

Diamond FRAQ fluid system

Water-based non-ionic visco-elastic surfactant (VES) fluid

Applications

- Openhole gravel packing through multi-path screens

Features and Benefits

- Diamond FRAQ fluid incorporates unique internal BreakBAQ chemistry to break the VES viscosity using bioactive agents and catalysts
- The internal breakers work in all reservoirs including in dry gas, condensate and oil reservoirs
- The fluid can be broken by both internal and external breaker systems assuring post treatment cleanup
- Does not degrade with time except with the use of internal breakers and upon contact with hydrocarbon fluids
- Excellent retained permeability of 90%–99% to maximize productivity and minimize draw down
- The fluid provides excellent sand/proppant transport characteristics. Concentrations of 1.5%–3% by volume are capable of carrying up to 14 ppa (pounds proppant added) sand to pack the fracture
- Leak off characteristic facilitates packing of the casing–screen annulus for the gravel pack operation
- The broken Diamond FRAQ fluid will not reform, minimizing post treatment cleanup problems
- The Diamond FRAQ fluid flows back with low differential pressure to recover treating fluid
- The non-ionic Diamond FRAQ surfactant is insensitive to emulsion formation in most crude oils
- The Diamond FRAQ fluid has demonstrated superior shale stabilizing characteristics for treating reservoirs with high shale content
- Wide temperature range, 80°F–250°F (26°C–121°C) to treat most formations

Diamond FRAQ™ fluid system is a water-based non-ionic “visco-elastic surfactant” (VES) fluid designed for treating oil and dry gas sandstone reservoirs where minimizing formation damage and maximizing proppant and gravel pack gravel retained permeability is of primary importance. Baker Hughes specifically developed the visco-elastic surfactant concentrate and the internal breaker system for sandstone frac pack applications where high retained permeability of the proppant in the perforation tunnels and casing – screen annulus is required.

Diamond FRAQ’s VES surfactant can be broken with internal breakers or external breakers. The internal breaker system utilizes Baker Hughes unique **BreakBAQ™ chemistry** consisting of bioactive agents and catalysts to break the VES viscosity and is pumped with the main frac fluid. The concentrations of these additives are adjusted to reservoir conditions and treatment requirements to degrade the visco-elastic surfactant with time and concentration across its temperature range. The external breakers are hydrocarbon based fluids pumped ahead or behind the Diamond FRAQ fluid or by the oil in the reservoir.

The system is ideal for use in both gas and oil sandstone reservoirs as it retains the natural water wet condition of the reservoir rock unlike other cationic VES systems that tend to oil wet sandstones which are undesirable for high rate production of hydrocarbon fluids.

Diamond FRAQ concentrate is a single additive concentrate that forms a non-ionic micelle viscous solution when added to aqueous fluids. The VES surfactant will viscosify seawater and brines made with sodium chloride, potassium chloride, calcium chloride and most bromide brine blends to 14.5 ppg (1.73°SG). Fluid viscosity is controlled by the concentration of the Diamond FRAQ VES concentrate and base brine. Diamond FRAQ is suited for use in a variety of frac pack and gravel pack applications up to 250°F (121°C).

Recommended Concentrations

Temperature	% VES
125°F (51.7°C)	2
150°F (65.6°C)	3
175°F (79.4°C)	4
200°F (93.3°C)	5
225°F (102.2°C)	6
250°F (121.1°C)	10

Diamond FRAQ Fluid Break

