

G-SEAL HRG

G-SEAL HRG FINE

ADVANTAGES

- Effective bridging and sealing agent for a wide range of formations and severity of losses
- Improved performance in comparison to G-SEAL materials
- Controls seepage losses, thereby reducing the possibility of differential sticking
- Decreases the CoF to reduce torque and drag in all mud systems
- Inert material with no adverse effects on mud rheology and compatible with all mud systems
- One-sack product with no other additive requirements; easy to mix and disperse into the system
- Temperature-stable to more than 260° C (500° F)

LIMITATIONS

- Can be removed from the circulating system by shale shakers and other solids-control equipment. Requires close monitoring of the shale shakers.
- Non-acid-soluble material may not be suitable for open hole completions.

G-SEAL*HRG and its finer grade alternative G-SEAL HRG FINE* are high-resiliency graphites that provide enhanced bridging and sealing of induced fractures.

Owing to their higher resiliency, G-SEAL HRG and G-SEAL HRG FINE deliver more deformability than conventional G-SEAL, making them suitable for either replacing or supplementing G-SEAL. Both grades of the product are compatible with water-, oil- and synthetic-based drilling fluid systems and are effective bridging and sealing materials for natural or induced fractures and for drilling permeable formations. The bridging ability of these products makes them effective additives when drilling depleted zones, where high differential pressure increases sticking tendency. They also can be used to control seepage in partial-to-severe lost circulation zones. G-SEAL HRG additives are completely inert and do not affect the rheological properties of the fluid. They have the capacity to increase lubricity, thereby reducing torque and drag. Furthermore, in Permeability Plugging Tests (PPT) and sand bed laboratory studies, G-SEAL HRG has been shown to exhibit lower spurt and total filtrate loss values.

Typical Physical Properties

Physical appearance	Dark gray-to-black powder
Solubility in water @ 20° C (68° F)	Insoluble
Specific gravity (lb/gal).....	2.19 - 2.26 s.g. (18.2 - 18.8 lb/gal)

Product Name	Median Particle Size d_{50} (μm)**	Recommended Test Procedure
G-SEAL HRG	450 - 550	Dry sieve analysis
G-SEAL HRG FINE	15 - 45	Laser light scattering

** Median Particle Size (d_{50}) is reported as a size range due to variations in the manufacturing and grinding process. If a precise size distribution of a product is critical to a drilling operation, it should be measured with the appropriate Recommended Test Procedure using samples that are representative of those expected to be used in that operation. Nominal d_{10} and d_{90} values are available from Houston Technical Services upon request.

Applications

G-SEAL HRG and G-SEAL HRG FINE are designed to bridge and seal fractures, particularly drilling-induced fractures and permeable formations. This makes them effective for controlling lost circulation and increasing lubricity while reducing the possibility of differential sticking.

The recommended treatment for seepage losses (<1.6 m³/hr or 10 bbl/hr) is 43 to 57 kg/m³ (15 to 20 lb/bbl) of G-SEAL HRG/G-SEAL HRG FINE in spotted pills or sweeps. The pills can be incorporated into the entire system for a total concentration of 14 to 29 kg/m³ (5 to 10 lb/bbl). However, when the pill returns to the surface, the shaker screens must be monitored for losses and changed if necessary. If changing shaker screens is impractical, once the pill returns to surface, it can be diverted to a standby pit, reconditioned and re-used as a spot or sweep.

The recommended treatment for partial losses (1.5 to 15 m³/hr or 10 to 100 bbl/hr) is 57 to 143 kg/m³ (20 to 50 lb/bbl) of G-SEAL HRG/G-SEAL HRG FINE in spotted pills. Highly permeable formations such as fractured carbonates and conglomerates may require additional pills in conjunction with lost circulation materials of various sizes. The product(s) also can be incorporated into the entire system for a total concentration of 29 to 70 kg/m³ (5 to 25 lb/bbl).

Torque and drag can be reduced by incorporating G-SEAL HRG/G-SEAL HRG FINE spots and sweeps into the active system up to a total concentration of 29 kg/m³ (10 lb/bbl). Initial treatments for the active system may be applied in 5.7 kg/m³ (2 lb/bbl) increments while monitoring torque and drag.

G-SEAL HRG/G-SEAL HRG FINE may require additional wetting agent when used in an oil- or synthetic-based drilling fluid system.

Toxicity and Handling

Bioassay information is available upon request.

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

Packaging and Storage

G-SEAL HRG AND G-SEAL HRG FINE are packaged in 22.7 kg (50 lb), multi-wall, paper sacks and do not require special storage.

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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