

## **Drilling Gilsonite Fluid Loss Control (FLC)**

**What is Gilsonite:** Gilsonite is mined in underground shafts and resembles shiny, black substance similar in appearance as the mineral Obsidian. It is brittle and usually micronized into dark brown powder. It is mainly composed of asphaltenes; thus, Gilsonite is classified as a Natural Asphalt and also known as uintaite or uintahite. Discovered in the 1860s, it was first marketed as a lacquer, electrical insulator, and waterproofing compound. This unique mineral is used in more than 160 products, primarily in dark-colored printing inks and paints, oil well drilling muds and cements, asphalt modifiers, foundry sand additives, and a wide variety of chemical products.

**What are Asphaltenes:** Asphaltenes are molecular substances that are found in crude oil, along with resins, aromatic hydrocarbons, and alkanes (i.e., saturated hydrocarbons). The word "asphaltene" was coined by Boussingault in 1837 when he noticed that the distillation residue of some bitumen had asphalt-like properties. Asphaltenes in the form of distillation products from oil refineries are used as "tar-mats" on roads. Asphaltenes consist primarily of carbon, hydrogen, nitrogen, oxygen, and sulfur, as well as trace amounts of vanadium and nickel. The C:H ratio is approximately 1:1.2, depending on the asphaltene source. Asphaltenes are defined operationally as the n-heptane (C<sub>7</sub>H<sub>16</sub>)-insoluble, toluene (C<sub>6</sub>H<sub>5</sub>CH<sub>3</sub>)-soluble component of a carbonaceous material such as crude oil, bitumen or coal. Asphaltenes have been shown to have a distribution of molecular masses in the range of 400 u to 1500 u with a maximum around 750 u.

**Gilsonite use in Drilling sector:** Gilsonite is used in drilling mud fluids and oil well cementing. Gilsonite, in a range of softening points and particle sizes, is a standard ingredient in oil-based drilling muds used in shale and other difficult geological formations. The addition of specially-treated Gilsonite to water-based drilling fluids helps minimize hole washout by stabilizing troublesome shale, and seals off highly permeable sands while reducing torque and drag. The addition of Gilsonite to oil well cements reduces slurry weight without loss of compressive strength and acts as an effective bridging and plugging agent to seal fractures in weak formations while cementing. The maintenance of circulation of the drilling fluid is essential to successful drilling by the rotary method. The drilling fluid or mud is supplied at the surface of the well in large earthen pits or metal tanks and is pumped from these into the bore hole through the drill pipe and the drill bit to the bottom of the hole. The mud returns to the surface between the drill pipe and the bore hole wall, bringing with it the drill cuttings. The circulation of the mud serves not only to carry the cuttings to the surface but also to cool and lubricate the drill bit, thus making possible the further effective penetration of the bit into deeper geological strata. In conventional drilling operation a drilling mud based on bentonite or other materials such as cane fiber, ground walnut hulls, sawdust etc. is commonly used, but the solid organic materials used are difficult to keep suspended in the drilling fluid, being of a higher specific gravity than the fluid, while materials such as expanded perlite, though easily to suspend, become compressed to a specific gravity higher than that of the fluid under the bore hole. Furthermore, the commonly used materials lack adhesive power and are insoluble, and they have been known to become lodged in the wall of the bore hole so as to obstruct or seal off a producing oil or gas zone, thus causing a costly or even a complete loss of production. To prevent Lost Circulation is needed a material with following specifications:

- Incompressible material
- Specific gravity lower than the fluid
- Solubility
- Adhesive power

All the common varieties of Gilsonite are substantially incompressible and have a specific gravity sufficiently near to that of water that properly sized granules of the Gilsonite can be readily suspended in aqueous liquid carrier. Thus, Gilsonite is used for this purpose in powder. Particle size (mesh) is variable according to the characteristic of the well bore. Softening point is very important as Gilsonite must soften at a temperature above the temperature of well formation. The first patent, dated 1954, indicated the use of a Gilsonite with softening point from 150 to 180°C and mesh from 4 to 100. Actually, with more technological devices, the most commonly used is 200/200 (softening point/mesh) type; by the way, Groupeve can supply Gilsonite in a range of 40/400 mesh and 140/230°C softening point.

## Drilling Gilsonite Data Sheet

### 1. Product description

Gilsonite is mined in underground shafts and resembles shiny, black substance similar in appearance as the mineral Obsidian. It is brittle and usually micronized into dark brown powder. It is mainly composed of asphaltenes; thus, Gilsonite is classified as a Natural Asphalt.

### 2. Application and usage

Gilsonite is used in drilling mud fluids and oil well cementing. Gilsonite, in a range of softening points and particle sizes, is a standard ingredient in oil-based drilling muds used in shale and other difficult geological formations. The addition of specially-treated Gilsonite to water-based drilling fluids helps minimize hole washout by stabilizing troublesome shale, and seals off highly permeable sands while reducing torque and drag. Gilsonite is normally used in a range of 40/400 mesh and 160/230°C softening point.

### 3. Technical data

GRADE B			
No.	Test	Result	Method
1	Ash Content, wt%	9-14	ASTM-D174
2	Moisture Content, wt%	<1	ASTM-D173
3	Volatile Matter, wt%	63	ASTM-D175
4	Fixed Carbon, wt%	29	ASTM-D172
5	Solubility in CS <sub>2</sub> , wt%	89	ASTM-D4
6	Specific Gravity @ 25 C°	1,11	ASTM-D3289
7	Color in mass	Black	-
8	Softening Point, C°	220	ASTM-D36
9	Flash Point	>420	Cleveland O.C.
10	Penetration @ 25 C°	0	ASTM-D5
11	Particle Size (mesh)	200	Tyler

GRADE A			
No.	Test	Result	Method
1	Ash Content, wt%	8-10,8	ASTM-D174
2	Moisture Content, wt%	<1	ASTM-D173
3	Volatile Matter, wt%	69	ASTM-D175
4	Fixed Carbon, wt%	25	ASTM-D172
5	Solubility in CS <sub>2</sub> , wt%	91	ASTM-D4
6	Specific Gravity @ 25 C°	0.98	ASTM-D3289
7	Color in mass	Black	-
8	Softening Point, C°	200-220	ASTM-D36
9	Flash Point	>400	Cleveland O. C.
10	Penetration @ 25 C°	0	ASTM-D5
11	Particle Size (mesh)	>200	Tyler

### 4. Packaging

In anonymous 25 kg or 21,5 kg craft paper bags, palletized and shrink wrapped. Tolerance in weight: ±2%. Certificate of fumigation is provided.

#### Disclaimer Statement

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