Product data sheet

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Sirius-ES drilling fluids

Polymeric deflocculant for drilling fluids

Description

Polythin is a synthetic, sulfonated organic polymer of tailored molecular weight. The polymer tolerates electrolytes such as seawater, NaCl and KCl.

Polythin adsorbs onto the surface of clay platelets, thus preventing the flocculation of bentonite particles caused by high temperatures.

Polythin can also recondition gelled muds by deflocculating the bentonite particles. The polymer lowers rheology and static shear strength values which makes the fluid pumpable again.

As a secondary effect of deflocculation Polythin supports fluid loss additives and decreases API and HTHP filtrates of drilling fluids.

Principal uses

Polythin prevents the high temperature induced gelation of bentonite and other clays. Polythin is very stable and functions at temperatures up to 250 °C (500 °F).

The benefits of using Polythin are:

- Prevention of mud gelation under high temperature conditions
- Superior deflocculation of bentonite at temperatures up to 500 °F (250 °C)
- Reconditioning of flocculated muds
- Pumpable mud with low static shear strength
- Electrolyte tolerance
- Stable and low viscosity in high solids muds
- Low treatment and replacement levels
- Assists fluid loss additives

Typical properties

Appearance:	Brown
powder pH (150 g/l) at 20 °C:	6 – 9
Solubility in water at 20 °C:	320 g/l Shelf life: 5 years

Storage of polymer in a cool, dry place in its original unopened bags.

Dosage depends on application but normally is in the range of 0.5 to 2.0 ppb and 1.5 to 6.0 kg/m³ respectively.

Polythin is used as deflocculant/thinner for clay/water-based fluids. Not

known as a hazardous substance.
Not classified as a dangerous good in the meaning of transport regulations.

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Application

A major problem when drilling high temperature wells with water based fluids is mud gelation due to bentonite flocculation.

This flocculation is caused by a chemical change in the structure of bentonite and leads to a highly viscous, non-pumpable mud. Clay flocculation begins at about 120 °C (249 °F) and becomes severe at temperatures exceeding 150 °C (300 °F). Prolonged static aging at the bottom of the well results in a highly viscous fluid which causes major problems in logging, coring and testing operations.

Polythin prevents the high temperature induced gelation of bentonite and other clays. Polythin is very stable and functions at temperatures up to 250 °C (500 °F).

Examples

Prevention of mud gelation

Polythin was added to a high solids mud to determine its ability to prevent bentonite gelation under high temperature conditions.

Fluid formulation: 17.9 ppg (2.15 g/ml) freshwater mud

350 g tap water
12 g Wyoming bentonite 850 g barite
4 g Polydrill x g Polythin
7 g lignite resin
60 g Revdust (drill solids) pH 10 with NaOH (10 %)

Aging conditions: 16 hrs, static, 400 °F

After static aging at 400 °F, the base mud without Polythin was completely flocculated. The fluid was gelled and difficult to pour from the aging cell. The fluid treated with Polythin was still liquid, as indicated by the low shear strength value.

The results illustrate that at low concentration, Polythin effectively inhibits the high temperature gelation of bentonite. The mud pours easily and remains fluid after hot rolling.

Polythin also assists in controlling fluid loss due to prevention of bentonite flocculation and improvement in filter cake quality.

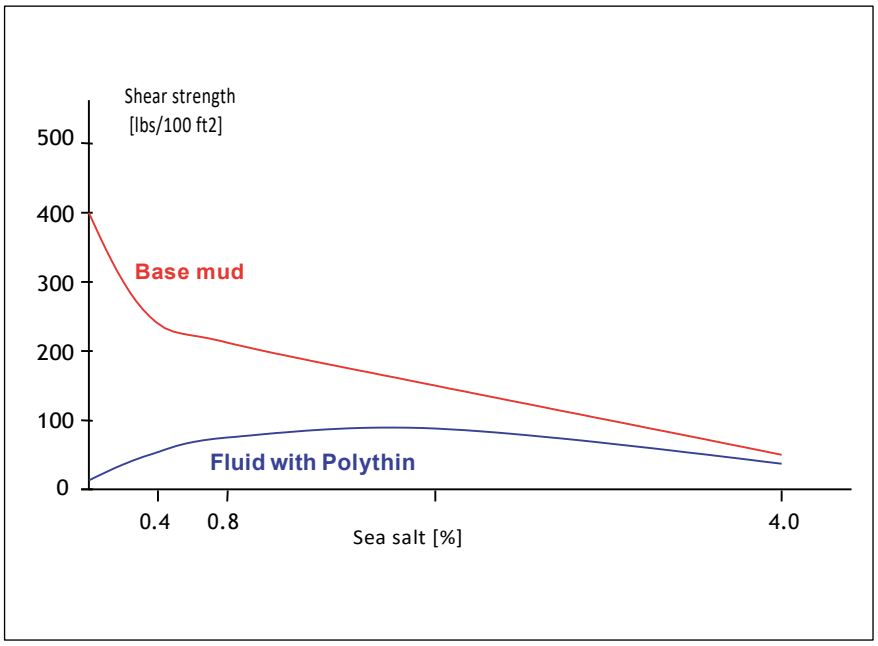
The combination of Polydrill fluid loss polymer and Polythin results in an easily engineered and contaminant resistant HT-fluid.

