

SUMMARY:

CoreVis-5 is a slurried, anionic, salt tolerant high viscosity friction reducer capable of producing exceptional viscosity and friction reduction regardless of water quality. At low concentrations such as 0.25-1 GPT, the result is a reduction in friction pressure during hydraulic fracturing operations. When pumped at higher concentrations, CoreVis-5 creates greater viscosity compared to conventional friction reducers which can improve proppant transport by yielding a proppant pack with higher conductivity. When compared to conventional guar based linear and cross-linked fluids, CoreVis-5 uses fewer chemicals, simplifies logistics, reduces equipment on location, and allows on-the-fly design flexibility. As a result, solutions are optimized to execute a variety of jobs.

ADVANTAGES:

- ◆ Creates higher viscosity than industry standard high viscosity FR's while promoting superior sand suspension
- ◆ Salt tolerant to greater than 200,000 TDS, monovalent and divalent ions
- ◆ Allows increased flow rates at lower treating pressures, reducing friction pressure by more than 70%
- ◆ Instantly disperses and hydrates in all types of water including recycled frac water and/or produced waters
- ◆ Degradable with oxidizers
- ◆ Effective at low concentrations

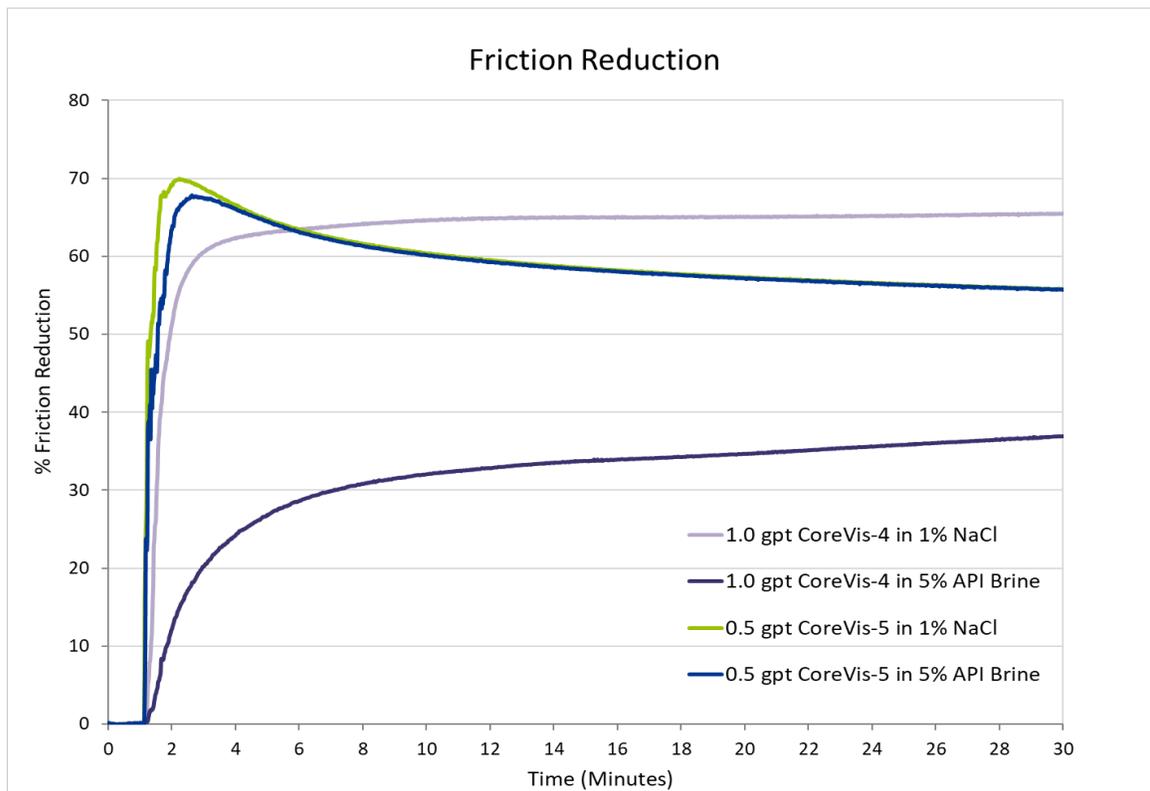


Figure 1: Friction Reduction

MIXING & BLENDING INSTRUCTIONS:

