.09</td>
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<tr>
<td>Density, 60 °F</td>
<td>8.60 - 9.10 lb/gal</td>
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<tr>
<td>Flash Point</td>
<td>&gt; 200 °F (&gt; 93.3 °C)</td>
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<tr>
<td>Freeze Point</td>
<td>-22 °F (-30 °C)</td>
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<tr>
<td>Ionic Charge</td>
<td>Anionic</td>
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