Electrolyte tolerance

In saline muds, high temperature has a different effect on bentonite than in a fresh water environment. Bentonite is dehydrated by salt and temperature resulting in less mud gelation but very high fluid loss values. In saline muds Polythin has a stabilizing effect on bentonite which results in low API and HTHP filtrates. Polythin protects the bentonite from the negative effects of salt at high temperatures.

To demonstrate this effect, a Polythin freshwater fluid was contaminated with increasing amounts of sea salt. This is to simulate muds which have been diluted with different amounts of sea water. The fluids were tested after HT-aging.

Fluid formulation:	16.5 ppg seawater mud 350 g water 22 g Wyoming bentonite 640 g barite pH is adjusted to 9.0 with NaOH (10 %) 2 g (1.3 ppb) Polythin 0.4, 0.8, 2.0 and 4.0 % resp. of seasalt
Aging conditions:	16 hrs, static at 350 °F



Static shear strength vs. Sea salt

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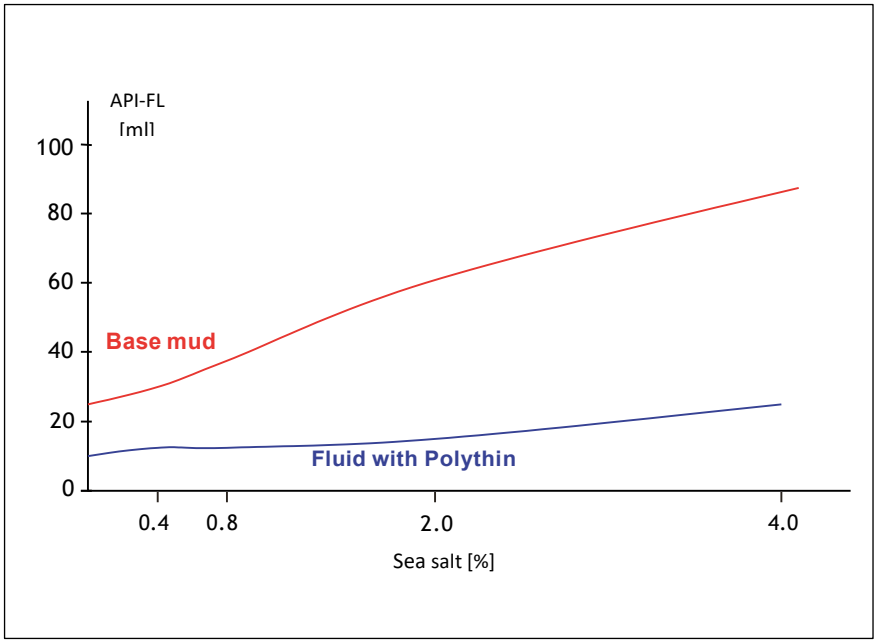

API-FL vs. Sea salt

The API and HTHP filtrates of seawater muds are drastically lowered by Polythin.

In fluids with low amounts of sea salt Polythin effectively prevents HT-gelation. As can be seen in above figure, temperature induced gelation becomes less severe with increasing salinity.

Note

The data contained in this publication are based on our current knowledge and experience. In view of the many factors that may affect processing and application of our product, these data do not relieve processors from carrying out their own investigations and tests; neither do these data imply any guarantee
of certain properties, nor the suitability of the product for a specific purpose. Any descriptions, drawings, photographs, data, proportions, weights etc. given herein may change without prior information and do not constitute the agreed contractual quality of the product. It is the responsibility of the recipient of our products to ensure that any proprietary rights and existing laws and legislation are observed.