

Propel SSP™

The first manned flight stayed
suspended for 120 feet.

That wasn't far enough.



Go Farther.

The Wright Brothers tried multiple times to glide their “flying machine” over the sandy terrain of Kitty Hawk. On December 17, 1903, they finally succeeded with Orville at the controls. But 120 feet wasn’t far enough. Nearly two years later, Wilbur flew over 24.5 miles and landed only because the plane ran out of fuel.

That same kind of innovation and determination has gone into Propel SSP™ proppant transport technology from Fairmount Santrol. So now, a proppant can swell and suspend in water to flow evenly along laterals and farther into fractures. We know the idea will fly.



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***“The airplane stays up because
it doesn’t have the time to fall.”***

Orville Wright

Game Changing.

The proprietary polymer coating attached to a proppant hydrates and swells upon contact with water, increasing the surface area and significantly lowering the effective specific gravity. The result is more efficient proppant transport into every fracture for improved hydrocarbon recovery and better NPV for your well.

Propel SSP uses a polymer coating only 1 to 3 microns thick applied to conventional proppant. When fully hydrated, the coating swells to form a hydrogel layer that changes the effective specific gravity from 2.6 to about 1.3*. And that completely changes the game for efficient proppant transport.

*Refers to coating on sand.

EFFECTIVE SPECIFIC GRAVITY COMPARISON

2.6

CONVENTIONAL FRAC SAND

1.3

FULLY HYDRATED PROPEL SSP PARTICLE*

Hydrogel coating increases proppant bed height, maximizing reservoir contact area

Shear-stable polymer coating swells in water to create efficient proppant transport



Maximum regained conductivity results from application of conventional chemical breakers

Maintains crush strength and conductivity of uncoated proppant substrate

*Refers to coating on sand.

Increase Stimulated Reservoir Volume.

Propel SSP technology holds up to the shear of proppant blending and injection. The hydrogel layer remains attached throughout proppant transport and helps proppant particles more easily negotiate the small passageways in complex fractures. It builds more vertical proppant bed height, then breaks on schedule using familiar breaker chemistry.

Compared with a slickwater design, our proppant transport technology stays suspended and moves more easily along laterals, eliminating the need for supplemental water sweeps or viscosifiers. Look at this side-by-side comparison to see the remarkable difference.



Northern White Frac Sand, Slickwater

OPERATING TEMPERATURE PROFILE

35°F

Low

380°F

High



Northern White Frac Sand, Propel SSP

Go Farther into Every Fracture.

With the effective specific gravity of Propel SSP particles cut nearly in half, proppant transport becomes considerably more efficient. Using fresh water without viscosifiers, you can move proppant greater horizontal distances, deeper and higher into the formation.

PROPPANT: NORTHERN WHITE FRAC SAND | **FLUID:** SLICKWATER

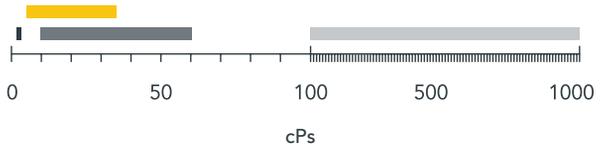


These illustrations provide a clear graphic representation of actual flow loop tests conducted at Stim-Lab. Above, uncoated Northern White frac sand shows behavior that's typical in traditional slickwater fracs. It drops out of the frac fluid and creates a duning effect that prevents proppant transport deep into the fracture.

REDUCING PUMPING HORSEPOWER REQUIREMENTS

The viscosities of proppant slurries using Propel SSP range from those commonly observed with slickwater to linear gel frac fluid designs, based on proppant concentration. Observed proppant transport capabilities are similar to cross-linked gels, yet the significantly lower viscosities promote farther transport and support fracture complexity.

SLURRY VISCOSITY COMPARISON



- 2-3 cPs, SLICKWATER
- 10-60 cPs, LINEAR GEL
- 100-1000 cPs, CROSSLINKED GEL
- 5-35 cPs, PROPEL SSP (Function of proppant concentration)

