

**Cementing solutions**  
Cement systems and additives

# SentinelCem™ Pro cement system

Cures severe to total losses

## FEATURES AND BENEFITS

- Single-sack, lost-circulation blend for proactive rig-site deployment
- Robust formulation easily blends with local cement types and preblended salt
- Simplifies operations using “on-the-fly” or batch mixing techniques
- Thixotropic system remains fluid while pumped into thief zones, and then builds rapid gel strength once static
- Low sensitivity to water source hardness
- Acid solubility enables use across sensitive reservoir sections
- Low-abrasion solution readily pumps through the BHA
- Early compressive-strength development helps plug thief zones and mitigate further lost circulation

## Overview

Risks associated with lost circulation increase when fractured, vugular, cavernous, or highly porous formations are present. Unplanned severe losses during drilling or running casing can lead to poor zonal isolation, decreased production, well abandonment, or costly remediation. To overcome challenges associated with lost circulation during well construction, Halliburton engineered the SentinelCem™ Pro cement system. The next generation of our SentinelCem™ system, SentinelCem Pro cement exhibits improved properties to cure severe to total losses in a single-sack formulation that simplifies mixing operations and enables proactive rig-site deployment. Because of its thixotropic nature, this solution is ideal for zones where particulates lost-circulation materials have limited success curing losses.

## Simplified mixing operation for proactive deployment

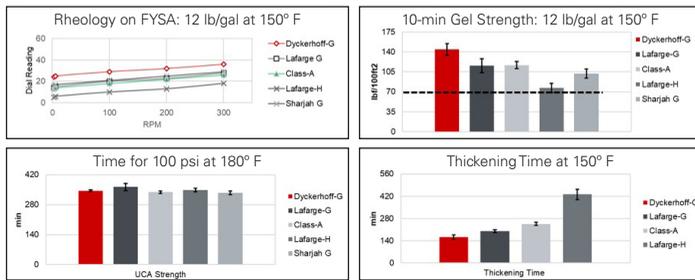
SentinelCem Pro is a single-sack lightweight system that easily blends with a wide range of cement types, reducing turnaround time between laboratory testing and rig-site application. This unique lost-circulation solution enables proactive storage at the rig site and deployment using “on-the-fly” or batch mixing techniques, without the need for pre-hydration of the slurry design or high-purity water sources. This low-abrasive product pumps safely through the bottomhole assembly (BHA). Enhanced acid solubility of the system is ideal for sensitive production zones. SentinelCem Pro cement allows operators to quickly address lost-circulation events to reduce nonproductive time (NPT) and continue drilling operations.

## Thixotropic cement system stabilizes loss zones

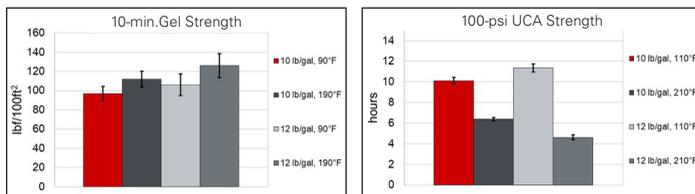
The thixotropic nature of SentinelCem Pro cement enables the system to remain fluid while pumped into lost-circulation zones. Once the product is placed in the loss zone and pumping ceases, the SentinelCem Pro cement rapidly gels with the shear rate reduction and then gains early compressive strength. This feature helps cure losses when the slurry enters fractures and vugular zones and it mitigates costly drilling fluid loss to the formation.

### Laboratory-proven performance results

Laboratory results show controllable gel-strength development, thickening time, and early compressive strength over a range of slurry densities (10 to 15 lb/gal) and bottom hole circulating temperatures (90 to 190°F). SentinelCem Pro cement exhibits significant tolerance to different cement types and local water sources with high sodium, calcium, magnesium, chloride, and sulphate. Additionally, cements with preblended potassium chloride and seawater exhibit good performance.

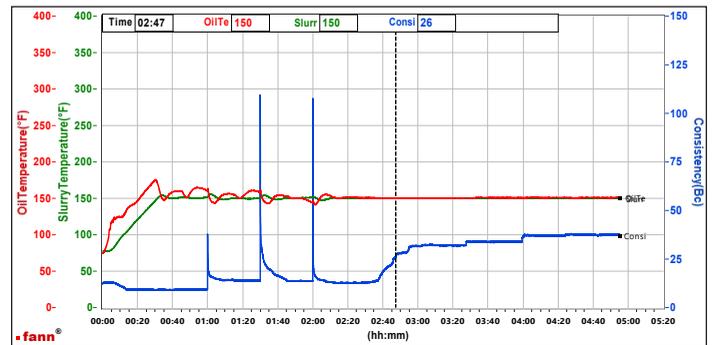


SentinelCem™ Pro cement exhibits significant tolerance to different cement types and local water sources with different concentrations of sodium, calcium, magnesium, chloride, and sulphate.



SentinelCem™ Pro cement exhibits similar gel strength and compressive-strength development over a range of temperature and slurry densities.

During on-off-on testing, shear is applied to the slurry in a High-Pressure High-Temperature (HPHT) consistometer at temperature and pressure, which mimics dynamic placement. After a set time, shear is removed and the slurry becomes static, allowing gel development. The shear is then reapplied. This test indicates the SentinelCem Pro cement’s capability to achieve a gel state and then regain fluidity for circulation when shear is applied. When the shear rate is high, viscosity is low, and the slurry flows easily for placement. When the shear rate is reduced, the slurry thickens and gels, which resists slurry flowback, fall back, or formation influx.



On-off-on testing indicates SentinelCem™ Pro cement achieves rapid gel strength when shear is removed and regains fluidity for circulation when shear is reapplied.

### Field-proven success

Boasting a lengthy success record, SentinelCem cement has cured severe to total losses in over 300 operations globally, in 31 countries. Our next generation SentinelCem Pro system provides continued success addressing lost circulation challenges in a single-sack, easy-to-blend formulation for proactive rigsite deployment.

For more information, contact your local Halliburton representative or visit us on the web at [www.halliburton.com](http://www.halliburton.com)

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