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FiberFRAC

Fiber-based fracturing fluid technology

APPLICATIONS

- Hydraulic fracturing operations on tight gas wells
- Low-permeability environments with extended fracture closure times
- Temperature ranges between 140 and 345 degF
- Slickwater fracturing fluid treatments
- Crosslinked polymer fracturing treatments

BENEFITS

- Improved production rates
- Greater reservoir drainage efficiency for lenticular reservoirs
- Increased retained proppant-pack permeability
- Optimal dimensionless fracture conductivity
- Less fracture height growth

FEATURES

- Proppant transport decoupled from fluid viscosity
- Enhanced proppant distribution fibers that degrade over time
- Lower-viscosity fracturing fluid extended temperature range
- Lower polymer loadings

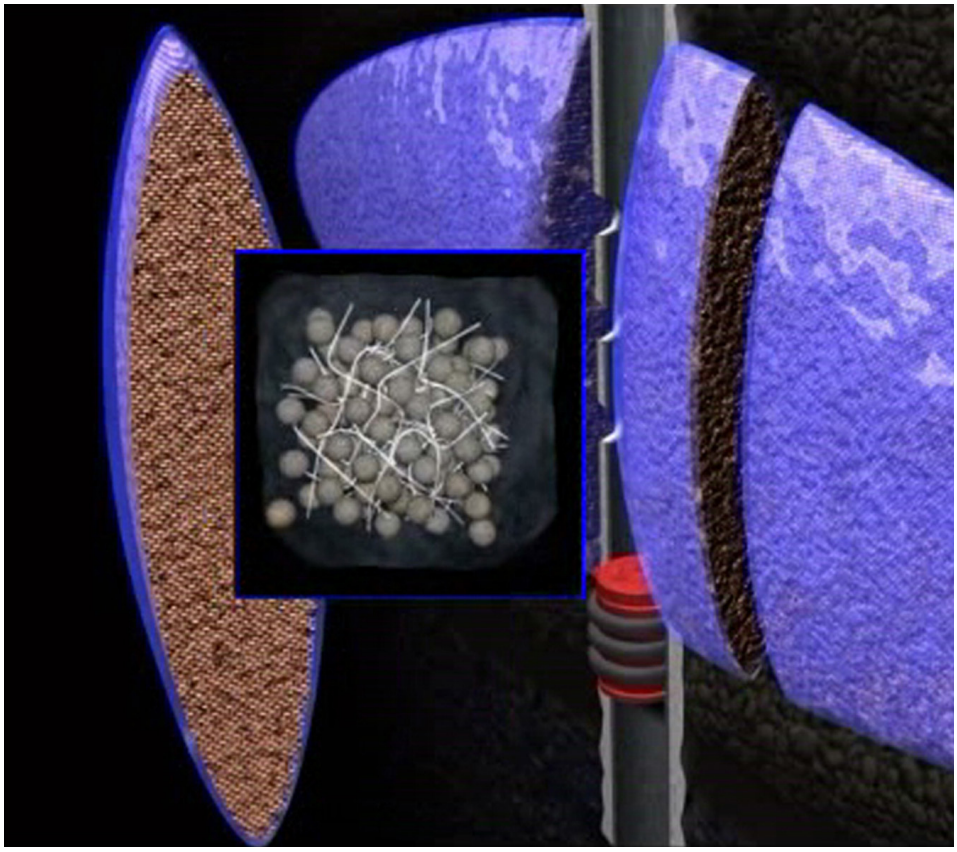
Proppant settling occurs during hydraulic fracturing operations when the fluid viscosity falls below the critical threshold required to suspend proppant. The settling can reduce the deliverability of the fracture, negatively impacting productivity.

In slickwater applications, the viscosity of the base fluid is inadequate to provide proppant transport. In tight gas applications with conventional crosslinked fluids, the fracturing fluid is designed to break shortly after pumping. The fracture remains open for hours, and a low-viscosity fluid remains that is unable to suspend the proppant.

Tailored, fiber-based fracturing fluid

FiberFRAC* fiber-based fracturing fluid technology decouples proppant transport from fluid viscosity. The technology creates a fiber-based network within the fracturing fluid, providing a mechanical means to transport, suspend, and place the proppant. Because the proppant transport then no longer relies on fracturing fluid viscosities, it can be tailored to reservoir conditions to optimize fracture geometry. If fracture height growth is a concern, a low-viscosity fluid can be used, even at high temperatures, while still maintaining good proppant transport.

In addition to fracture height containment, the retained proppant-pack permeability can be significantly increased because of the lower polymer loading required. Laboratory testing has shown that decreasing the polymer loading by 40% can increase retained permeability by 24%. When less polymer is used, more of the propped fracture contributes to production, yielding a longer effective fracture half-length.



Fiber-based mechanical support for proppant pack.

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Expanded temperature range

FiberFRAC technology can be applied in wells with 140 to 345 degF temperatures—a range that accounts for more than 80% of the tight gas wells in North America. Proven in both the laboratory and the field, the FiberFRAC technology enhances proppant distribution in hydraulically fractured wells for increased stimulation effectiveness and improved subsequent production.

Field tests have demonstrated that the fibers do not adversely affect retained proppant-pack permeability and hence fracture conductivity. Recent extensive field testing of fiber-based fracturing treatments in tight gas wells in North America has shown significant production improvements compared with production increases seen after conventional treatments in offset wells.

FiberFRAC Specifications		
Temperature range	Low-temperature fiber	140 to 200 degF
	High-temperature fiber	200 to 345 degF
Fracturing fluid compatibility	Low-temperature fiber	Borate cross-linked fluids, ClearFRAC* family of polymer-free fracturing fluids, and zirconate cross-linked fluids
	High-temperature fiber	Borate cross-linked fluids, ClearFRAC fluids, and zirconate cross-linked fluids
Proppant compatibility	All mesh sizes: sand, precured resin-coated proppant, intermediate-strength proppant, bauxite	
Energized compatibility	Nitrogen in all cases; CO_2 based on fluid compatibility	
Connate water conditions	Max. total water hardness	20,000 mg/L
	Max. magnesium	8,000 mg/L

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