Water-based sand consolidation system

Single-step water-based sand consolidation treatment

Reservoir temperature:
130 to 250 degF [54 to 121 degC]

Permeability:
50 to 20,000 mD

Viscosity:
<5 cp at 77 degF and 170 s^{-1}

Applications

- Unconsolidated sandstone reservoirs
- Remedial, primary, or in combination with mechanical sand control
- Deepwater, continental shelf, and offshore wells
- All well types, including oil, gas, and water

How it improves sand consolidation

- Optimizes well productivity and reduces asset maintenance costs by minimizing sand production
- Retains high productivity from low-damage technology
- Increases execution efficiency with a single-step main-job pumping sequence and low-viscosity fluid properties
- Enables more sustainable sand consolidation treatment using water-based solvent
- Has a low viscosity for better placement

Features

- Mixed fluid that is stable up to 24 hours at ambient temperature
- No preflush and overflush treatment required
- Compatibility with up to 30% clays
- Compatibility with mineral, diesel, and crude oils
- Compatibility with acid (tested up to 15% HCl)
- Pumpability through production tubing, coiled tubing, or flow line
- High retained permeability
- High unconfined compressive strength (UCS)

Sustainable sand consolidation treatment

The water-based sand consolidation system chemically binds the formation sand grains together and provides strong cohesion to prevent their migration from the formation into the wellbore. This results in high retained permeability and delivers a more sustainable solution than traditional consolidation resin products.

More reliable field operations

Traditional resin consolidation systems are often externally catalyzed, in which the injection of the resin is followed by an overflush of the chemical activator, adding operational complexity. Additionally, most conventional systems are often based on environmentally hazardous solvents.

The water-based sand consolidation system is an internally catalyzed fluid activated by temperature. This allows all fluid components to be mixed on surface and simplifies field operations.

How it works—preparation, injection, and well shut-in

The water-based sand consolidation system consists of a resin, curing agent, and surfactant dispersed in water. The fluid is prepared by mixing all components in freshwater at surface. After preparation, the fluid is bullheaded or injected into the reservoir using coiled tubing at matrix rates.

After placement, the consolidation mechanism is triggered by the downhole temperature. The well is then shut-in for 1 to 6 days to allow the resin to cure, depending on the temperature and clay content. This shut-in time allows the sand particles to bond and develop a strong UCS of the formation.

Simple sand consolidation system with optimal results

Poor retained permeability is known to be a limitation of traditional sand consolidation chemicals. The water-based sand consolidation system addresses this by using less resin compared with other products, minimizing formation damage. Retained permeability of up to 96% can be achieved with fluid from the water-based sand consolidation system.

Water-Based Sand Consolidation System Specifications

Temperature, degF [degC]	130 to 250 [54 to 121]
UCS, psi [kPa]	500 to 2,800 [3,447 to 19,305]
Permeability range, mD	50 to 20,000
Retained permeability, %	Up to 96%
Viscosity, cP at 77 degF and 170 s^{-1}	<5

All specifications are subject to change without notice.

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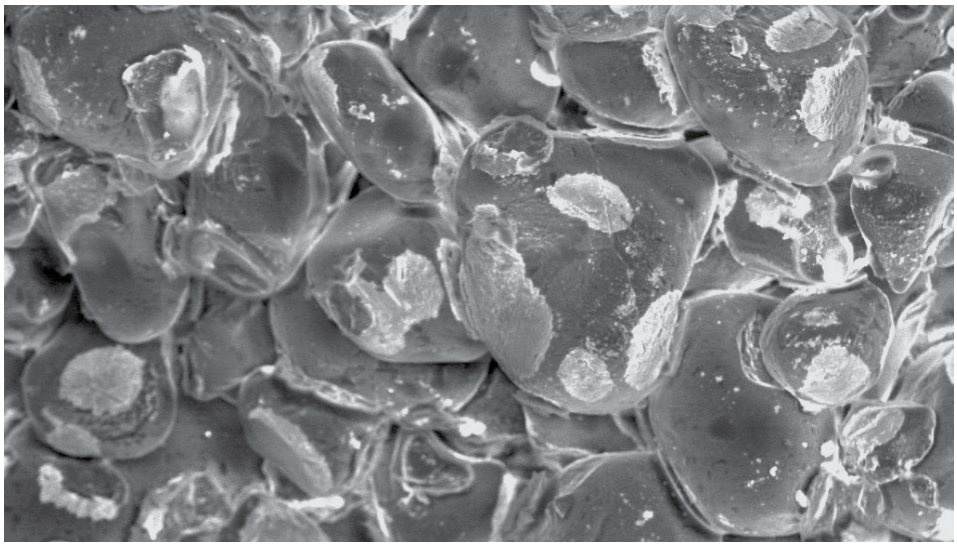
Column of consolidated sand (right) formed by combining fluids from the water-based sand consolidation sysem (center) and unconsolidated sand (left).



Scanning electron microscope (300× magnification) image of 100-mesh sand showing consolidation posttreatment.

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