PROPPANT: PROPEL SSP | **FLUID:** FRESH WATER

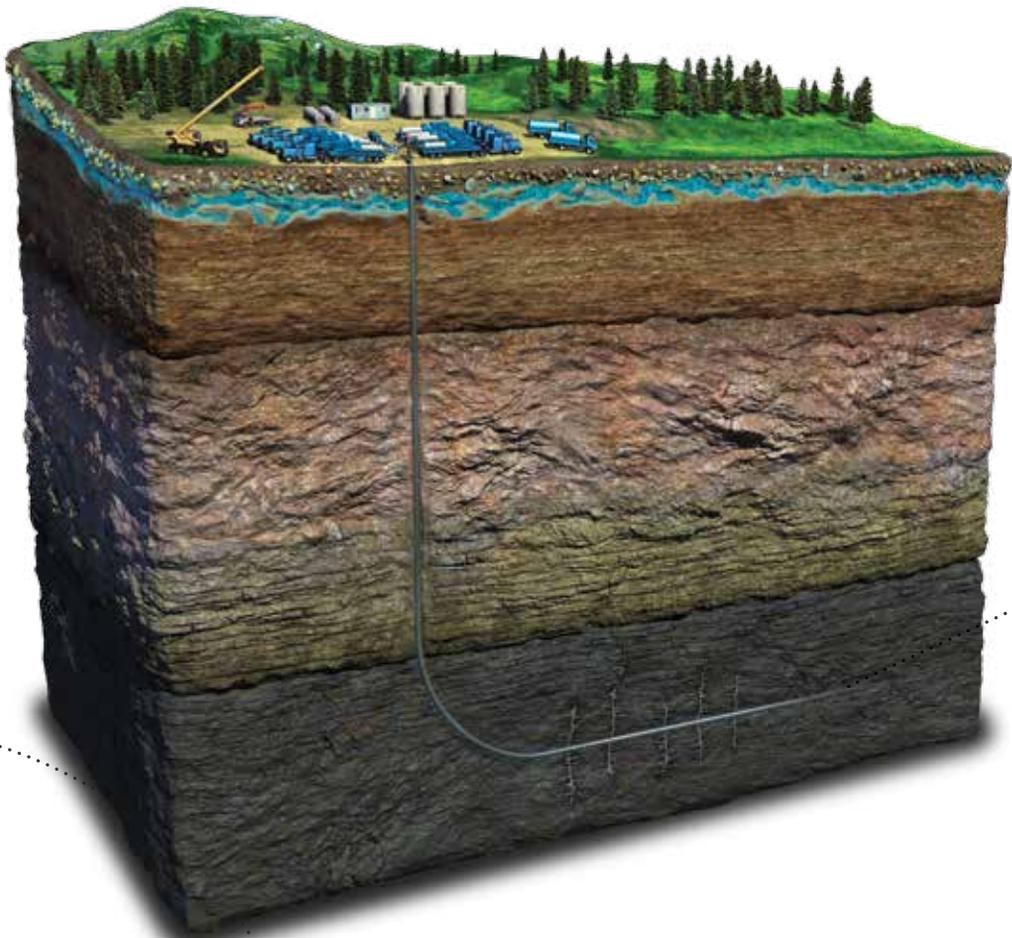


Compared with slickwater, Propel SSP displays superior transport behavior and uniformly distributes proppant throughout the fracture. Proppant does settle at low loading rates, yet remains fluidized and in motion. At higher loading rates, proppant fills the entire fluid column. Improving flow and maximizing propped surface area result in better hydrocarbon recovery.

The Upside of Improved Frac Efficiency.

With Propel SSP, you won't need additional viscosifiers or friction reducers in your frac design. The unique polymer coating provides excellent proppant transport and friction-reducing properties when mixed with fresh water. Further the synthetic polymer yields maximum regained conductivity and retained permeability by pumping with conventional breaker chemicals.

For oilfield service companies, there is no new equipment or chemistry to master. Easier on pumping equipment and iron, the use of Propel SSP results in less maintenance and longer equipment life.



TRANSPORT EFFICIENCY

37%

3 PPG FRAC SAND
IN SLICKWATER

100%

3 PPG PROPEL SSP
IN WATER

PROPEL SSP ACHIEVES 100% PROPPANT TRANSPORT IN A THIN FLUID.



Our proprietary polymer coating swells to provide efficient thin fluid proppant transport deep into fracture tips. Propping open the fracture uniformly from wellbore to tip maximizes contact surface area for improved production.

Propel SSP™

Better Hydrocarbon Recovery.
Improved Frac Efficiency.



You've invested in exploration, drilling, and data analysis. Now make it all go farther. Propel SSP can help you uniformly transport the right proppant higher and deeper into fractures. You'll increase propped fracture surface area to improve hydrocarbon recovery. You'll use less water, simplify frac design and improve frac efficiency. That all adds up to increased recovery rates and a better NPV for your well.





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***“It is possible to fly without motors, but
not without knowledge and skill.”***

Wilbur Wright



Go Farther.

See for yourself how Propel SSP will change the game and help you get more from your wells.

Go to PropelSSP.com to learn more.

