

Sand Control

SandTrapSM Formation Consolidation Service

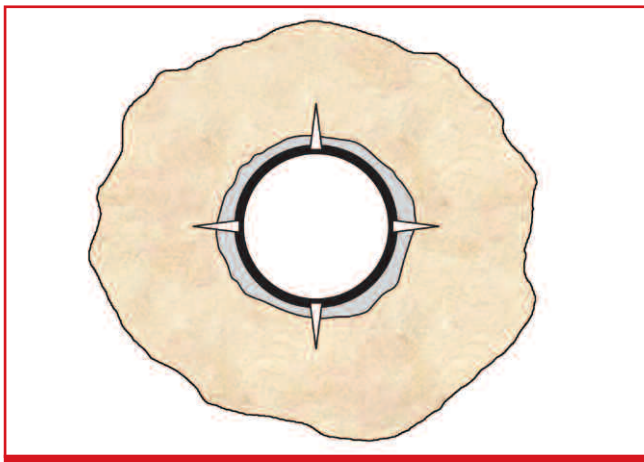
New Developments for Through-Tubing Applications Enable Use of Resin Consolidation for Oil and Gas Sands Requiring Sand Control

With recent emphasis on recovery of bypassed hydrocarbon reserves and extending field production, through-tubing sand control techniques present an economically attractive completion option. Since economics is a key decision criterion in these types of developments, the availability of reliable and cost-effective through-tubing sand control techniques can be a major deciding factor.

Consolidation for Real Wells

Formation consolidation is not a new concept and in many applications has proved to be a successful means of providing sand control. SandTrapSM service provides features that facilitate the successful use of resin consolidation for oil and gas sands requiring sand control. These features include:

- Operational simplicity with brine and solvent preflush stages, two-component consolidation fluid and brine post-flush
- Low-viscosity fluids for more effective placement into reservoirs with variable permeability
- Good consolidation performance in sands with clay mineral content
- Post-flush displaces the consolidation fluid to retain pay sand permeability.



SandTrapSM service uses resin technology to consolidate the near-wellbore area to help prevent sand production. The consolidated area maintains almost 100 percent of initial permeability.



What's New

This new system incorporates a solvent/resin mixture with very unique properties that cause the resin to be deposited as a thin film on the formation and clay surfaces. The solvent package is used to provide a very low-viscosity treating fluid and to provide a means to get the resin in contact with the formation. The resin is internally catalyzed so that no post-flush treatments are required to initiate the curing process. The resulting treatment procedure involves only four stages:

- A brine pre-flush treatment
- A solvent pre-flush
- The formation consolidation system
- Brine post-flush over-displacement.

The absence of any severe contrasts in fluid rheology provides much more uniform and consistent placement of the resin.

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Applications

SandTrap service can be applied to new or existing sand completions. The treatment can be placed several ways:

- Down production tubing
- With jointed pipe and service packer
- With coiled tubing.

New perforations can be treated down production tubing for zone changes or recompletions to access additional reserves.

Coiled tubing and SandTrap service can put existing zones back on production without the expense of a rig-based workover.

For wells with failed gravel packs, SandTrap service can be used to consolidate the existing gravel pack and reservoir sand in the problem area to put a shut-in well back on line. Sand consolidation treatment fluids commingled with nitrogen have proved to be an effective solution for gravel pack repair. Contact of the treatment with the gravel pack and surrounding sand can be enhanced with fluidic oscillator technology provided by Pulsonix® service.

Results

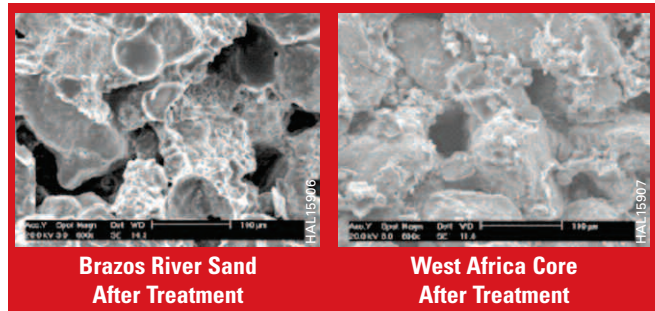
Gulf of Mexico gas recompletion on a 2-ft pay interval.
Treatment bullheaded down tubing.

Well test:

Gas rate – 1.3 mmcfpd
FTP – 2,000 psi
SITP – 2,200 psi
Sand free.

How SandTrap Service Works

Two preflush stages prepare the formation sand for a high-strength consolidation and improved permeability retention. The brine preflush allows the mineral surfaces to attract the consolidation fluid so that a thin, uniform coating of consolidation fluid coats the formation matrix grains. Connate water is displaced from the pore spaces to improve penetration of the treatment into the pores and subsequent displacement by the post-flush to enhance consolidation strength and permeability retention.



Photomicrographs show the effect of SandTrapSM service on formation material. Note that the grains are coated while porosity is maintained.

Performance of Resin-Treated Formation Materials

Formation Sand	Initial Permeability (mD)	Regained Permeability (mD)	Regained Permeability (%)	UCS (psi)
Bakersfield 1	857	819	95	1,700
Bakersfield 2	635	552	87	1,550
West Africa	636	542	85	1,320

For more information on how SandTrapSM service can help you maximize production without a maximum investment, contact your local Halliburton representative or e-mail sandcontrol@Halliburton.com.