Kol-Seal Lost Circulation/Extender Additive

Kol-Seal^{*} is a lightweight granular solid with a specific particle-size distribution for maximum bridging efficiency. It provides an economical cementing system with low-density, lost circulation control and a superior scouring action. The particle size distribution of Kol-Seal is controlled to serve as an aid in controlling lost circulation. Kol-Seal functions as a scouring agent of formation mud cake because of its hardness.

Application

Kol-Seal is used as an extender to provide a light-weight, high yield slurry. Because of its insolubility and low surface area Kol-Seal does not require large amounts of additional water. (The additional use of water with most extenders materially reduces the strength of set cement.) The amount of Kol-Seal used varies from 5-10 lbs. per sack of cement.

Each 10lbs. of Kol-Seal added to cement will increase the slurry yield .17 cubic ft. per sack of cement, including water. Normally 1 gallon of water is used for each 25 lbs. of Kol-Seal.

ADVANTAGES

- 1. Kol-Seal is insoluble in oil.
- 2. Kol-Seal does not soften at high temperature.
- 3. Kol-Seal does not appreciably change in thickening time of cement.
- 4. Slurries containing Kol-Seal have higher compressive strengths at all ages than slurries containing other lost-circulation and extending additives.
- 5. Kol-Seal is compatible with most other cement additives.
- 6. Kol-Seal does not require complicated mixing equipment or procedures.

Physical Properties

Specific Gravity: 1.30	Water Requirement: 1 gal/25 lbs.
Absolute Density: 80.8 lbs/cubic ft.	Absolute Volume Occupied by 1 lb.: 0.0926 gal.
Melting Point: Greater than 1000 degrees F	

Kol-Seal is available in 50 lb. multi-wall polyethylene lined bags, 2,200 lb. IBC's or bulk.

Specification Sheet

Trade Name: Kol-Seal

Description: Ground Coal, Black Solid Raw Material: Bituminous Coal, Chunky (2" by 0), Low Ash (9 – 10%0), Low Sulfur (4 -5%) Low Moisture (no more than 6%)

Test Item: <u>Screen Analysis</u> (Std Sieve Analysis, ASTM D4749-87)

<u>Mesh Size</u>	Specification Range	Analysis Results
6	Trace	Trace
12	25 - 40%	30.9%
30	25 – 40%	33.6%
60	10-20%	16.4%
100	5 – 15%	7.3%
200	1-10%	5.5%
Pan	5 – 15%	6.4%

Surface Moisture (ASTM 3302-91, Procedure B, Air Dry Oven)

<u>Sp</u> 3.5	<u>ecification Range</u> % Maximum	<u>Analysis Results</u> 2.85%		
Specific Gravity: Bulk Density: Water Requirement: Solubility: Softening Temperature:	1.30 50# per CuFt 1 Gallon per 25# Insoluble in Oil 1000 ^o F			
Bag Specifications:	50# Bag Type: PBOM Size: 16" x 4" x 28 Construction: 1/.5H Printing: 1 Color, 1 Lustergrip	½" IDPE, 3/50NK Side, Blue (see attached or printing spec.)		

KOL-SEAL EXTENDER/LOST-CIRCULATION MATERIAL

Summary

Kol-Seal Extender serves several purposes as a cement additive. While is it primarily used as a lostcirculation additive, it also extends the slurry yield. In turbulent-flow fluids suck as scavenger slurries or chemical washes, Kol-Seal provides scouring action helping to remove excessive gelled mud from the formation.

Kol-Seal exhibits the following properties which are superior to gilsonite: Kol-Seal is not soluble in petroleum fluids. Its melting point is in excess of 1000 degrees F (538 degrees C) and therefore its use is not limited by well temperatures. The compressive strengths of Kol-Seal cements are higher than those obtained with cements containing gilsonite.

In general, Kol-Seal is recommended as a combination extender/lost-circulaton material. Because Kol-Seal has extending properties it can be used as an extending material as well.

Lost Circulation

The primary use of Kol-Seal Extender is to provide lost-circulation control during a cement job. It achieves this through the bridging action at the point of lost returns. Its effectiveness is due to the particle size distribution. The larger and medium size Kol-Seal particles bridge forming a network which retains the finer particles. Thus, a dense deposit is formed which is completely sealed by the cement.

Screen Analysis

Standard Sieve	Percent Retained		
1/4 mesh	0		
1/8 mesh	0		
12 mesh	35 - 40		
30 mesh	20 - 35		
50 mesh	10 - 20		
100 mesh	5 - 15		
200 mesh	1 - 10		
Finer than 200 mesh	5 - 15		

Kol-Seal helps control lost circulation. Since it has extending properties, it reduces the slurry weight thereby reducing the hydrostatic pressure on the weak zone.

Extender Use

Kol-Seal Extender can be used to lower the slurry density and increase the slurry yield while still providing the set cement with good compressive strength. Large amounts of water are not required for Kol-Seal used as an extender. The reduction of slurry density is primarily the result of Kol-Seal's low specific gravity. For this reason, good compressive strengths are obtained with Kol-Seal cement systems.

Physical Properties and Hazards

Product	Form	Absolute	Specific	Health	Physical	Flash Point	рН
Name		Volume	Gravity	Hazard*	Hazard*		
		(gal/lb)					
Kol-Seal	Black	.0925	1.30	Eyes	Dust	200° F	-
Cement	Angular						
Extender	Solid						

*Only the principal, immediate hazards are indicated here. Complete information on health hazards, protective equipment, handling precautions, environmental hazards and disposal is listed in the current WelDril Material Safety Data Sheet for this product.

Kol-Seal Concentration

The concentration of **Kol-Seal** may vary from 5 to 50 pounds per sack of cement. The usual proportion is 12.5 to 25 pounds per sack of cement since higher concentrations may cause mixing problems and bridge-off the float equipment or the annulus.

Mixing Water Requirement

One extra gallon of water is normally added per 25 pounds of **Kol-Seal**. Bentonite can be used with Kol-Seal, but it is not required to prevent gravitational separation of the **Kol-Seal**.

Thickening Time

Kol-Seal is an inert solid. The small amount of additional water used does not appreciably change the thickening time. Existing thickening time data for a particular cementing system can be used.

Compressive Strength

Laboratory tests indicate that Kol-Seal cement has a higher compressive strength than other available low-density or lost-circulation slurries at the equivalent slurry density, although the strength is less than that of the same Cement system without extender.

Compatibility

No compatibility problems with various additives are known or anticipated, since **Kol-Seal** is inert with respect to cement hydration.

Field Mixing Procedure

The use of **Kol-Seal** in cement does not require complicated mixing equipment or procedures. The additive should be dry-blended with the cement when continuously mixing. The **Kol-Seal** should be added last when batch mixing.

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