

Cla-Sta[®] Clay Damage Control Additives

Stabilize water-sensitive clays for improved well productivity

FEATURES AND BENEFITS

- Offers permanent clay protection that is more effective and longer lasting than temporary inorganic salts and semi-permanent clay stabilizers.
- Resistant to removal by acid and other chemical washes, or by production of fluid from the formation.
- Provides broad compatibility across a wide range of fluid additives, including anionic friction reducers.
- Effective at lower concentrations on low and moderate clay content reservoirs, compared to other compatible offerings.
- No shut-in time required because it adsorbs rapidly onto formation fines.
- Effective at high temperatures. Shown to effectively stabilize mineral fines even after exposure to temperatures of 500°F (260°C).
- Batch or metered on-the-fly as a liquid additive to save mixing time.

Overview

During hydraulic fracturing, water sources of different salinities, may contact the formation. This can result in an equilibrium disruption, which may lead to water-sensitive clays causing fracture instability issues. If clays are not managed properly, they can swell, disperse, or migrate, and create fracture degradation, leading to a reduction in permeability, which limits the production of hydrocarbons.

Our portfolio of Cla-Sta[®] clay damage control additives stabilize water-sensitive clays by minimizing issues such as fines migration, clay swelling, and blockage.

These additives can be used to prevent permeability damage caused by fines migration in the formation and around the wellbore. The Cla-Sta additive is a polymer that stabilizes mineral fines by adsorbing on formation surfaces, altering the surface properties of particles, and reducing their interaction with flowing fluids, even at high flow rates. These clay control additives provide substantial, long-term stabilization of clays, such as smectite, illite, chlorite, and kaolinite.

Control fines migration with long lasting stabilization

Migrating fines can substantially reduce permeability in the vicinity of the wellbore, which greatly reduces well productivity or injectivity. This fines migration is often caused by rapid fluid movement through a formation. In addition, fines can be produced through fractures or from poorly consolidated formations. Produced fines can cause erosion of tubing and surface equipment, as well as create disposal problems.

The Cla-Sta additive is a polymer that can be used to stabilize several types of mineral fines commonly produced from formations, including fines that do not respond to treatment with conventional clay stabilizers. It is readily adsorbed on formation surfaces, reducing migration or movement, even when exposed to very high rates of fluid flow.

By substantially stabilizing mineral-fine particles and solids production, permeability impairment can be greatly reduced.

Prevent clay swelling to maintain permeability

Clays, especially with high swelling potential can absorb water when contacted by low salinity waters. This can lead to expansion of the rock matrix, which can obstruct fluid flow pathways and reduce the efficiency of hydraulic fracturing. Swelling clays can also result in the release of fines. Both swelling and fines release can reduce formation permeability.

The Cla-Sta portfolio is highly effective in preventing clay swelling and fines migration, and is the preferred chemical treatment for many different formations and applications.

Minimize fines migration in several applications

Cla-Sta additives can be used to help minimize permeability damage caused by fines migration in several situations occurring in oil, gas, and water-injection wells, including:

- **Gravel Packing:** Can be used as a pre-flush before gravel packing to help minimize formation damage and, later, fines migration into the gravel pack.
- **Sand Consolidation:** Sand-consolidation treatments stabilize clays and most of the fines in the near-wellbore region. Use of the Cla-Sta additive in conjunction with a sand-consolidation treatment helps stabilize fines to reduce fines migration into the consolidated sand zone.
- **Before Water Breakthrough:** Fines are most readily produced when the flowing fluid is rock wetting. A water-wet formation often will not exhibit fines production or productivity decline resulting from permeability damage caused by fines migration until the well begins producing water. Timely well treatment with the Cla-Sta additive before the onset of water production could reduce the need to acidize the well later.
- **Injection Wells in Waterflood:** The Cla-Sta additive can be used to prevent permeability damage caused by fines migration around the injection wellbore in enhanced oil recovery (EOR) projects or chemical-disposal operations. This allows operators to maintain higher fluid-injection rates and consequently higher rates of oil production.
- **Acidizing:** The Cla-Sta additive can also substantially reduce permeability damage caused by fines migration in acidizing operations. The additive can be used in a flush after the acid injection as a permeability-damage prevention treatment. Unlike acidizing, it will not repair permeability damage that has already occurred.

CLA-STA PRODUCT OFFERING

- **Cla-Sta FS®** – Mineral fines and clay stabilizing additive
- **Cla-Sta IR®** – Permanent clay stabilizer that mitigates damage from fines generation and clay swelling
- **Cla-Sta XP®** – Prevents clay swelling and migration

APPLICATIONS

- Used in a wide variety of fluids, such as brines, seawater, and acids.
- Liquid clay stabilization additives that can be used in hydraulic fracturing treatments that interact with particles to form a protective coating.
- Alternative to KCl, NaCl, choline chloride and other KCl substitutes for clay control service.
- Applicable for bottomhole temperatures from 50 - 500°F (10 - 260°C).

For more information, contact your local Halliburton representative or visit us on the web at www.halliburton.com

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