

# Optiseal I, II, III & IV

The Optiseal\* product family consists of four comparable blends of Lost Circulation Materials that can function as Wellbore Strengthening Materials (WSM).

The four WSM blends are designed to plug fracture apertures up to at least 1,200 µm in addition to providing good fluid-loss control in moderate-to-high-permeability formations. Fracture sealing and fluidloss-control performance have been confirmed by laboratory testing.

## Typical Physical Properties

Physical appearance .....	White to gray or tan
Specific Gravity .....	1.6 - 2.8
Solubility in Water @ 68°F (20°C) .....	Insoluble

## Applications

The Optiseal blends I, II, III and IV are designed as fracture sealing and Wellbore Strengthening Materials (WSM) in porous and fractured formations while drilling with non-aqueous fluids. The Optiseal III blend has been specifically optimized for Non-Aqueous Fluid (NAF) applications. The four blends are also effective in water-based fluids, reducing the possibility of differential sticking, lost circulation and torque and drag through increased sealing of problem zones. The Optiseal IV blend is composed of acidsoluble marble for use in reservoir drilling operations.

Lost circulation treatments can be applied either as a remedial treatment (squeeze treatment, spot application) or as a preventative treatment (continuous particle addition to the circulating drilling fluid or regular, repetitive sweeps). The former constitutes the majority of cases where lost circulation has occurred; the latter can be deployed when drilling through a formation with a known history of losses. Remedial Lost Circulation Treatments: The basis of design for the treatment is a low-fluid-loss WSM formulation. The four Optiseal formulations are designed to plug fracture widths up to at least 1,200 µm in addition to providing good fluid-loss control in moderate-to-highpermeability formations. Particle Size Distribution (PSD) for The Optiseal formulations is based on Ideal Packing Theory. The blends can be mixed at rigsite from sacks/big bags. An alternative is to pre-mix the WSM at a liquid mud plant in a high-volume, high-density slurry before shipping to a rig. The WSM slurry uses the same base fluid as the drilling fluid but is unweighted. The slurry provides greater flexibility, improved logistics and reduced hazards associated with sacked materials. Typical final concentrations range from 30 – 70 lb/bbl (85 – 200 kg/m<sup>3</sup>) depending on severity of losses.

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**Preventative Treatments by Continuous Additions:** The basis of design for the treatment is continuous particle addition to a circulating drilling fluid when drilling through a formation known to have losses.

The main challenge is to maintain a required PSD and concentration in the drilling fluid; typical concentrations range from 12 to 20 lb/bbl (35 – 57 kg/m<sup>3</sup>). The method of treatment will depend on length of interval to be drilled:

- While drilling short intervals, the WSM is added to the active pit or spotted at the bit. When drilling-ahead the shaker screens are either entirely bypassed or all but the top screens are removed. This allows the WSM to be directly recycled and retained in the drilling fluid. Another option is to utilize a Managed Particle Size Recovery System\* (MPSRS) to recover the WSM while discarding drilled solids.
- While drilling extended intervals (> 300 ft), it is recommended to use a MPSRS or shaker screens combined with a solids-control system for recovering the WSM. By managing the particles in circulation, the rheology of the fluid is more easily controlled, resulting in improved Equivalent Circulating Density management.
- While drilling short or extended intervals, utilization of the Wet Sieve Analysis rigsite test protocol to determine the concentration and particle size of WSM in drilling fluid samples is recommended. A sample of fluid is taken from the suction pit (this represents what is being sent downhole) and the Wet-Sieve onsite method is used to monitor and track data for performance evaluation of the application. Wet Sieve Analysis testing instructions are available from Technical Services.

## Advantages

- “One-sack blends” of specifically sized WSM for a wide range of formations and severity of losses.
- Consistency of grind size, composition and physical properties.
- Essentially inert materials, having a minimum effect on fluid properties and compatible with all mud systems.
- Hard, tough ground marble and synthetic graphite resist degradation of particle size.

## Limitations

- Bypassed shaker screens or screens with larger openings allow drill cuttings to remain in circulation, resulting in higher fluid rheology, wear on pump liners, and wear on LWD tools and risk of plugging LWD tools.
- A logistical disadvantage of continuous additions is that there can be large volumes of waste material and more inventories required on the rigsite.

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### Toxicity and Handling

Bioassay information is available upon request.

Handle as an industrial chemical, wearing protective equipment and observing the precautions as described in the Safety Data Sheet (SDS).

### Packaging and Storage

The Optiseal I, II, III and IV additives are packaged in 55.1-lb (25-kg) multi-wall, paper sacks.

Store in a dry, well-ventilated area. Keep container closed. Store away from incompatibles. Follow safe warehousing practices regarding palletizing, banding, shrink-wrapping and/or stacking.

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