BENTONE® 150
Rheological Additive

easy dispersing, self activating organoclay for drilling muds and completion fluids

BENTONE® 150 rheological additive is an easy dispersing, self activating organoclay that exhibits high performance efficiency in diesel, low aromatic mineral oil, poly, linear and isomerized alpha olefins, and modified vegetable oil containing base fluid formulations. It is highly effective in all-oil and invert muds, fracture and workover fluids.

Application

BENTONE 150 is a self-activating gellant offering rapid yield development, high gel strengths, and increased efficiency. It is an attractive alternative to conventional clay gellants that require higher shear and chemical activation for optimal dispersion and performance. The unique properties of BENTONE 150 are especially valuable in low-shear mud plant operations and during completion fluid manufacture at the well site. BENTONE 150 also possesses good low temperature incorporation properties.

BENTONE 150 imparts high gel strengths to inverts and all-oil muds, as indicated by their high low shear Brookfield viscosities (see formulation data). This translates into muds and slurries having improved anti-settling and downhole sag resistance properties.

Attributes

BENTONE 150 rheological additive

- Requires no external chemical activators in all-oil or invert systems
- Is easy to disperse
- Improves mud plant throughput
- Gives greater batch-to-batch uniformity
- Offers fast well-site mud incorporation and yield
- Generates high Brookfield viscosities
- Is not harmful to the environment

Typical Properties

Composition: organic derivative of a bentonite clay
Color: light cream
Form: finely divided powder
Specific Gravity: 1.6
Moisture: 2.5% maximum

Incorporation

Self activating BENTONE 150 requires no external chemical activator. We note that a small amount of water (0.1 - 0.2% by weight of total formula) added to all-oil muds further speeds the gelation process and optimizes organoclay use.

Good agitation should be used for mixing BENTONE 150 additive. Since it is an easy dispersing organoclay, less work will be required to incorporate it into the drilling fluid, and to build initial viscosity.

Levels of Use

The level of use depends on the rheological properties needed, and the base oil being used. Compared with conventional organoclay gellants, typically 25% - 50% less BENTONE 150 is needed to develop a given yield depending on base fluid.

The following loading “rules of thumb” are offered as starting point ranges for screening BENTONE 150 in typical all-oil and 80/20 inverts muds. Since other ingredients and incorporation conditions can influence ultimate YP/PV values, the BENTONE 150 level should be optimized to the target YP in the full formulation.

<table>
<thead>
<tr>
<th>Mud Type</th>
<th>Pounds per barrel</th>
<th>Kg/m³</th>
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</thead>
<tbody>
<tr>
<td>All-Oil</td>
<td></td>
<td></td>
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<tr>
<td>Diesel Oil</td>
<td>4 - 10</td>
<td>11-28</td>
</tr>
<tr>
<td>Mineral Oil</td>
<td>4 - 10</td>
<td>11-28</td>
</tr>
</tbody>
</table>
Invert Emulsions

- Diesel Oil: 2 – 5
- Mineral Oil: 3 – 7
- Alpha Olefins (PAO, LAO, IAO): 3 – 7
- Modified Vegetable Oil: 3 – 7

Properties

- Initial: 10/15
- @250°F: 15/20

Diesel Invert, 80/20, 14ppg

Aged 16 hrs. @ 250°F, Tested @ 120°F

Formulation

- #2 Diesel, bbl: 0.52
- Primary Emulsifier, ppb: 9
- Secondary Emulsifier, ppb: 2
- Lime, ppb: 5
- BENTONE® 150, ppb: 3
- Fluid Loss Additive, ppb: 8
- Barite, ppb: 325
- Brine, 30% CaCl2, bbl: 0.17

Properties

- Initial: 38
- @250°F: 39
- Plastic Viscosity, cPs: 19
- Yield Point, lbs./100ft²: 12/14
- Gels, 10sec/10min, lbs./100ft²: 733
- ES, volts: 36,000
- Brookfield, 0.3 RPM, cPs: 615

IAO Invert, 80/20, Unweighted

Aged 16 hrs. @ 300°F, Tested @ 120°F

Formulation

- IAO, bbl: 0.80
- BENTONE® 150, ppb: 10
- Lime, ppb: 1
- Primary Emulsifier, ppb: 10
- Secondary Emulsifier, ppb: 3
- Brine, 30% CaCl2, bbl: 0.20

Properties

- Initial: 18
- @300°F: 20
- Plastic Viscosity, cPs: 33
- Yield Point, lbs./100ft²: 19/19
- Gels, 10sec/10min, lbs./100ft²: 1039
- ES, volts: 54,400
- Brookfield, 0.3 RPM, cPs: 568

Vegetable Oil Derivative Invert, Unweighted

Aged 16 hrs. @ 250°F, Tested @ 120°F

Formulation

- Base Fluid: 0.73
- BENTONE® 150, ppb: 6
- Primary Emulsifier, ppb: 10
- Secondary Emulsifier, ppb: 8
- Lime, ppb: 2
- Brine, 30% CaCl2, bbl: 0.18

Properties

- Initial: 5
- @250°F: 10
- Plastic Viscosity, cPs: 12
- Yield Point, lbs./100ft²: 16
- Gels, 10sec/10min, lbs./100ft²: 13/19
- ES, volts: 22,000
- Brookfield, 0.3 RPM, cPs: 50,400

MO Invert, 80/20, 14ppb

Aged 16 hrs. @ 300°F, Tested @ 120°F

Formulation

- Mineral Oil, bbl: 0.52
- Primary Emulsifier, ppb: 9
- Secondary Emulsifier, ppb: 2
- Lime, ppb: 5
- BENTONE® 150, ppb: 6
- Fluid Loss Additive, ppb: 8
- Barite, ppb: 325
- Brine, 30% CaCl2, bbl: 0.17

Properties

- Initial: 51
- @300°F: 54
- Plastic Viscosity, cPs: 22
- Yield Point, lbs./100ft²: 13/19
- Gels, 10sec/10min, lbs./100ft²: 700
- ES, volts: 28,000
- Brookfield, 0.3 RPM, cPs: 23,000

All-Oil – No polar activator

Aged 16 hrs. @ 150°F, Tested @ 120°F

Formulation

- Base Oil, bbl: 0.78
- (#2 Diesel or Mineral Oil)
- Emulsifier, ppb: 0.75
- Lime, ppb: 1
- BENTONE® 150, ppb: 5, 7.5 or 10
- Barite, ppb: 325

Properties - #2 Diesel

- Initial: 5 ppb
- Plastic Viscosity, cPs: 12
- Yield Point, lbs./100ft²: 16
- Gels, 10sec/10min, lbs./100ft²: 7/9
- ES, volts: 22,000
- Brookfield, 0.3 RPM, cPs: 50,400

Properties – Mineral Oil

- Initial: 7.5 ppb
- Plastic Viscosity, cPs: 14
- Yield Point, lbs./100ft²: 12
- Gels, 10sec/10min, lbs./100ft²: 20/25
- ES, volts: 31,200
- Brookfield, 0.3 RPM, cPs: 112,000

Health and Safety Data

Before using this product please consult our Material Safety Data Sheet for information on safe handling.