Stepan®
OILFIELD SOLUTIONS

CLAY CONTROL ADDITIVES

Optimizing Formation Stability In Water-Based Well Treatments

Background

Incompatible clay minerals are a frequent challenge in oil and gas production, particularly in shale reservoirs. When exposed to water, certain clays swell and migrate, leading to permeability loss, formation damage, and proppant embedment. These issues can significantly impact well performance, especially in hydraulic fracturing and stimulation treatments that rely on large volumes of water-based fluids.

Without proper clay stabilization, injected fluids can mobilize fine particles and reactive clays, reducing fracture conductivity and impeding hydrocarbon flow. Operators need an effective solution to mitigate swelling and migration while preserving formation integrity.

Why Choose PETROSTEP® CC-1?

PETROSTEP® CC-1 Clay Control is a proven additive designed to mitigate clay swelling and migration in water-based well treatments. Its specialized formulation offers temporary clay stabilization, preserving fracture conductivity and ensuring consistent well performance.

By integrating PETROSTEP® CC-1 into completion and stimulation fluids, operators can optimize well productivity and extend the longevity of their hydraulic fractures.

KEY BENEFITS OF PETROSTEP® CC-1

1. **Temporary Clay Stabilization**
   Prevents swelling and migration, reducing formation damage
2. **Preserves Fracture Conductivity**
   Helps maintain permeability and hydrocarbon flow
3. **Prevents Proppant Embedment**
   Protects against shale softening and proppant loss
4. **Enhances Fluid Efficiency**
   Minimizes water-induced formation damage for better productivity
5. **Compatible with Various Treatment Systems**
   Works in batch or continuous mix operations

Applications

- Aqueous-based completion and stimulation operations
- Water-based fracturing treatments in formations with known clay sensitivities

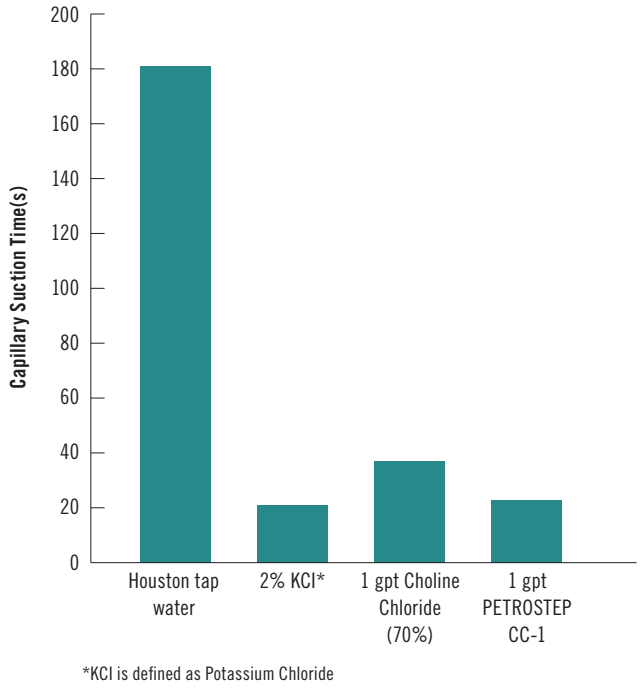
Performance Testing & Validation

PETROSTEP® CC-1 has undergone rigorous laboratory testing to confirm its effectiveness in preventing clay swelling and migration. Capillary Suction Time (CST) testing demonstrates its ability to reduce permeability loss, while compatibility studies show seamless integration with a range of fracturing fluids. Field applications further validate its role in maintaining formation stability and optimizing production.

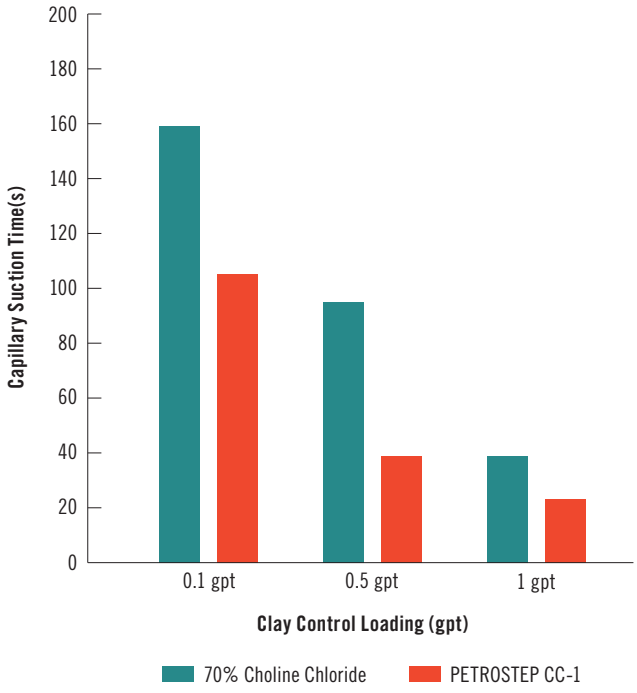
TYPICAL PROPERTIES

Appearance	Clear, colorless to pale-yellow liquid
Freezing Point	14°F (-10°C)
Typical Concentration	0.1 to 4 gpt
Density	7.9 lb/gal (0.94 g/mL) 25°C
Typical pH Range	5.5 to 9.0 (10% solution in water)

CAPILLARY SUCTION TIME COMPARISON (USING 17% BENTONITE/83% SILICA, 200 MESH)



*KCl is defined as Potassium Chloride



Safety Precautions: Refer to safety data sheets (SDS) for handling, transport, environmental information, and first aid.

For more information about PETROSTEP CC-1 and other PETROSTEP products, email oilfield@stepan.com or call 713.955.8100.

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