Reduce Cost per BOE with Efficient Self-Suspending Proppant Transport Technology

THIS PROPPANT BRIEF DISCUSSES:

- Self-suspending proppant transport technology reduces cost per BOE by efficiently increasing the propped fracture surface area.
- The technology's suspension and stacking enable uniform proppant distribution throughout the low-viscosity, water-based frac fluid unlike proppant in slickwater and gel-based fluids.
- The shear-stable, hydrogel polymer, which increases fracturing efficiency, breaks cleanly and flows back easily to significantly decrease formation and proppant pack damage.

Operators can now choose coarse-mesh, higher conductivity proppant, without sacrificing proppant transport.

Self-suspending proppant transport technology lowers cost per BOE by efficiently increasing the propped fracture surface area compared with traditional stimulation designs. By just adding to water, the shear-stable, hydrogel polymer rapidly swells, uniformly stacking proppant throughout the low-viscosity, water-based frac fluid unlike proppant in slickwater and gel-based fluids. The polymer breaks cleanly and flows back easily to considerably decrease formation and proppant pack damage. Operators working in heterogeneous formations are applying this efficient proppant and fluid system in one. Less water with fewer fluid additives in less time means achieving compelling hydrocarbon production success.

UNIFORM PROPPANT DISTRIBUTION

Petroleum engineers now have a better approach to stimulating oil and gas reservoirs. With self-suspending proppant transport technology, they can choose the optimal proppant for the application, relying on the technology to stack proppant uniformly in the fracturing fluid and travel farther in the formation. No longer do operators have to choose between finer-mesh, lower-conductivity proppant in favor of enhanced transport.

Figure 1a

Figure 1b

These two Stim-Lab slot test images compare self-suspending proppant technology, Figure 1a, and proppant in slickwater fluid, Figure 1b. At full saturation, the technology's polymer wrapped around 20/40-mesh Northern White sand is uniformly transported and distributed higher throughout the fracture network to enhance oil and gas production. In the slickwater fluid, Figure 2b, 20/40-mesh Northern White sand quickly settles and forms a dune that requires fluid sweeps and high pumping rates to keep pushing the sand farther into the fracture.

Additionally, in traditional completions designs, proppant falls out of the frac fluid and forms a dune. Operators often pump fluid sweeps to keep treating pressure down and populate the fracture. Self-suspending proppant has also eliminated this unnecessary process.

An engineered polymer—wrapped around a sand grain or ceramic proppant—rapidly swells in water, mobilizing placement of the proppant pack farther into the fracture. This eliminates the duning effect operators have encountered for decades.

The shear-stable polymer remains attached to the sand grain or ceramic proppant during blending and transport through the perforations and into the fracture network. Once in the fractures, the polymer-coated proppant relies on a conventional breaker. The breaker strips away the polymer, leaving only the original proppant in place, without traditional frac fluid's negative effects that can lower formation permeability and proppant pack conductivity up to 60% and 70%, respectively. Self-suspending proppant has substantially diminished adverse of gel and slickwater based fluids that obstruct hydrocarbon production.

REDUCED COST PER BOE

A DJ Basin operator compared 11 wells on the same pad — six self-suspending proppant wells against five wells completed with a high viscosity friction reducer. Both used only 40/70 northern white sand. The self-suspending proppant wells averaged more than 20% cumulative production increase, without any further optimization of the completion design.

In another field trial, a Williston Basin operator also improved hydrocarbon production while significantly enhancing operational efficiency. The 11-well trial included 6 self-suspending proppant wells and 5 wells completed with frac sand in a 30-lb crosslinked gel-based fluid. The new technology wells required 77% fewer fluid additives and 14% less pumping time. On average, the operator increased production 39% while paying for the proppant investment in less than 4 months.

CONCLUSION

A better completions design is supporting operators in their search for lower-cost production. Self-suspending proppant transport technology, whose robust hydrogel polymer has opened a new chapter in oil and gas reservoir stimulation, is increasing hydraulic fracturing efficiency and reducing cost per BOE.

Part Two: *Reduce Formation and Proppant Pack Damage with Self-Suspending Proppant Transport Technology*

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