TECH REPORT

NORTH AMERICA

Completion type	Cemented
Drilling fluid	Nonaqueous fluid (NAF)
Distance between stages, ft	20 to 50
Typical differential pressure experienced during multistage fracturing, psi	600†

†Up to 2,000 psi in some wells

Background

Cement placement challenges common to horizontal wells can lead to formation of mud channels behind the casing. During multistage stimulation treatments, these channels enable communication between stages, allowing fracturing fluids to reenter previously fractured stages while leaving some reservoir sections untreated. To resolve this problem, operators need a technology that can stop fluid movement through channels with differential pressures from 100 to approximately 2,000 psi.

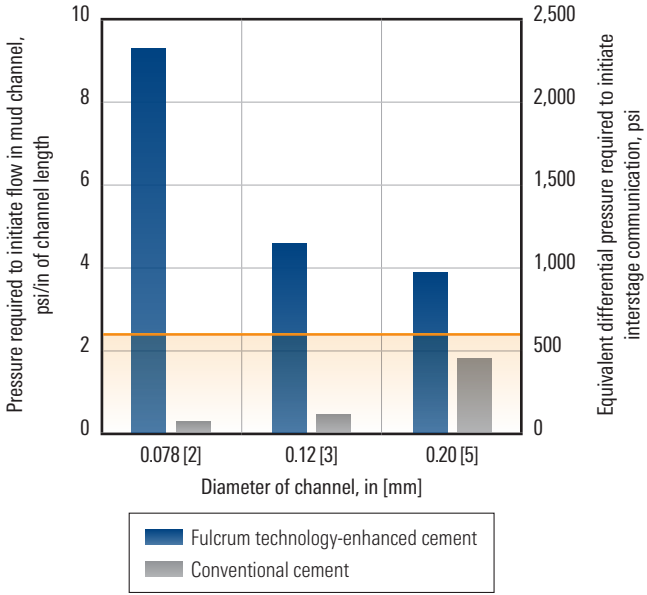
Technologies

Fulcrum* cement-conveyed frac performance technology, which reacts with NAF to modify its rheology

Schlumberger

Fulcrum Technology Stops Pressure Communication through Cement Samples in Lab-Scale Testing

Rheology change prevents fluid movement through mud channels in cement samples, even beyond pressures typically seen during multistage fracturing



In a lab-scale experiment, channels were created in plugs made from conventional cement and cement enhanced with Fulcrum technology, and then diesel-based drilling fluid was injected into each channel for pressure testing. Scaling the data for a downhole scenario with 20-ft stage spacing and a mud channel diameter of 0.12 in [3 mm], the pressure required to initiate stage-to-stage communication was just 120 psi for conventional cement and more than 1,100 psi for cement enhanced with Fulcrum technology—well above the 600-psi differential pressure (orange line) required to prevent fluid movement through such a channel during fracturing. For details, see SPE-191561.

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