- ◆ CoreVis-5 can be added on-the-fly or batch mixed
- ◆ CoreVis-5 can be added to either the suction or discharge side of the blender at typical concentrations ranging between 0.25 and 1.0 GPT
- ◆ To create greater viscosity, CoreVis-5 should be pumped at 1.5-5 GPT

TECHNICAL LAB RESULTS:

Friction Loop Testing:

Friction loop testing was performed to evaluate the effectiveness of two high viscosity friction reducers in brine water. CoreVis-4 is a conventional emulsion PAM high viscosity FR. **Figure 2** shows the relationship between viscosity and shear rate in addition to the characteristics of CoreVis-5 when compared to other high viscosity friction reducer CoreVis-4.

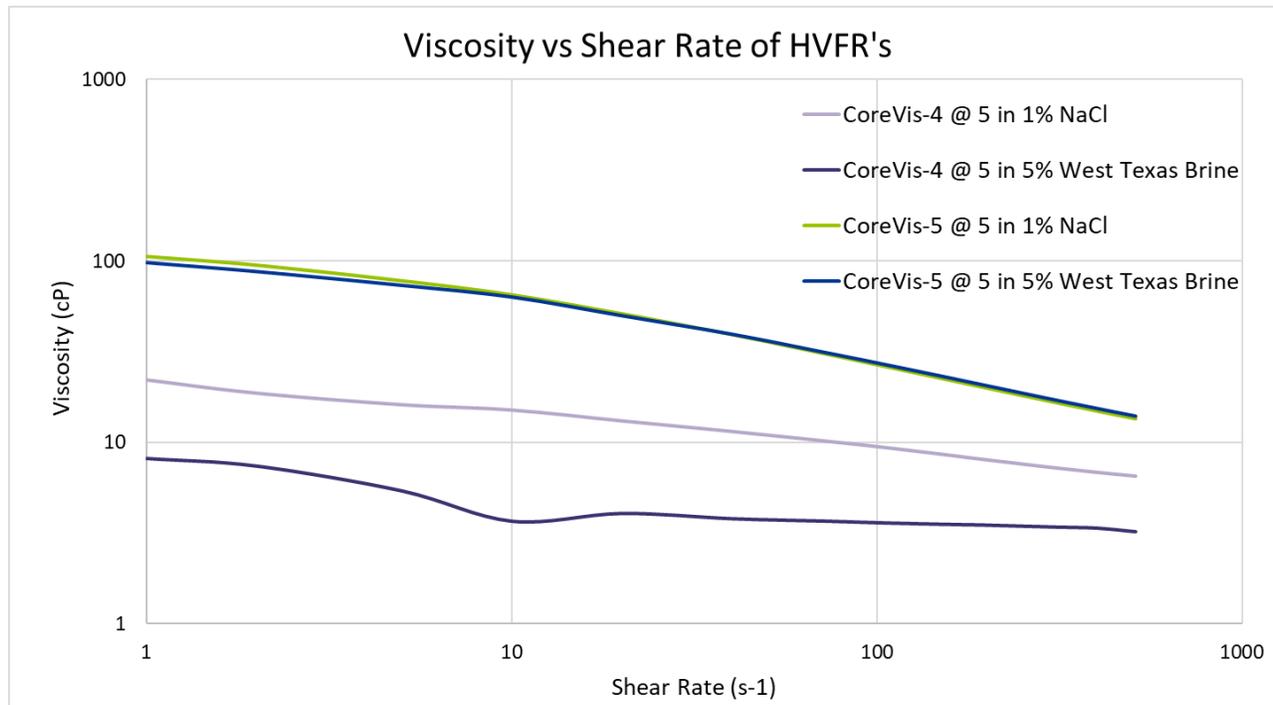


Figure 2: Viscosity vs Shear Rate of high viscosity FR's