

ZIRCONIUM-BASED CROSS-LINK FLUID

Many of the oil-bearing formations in the Illinois Basin have a high permeability but are also high in natural silts and fines. To sustain production, most formations must be hydraulically fractured. To complete fracturing treatments in high permeability zones, a viscous fluid must be pumped to control leak off. Reliable breakers are also critical due to the low BHST in the Illinois Basin.

Zirconium cross-linked carboxymethylhydroxypropyl guar gel (CMHPG) develops high viscosity which will carry proppants effectively. This allows higher proppant concentrations which increases the fracture width. Fracturing fluid leak-off is reduced, which assists in increasing the fracture Half-length. CMHPG gel is an extremely low residue gelling agent.

Franklin's Zirconium cross-link fluid yields a high-quality, temperature stable gel system with very accurate break times at very low temperatures. Zirconium utilizes WGA-5, a CMHPG gel. Normal concentrations of cross-linked fluid gel loading range between 25 to 40 lbs per 1,000 gallons of frac fluid. Zirconium gels can be cross-linked at a pH of 3.5 to 4.8 and temperature delayed cross-link at high pH 8.5 to 9.75.

When bottom hole temperatures exceed 225 degrees Fahrenheit, zirconium based crosslinkers are used to create highly-viscous, temperature-stable fracturing fluids. Viscosity of zirconium cross-linked fluids will develop in excess of 2,000 cps. When broken, viscosities will return to +/- 10 cps.

The biocide, gel, oxidizer breaker, cross-linker, surfactants, and clay stabilizers are pregelled into frac tank. The low-temperature breaker aid and cross-link activator will be added on the fly.