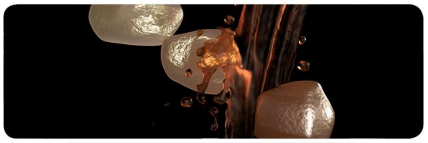
HEXION
Responsible Chemistry

Technical Bulletin

Proppant Enhancement

Economical proppant flowback control additive

PropShield™
Proppant Flowback Control Additive


Proppant flowback occurs when well production carries unbonded proppant out of the fracture. This can have a detrimental effect on the success of a well by causing frac width reduction, wellbore deposition, and pump/surface equipment damage.

With the evolution of completion designs leveraging longer lateral lengths and increased proppant intensity, proppant flowback control has become a critical challenge. In some cases, conventional solutions do not provide the cost-benefit ratio operators are looking for.

Hexion's PropShield™ additive is a liquid proppant flowback control agent that can be added directly to the blender tub. It is designed to economically control proppant flowback and is suitable for all sand mesh sizes.

The PropShield proppant flowback control additive is effective over a wide range of bottomhole temperatures and is compatible with most commonly used fracturing fluid additives.

Permian Basin Case Study

The PropShield additive continues to be successfully used in the Permian Basin, Anadarko Basin, and Viking formation to control proppant flowback.

Compared to offset wells, a PropShield additive user in the Permian Basin experienced:

- **50% less** proppant returned during drillout
- **80% less** proppant flowback once the wells were put in production

According to a completion manager at Centennial Resource Development, Inc., the well in which the PropShield additive was utilized produced half the sand that the offset well produced.

The manager stated that the flowback phase yielded positive results as well. The well using the PropShield additive averaged 0.5 to 3 gallons/hour of sand recovered, while the offset well averaged 6 to 8 gallons/hour of sand recovered. The manager concluded that they were very pleased with the results and will continue to evaluate the PropShield additive in various areas across their acreage.

Technical Applications

Fracture Treatments:

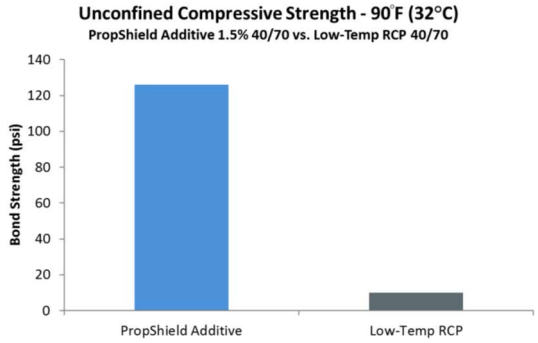
- At bottomhole static temperatures ranging 90°F – 215°F (32°C – 102°C)

Technical Advantages and Benefits

- Cost-effective means of minimizing proppant flowback
- Applied at the blender tub on location using a standard liquid additive pump
- Frac sand treated with the PropShield additive can control proppant flowback at bottomhole temperatures as low as 90˚F

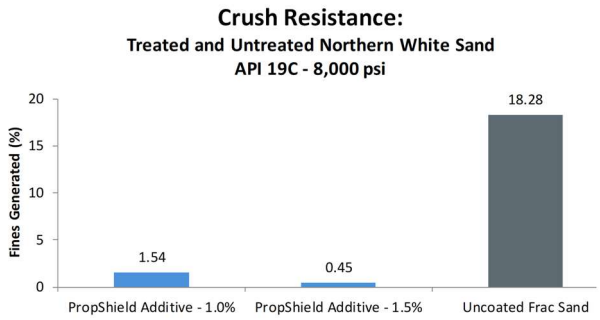
Unconfined Compressive Strength Testing

At 90°F, sand treated with the PropShield additive showed much higher bond strength compared to a commonly used low temperature resin-coated proppant.



Crush Resistance Testing

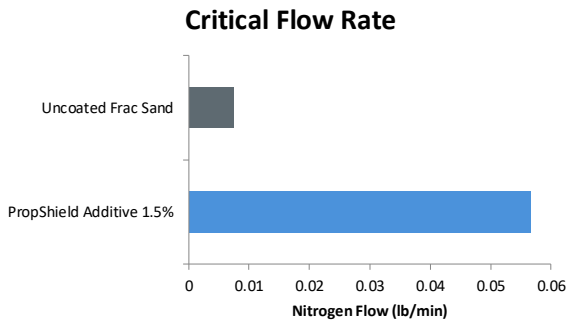
Crush resistance testing demonstrates the PropShield additive's ability to encapsulate fines, which could otherwise migrate and have a negative impact on well production.



Consolidated proppant core formed from PropShield additive treated sand.

Third Party Critical Flow Rate Testing

Sand treated with PropShield additive can withstand flow rates that are eight times higher than uncoated frac sand.



Physical Properties	Typical
Physical Form	Liquid
Color	Brown
Odor	Very slight
pH (5% in 50/50: water/IPA)	9.58
Viscosity 68°F (20°C) (100 RPM)	250–300 cP
Pour Point	14.8°F (-26°C)
Flash Point	165°F (74°C)
Density lb/gal	8.6383
Specific Gravity	1.0351

Application and Storage	
Suitable Mesh Sizes	12/20, 16/30, 20/40, 30/50, 40/70, 100 Mesh
Recommended Storage Conditions	Cool and dry
Shelf Life	1 year
Packaging	Tote or ISO container

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