FULCRUM

Engineered scrubbing spacer

APPLICATIONS

- Multistage fracturing in horizontal wells drilled with nonaqueous fluid (NAF)
- Cementing with mud removal challenges such as poor centralization or inability to rotate and reciprocate casing

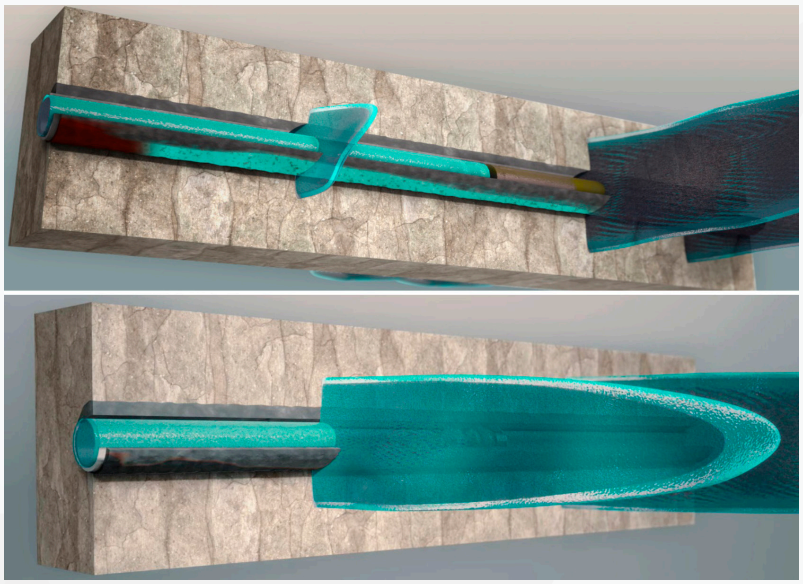
BENEFITS

- Improves hydraulic fracturing performance and efficiency by limiting detrimental effects of poor mud removal
- Reduces behind-casing fracture communication by reacting with NAF in channels to reduce mobility and limit channel permeability
- Improves zonal isolation and cement bonding in wells drilled with oil-based mud (OBM) and synthetic oil-based mud (SOBM)

FEATURES

- Delivery downhole during cementing with no detrimental effect on slurry or cement mechanical properties
- Immediate reaction as cement sets; mud mobility change after several days

Fulcrum* cement-conveyed frac performance technology improves hydraulic fracturing efficiency in cemented horizontal wells that are drilled with NAFs. Delivered during the cementing operation, Fulcrum technology helps keep fracturing fluid in the intended reservoir zone by limiting fluid migration through mud channels. The technology is designed to improve fracturing performance in wells where the casing is poorly centralized or where well conditions limit or preclude mud removal techniques such as casing rotation.



Fulcrum technology improves fracturing performance by reacting with NAF to limit its mobility and improve resistance to out-of-zone fracturing fluid flow. Top, fracturing fluid migrates between stages behind the casing through mud channels, resulting in stunted fracture extension. Bottom, Fulcrum technology reduces mud channel permeability and mobility, keep the fracturing fluid in the intended stage to improve fracture length and efficiency.

PLUG CHANNELS TO IMPROVE HYDRAULIC FRACTURING

During stimulation treatments, unintended channels behind the casing can act as nonproductive communication pathways between stages. This allows stimulation fluids to reenter previously fractured stages, leaving some reservoir sections untreated—and unproductive. Fluid traveling behind the casing, and away from the intended perforation cluster, can also lead to undesirably high fracture initiation pressures or early screenouts due to nonoptimized initiation geometry.

To avoid these problems, Fulcrum technology is delivered during a conventional cementing operation. When placed in the well, it interacts with residual NAF to reduce the communication potential along the channels. The system is compatible with conventional cementing equipment,

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blending processes, additives, laboratory testing, and design considerations, making it easy to use in the field. In addition, Fulcrum technology improves cement bond logs (CBLs) and ultrasonic logs for cement sheaths in the NAF environment.

FULCRUM TECHNOLOGY SPECIFICATIONS	
Temperature, degF [degC]	340 [171]
Density, lbm/galUS [g/cm3]	12 to 16.2 [1.44 to 1.94]