Why Choose Resin-Coated Proppant Over Frac Sand for Moderate Well Conditions?

Operators can choose from a wide range of proppants—ultrahigh performance for the most severe conditions to frac sand—for their completions.

Often, we’re asked if there’s a measurable performance difference between resin-coated proppant and frac sand, especially where closure stress conditions are in the intermediate range between 4,000 psi and 8,000 psi.

During the 38 years since our company was founded, we have documented that resin-coated proppant offers superior performance and increased well net present value in these conditions. Resin coatings, which are continuously quality controlled and tested, are the optimal approach to managing the forces that can reduce short-term and long-term hydrocarbon production.

Superior Embedment Resistance

Under closure stress, a proppant’s outer coating deforms to collectively redistribute closure stress forces across a greater area. Individual proppant particles are less prone to embedment in fracture walls, better maintaining fracture width over time and also resisting fines formation. (Figure 1).

*Figure 1 — Resin Coating Redistributes Closure Stress to Reduce Embedment*
Higher Flow Rates with Reduced Fines

The 1972 Coulter and Wells study on fines and flow capacity remains the industry standard. The researchers determined in a laboratory setting just 5% fines decrease flow capacity by 60% in a model proppant pack. (Figure 2).

Generation of Fines

![Generation of Fines](image)

Figure 2 – 5% Fines Generate a 60% Loss in Flow Capacity

Proppant concentration was 20/40 mesh and 1 lb./sq.ft.

Additional laboratory research over extended time frames has shown all conventional proppant types are subject to forces that can cause crushing, fines formation, and conductivity losses.

Resin-coated proppant has an important advantage in combating these destructive forces: Resin coating redistributes point-loading forces, giving individual proppant particles significantly greater resistance to crushing and fines formation.

WHY CHOOSE RESIN-COATED PROPPANT OVER FRAC SAND FOR MODERATE WELL CONDITIONS?
Superior Crush Resistance of Resin-Coated Proppant: Fines Formation at 6,000 psi

In addition, resin coating encapsulates fines, preventing mobilization and subsequent bridging within a proppant pack. One research study that examined the mobility of fines in 20/40 Jordan sand concluded only particles smaller than 100 microns could actually migrate through the fracture. Larger particles were simply too large to move through the proppant pack pore structure.³

Controlling Flowback with Curable Resin-Coated Proppant

Curable resin-coated proppant preserves well production rates longer than frac sand by preventing flowback.

Curable resin-coated proppant particles form a bonded particle matrix downhole while preserving excellent pore space and conductivity. Individual proppant particles are held in place and resist flowback far better than uncoated sand.

The curability or bond strength is a function of proppant set time and reservoir temperature. For lower downhole temperature, supplementary activators are available.

References


WHY CHOOSE RESIN-COATED PROPPANT OVER FRAC SAND FOR MODERATE WELL CONDITIONS?

Fairmount Santrol is a leading provider of high-performance sand and sand-based products used by oil and gas exploration and production companies to enhance the productivity of their wells. The company also provides high-quality products, strong technical leadership and applications knowledge to end users in the foundry, building products, water filtration, glass, and sports and recreation markets. Its global logistics capabilities include a wide-ranging network of distribution terminals and thousands of rail cars that allow the company to effectively serve customers wherever they operate. As one of the nation’s longest continuously operating mining organizations, Fairmount Santrol has developed a strong commitment to sustainable development, environmental stewardship, and operational safety. Correspondingly, the company’s motto and action orientation is: “Do good. Do well.”

Data listed has been generated by Fairmount Santrol and independent laboratories. Closure stress testing has been conducted with a baseline of 2 lb/ft2 @ 250°F and 50 hours of closure. Every real-world sampling is different, so your results may vary. Fairmount Santrol proppants are compatible with most all commonly used water- and oil-based fracturing fluids. Some fluids may require adjustment of pH control, foamer, or breaker loading. Avoid prolonged exposure to highly alkaline fluids. Testing prior to pumping is advised.

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