

# Friction Reducer Selection

## Helping You Select the Right Product

25+

Suppliers

A Friction reducer (FR) is a polymer chemical additive that when added to the fracturing base fluid, reduces turbulence, decreases friction pressure losses, and as a result allows higher pump rates. Higher pump rates along with incremental changes to the fluid viscosity enable the transport of proppant into the fractures. Without either, proppant transport would be negatively affected and lead to premature settling and/or a screen out.

125+

FR Options

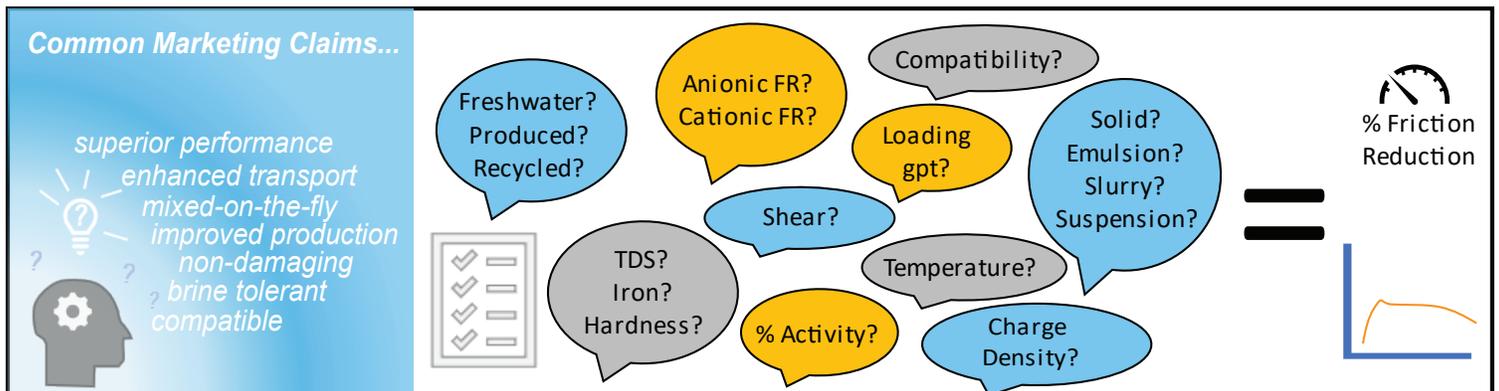
A FR is typically manufactured as a dry polymer or reacted into an emulsion. The dry polymer can also be used to create a slurry or suspension in mineral oil. Currently, there are four forms in which FR is delivered to a jobsite: solid, water-in-oil emulsion, suspension, water-in-water dispersion. Irrespective of form, all FRs must mix in, disperse or hydrate, and be compatible with the frac fluid water to be effective.

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Testing Standards

With over 25 vendors supplying on average 3-5 products, there are 125 different possible FR's to choose from. Along with the large number of FR options come the technical data sheets and test data generated, creating an endless pool of information to sort through. Attempting to decode the marketing jargon and technical information can be a daunting task. A major pressure pumping company recently shared that they screened 70 products from 17 suppliers.

A review of the FR marketing data publicly available, identified recurring marketing and benefits claims: high molecular weight, superior performance, enhanced transport, brine tolerant, fast inversion, compared to competitive product X or technology, etc. While these all describe certain properties of FR's, there is no standard by which these are compared, leaving it open to interpretation or speculation.



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## On-Site Testing Benefits

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Up to

**30%**

Chemical Cost  
Savings

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Up to

**1000  
psi**

Decrease in Frac  
Pressures

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Up to

**50%**

More Recycled  
Water Usage

Lack of testing standards or specifications limit the field engineers' ability to diagnose FR issues, prescribe corrections, and/or optimize performance. This can be further complicated by marketing claims, use of proprietary naming, and changes in field conditions that affect product performance and dosages needed. FR performance is highly affected by the water in which it will be dispersed. As such, the selection is based on several water properties including Total Dissolved Solids (TDS) levels and ion concentrations (i.e. Cl, Ca, Mg). As water composition changes, it is important to determine the tolerance range of the FR to the specific ions rather than TDS alone.

FR performance is typically quantified in the lab by evaluating its ability to reduce friction in a pipe. A friction loop is used to quantify the % friction reduction that each FR can achieve in a specific fluid. However, there are no standard specifications on a friction loop design or test methods. This makes it difficult to compare one product versus another if they are not evaluated on the same equipment. Results can also change with the water composition and temperature. Tests must be completed in a lab days or weeks before a frac is scheduled. If not, this results in use of water or FR that is not representative of what will be available on-site.

On-site FR testing can provide real-time results, eliminating variations resulting from changes in water composition and FR. Product performance can be measured on the same equipment under field conditions and with field chemicals. Trends in water composition can also be identified monitored for effect on FR performance. By optimizing the FR in real-time E&P companies using on-site friction loops have been able to reduce their chemical usage, increase recycled water usage, set KPI's for performance, create performance databases, and create standard FR selection criteria.

The number of FR products and data available will continue to increase as the industry develops product to meet the ever changing field conditions. As such, the ability to identify the best candidate to meet the field specifications will be critical. Special considerations should be made to evaluate products under the same test conditions and independent of bias towards a particular claim or benefit. To learn more about proper FR selection and testing contact us today.