Product Data Sheet

BENTONE® 38

Rheological Additive for HTHP drilling muds and working fluids

BENTONE 38 rheological additive is the oil service industry's standard for a high temperature/high pressure performance organoclay. This additive is manufactured with a high efficiency hectorite clay noted for imparting superior heat stability.
BENTONE 38 exhibits an excellent balance of dispersibility and efficiency. **BENTONE 38** performs well in diesels, mineral oils, poly, linear and isomerized alpha olefins and vegetable oil derivative base fluids.

Applications

Viscosifying drilling fluids
including: Oil-based drilling muds
Invert emulsion muds
Packer fluids
Completion fluids
Workover fluids

Based on:
Synthetic Oils
Mineral Oils
Low toxicity oils and fluids Diesel oil
Crude oil

- Manufacturing fluids at low temperatures
- Conditioning mud before storage
- Increasing suspending properties of packer fluids
- Preparing spotting fluids to free stuck pipe

Attributes

BENTONE 38 gellant

- Confers superior downhole stability to muds and completion fluids versus conventional organoclays
- Delivers high rheology efficiency over a wide range of intermediate and low polarity base fluids including diesels, mineral oils, poly, linear and isomerized alpha olefins and vegetable oil derivatives
- Effectively suspends weighting agents and cuttings
- Improves cuttings carrying capacity and hole cleaning
- Is not harmful to the environment

Chemical and Physical Data

Composition	organically modified hectorite clay
Color	cream white
Form	finely divided powder
Specific Gravity	1.7
Moisture	3.0% maximum

Incorporation

Good agitation should be used when incorporating **BENTONE 38** into the drilling or completion fluid. The amount of stirring needed will depend on the temperature of the oil, with the rate of organoclay gelation increasing with increasing temperature, and the level of shear available. Downhole circulation after the initial mixing will aid in achieving the full viscosity and yield.

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A chemical polar activator may be needed to ensure full development of rheological properties. When water is present in the mud, it acts as the activator, and a separate activator is not needed.

However, in all–oil systems or in other fluids where no water is included in the formulation, or where water is unwanted, a chemical activator such as methanol or propylene carbonate should be added. Mixing 5% water, by weight, into the activator can further enhance efficiency.

The following activators have proved effective for **BENTONE® 38** in waterless systems:

Suitable Chemical activators	Use level as a percentage of **BENTONE 38** weight
Methanol / water (95/5)	33%
Propylene carbonate	33%
Propylene carbonate/ Water (95/5)	33%

Levels of Use

The level of use depends on the rheological properties needed, and the base oil being used. Pilot trials are recommended to optimize performance before field use.

The following loading "rules of thumb" are offered as starting point levels for screening **BENTONE 38** in typical all oil and 80/20 inverts muds. Recognize other ingredients can influence ultimate YP/PV values and the **BENTONE 38** level should be optimized to the target YP in the full formulation.

Mud Type	Pounds per barrel	Kg/m^3
All Oil		
Diesel Oil	4 – 10	11 – 28
Mineral Oil	8 – 12	23 – 34
Invert Emulsions		
Diesel oil	2 – 6	6 – 17
Mineral oil	5 – 9	14 – 26
Alpha olefins	5 – 10	14 – 28
(PAO, LAO, IAO)		
Modified Vegetable oil	4 – 8	11 - 23

Performance
Invert Muds

Diesel Invert, 80/20, 14ppg
Aged 16 hrs. @ 250°F, Tested at 120°F

Formulation

#2 Diesel, bbl	0.52
Primary Emulsifier, ppb	9
Secondary Emulsifier, ppb	2
Lime, ppb	5
BENTONE 38, ppb	3
Fluid Loss Additive, ppb	8
Barite, ppb	325
Brine, 30% $CaCl_2$, bbl	0.17

Properties	Initial	@250°F
Plastic Viscosity, cPs	30	33
Yield Point, $lbs./100ft^2$	10	7
Gels, 10sec/10min, $lbs/100ft^2$	7/11	7/10
ES, volts	704	704
Brookfield, 0.3 RPM, cPs	20,000	17,600

Mineral Oil Invert, 80/20, 14ppg
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 38, ppb	6
Fluid Loss Additive, ppb	8
Barite, ppb	325
Brine, 30% $CaCl_2$, bbl	0.17

Properties	Initial	@300°F
Plastic Viscosity, cPs	11	38
Yield Point, $lbs./100ft^2$	11	10
Gels, 10sec/10min, $lbs/100ft^2$	8/13	9/15
ES, volts	760	1080
Brookfield, 0.3 RPM, cPs	12,800	12,400

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IAO Invert, 80/20, Unweighted
Aged 16 hrs. @ 300°F, Tested @ 120°F

Formulation

IAO, bbl	0.8
Primary Emulsifier, ppb	10
Secondary Emulsifier, ppb	3
Lime	1
BENTONE® 38, ppb	10
Brine, 30% $CaCl_2$, bbl	0.2

Properties	Initial	@300°F
Plastic Viscosity, cPs	9	10
Yield Point, lbs./100ft^2	8	7
Gels, 10sec/10min, lbs/100ft^2	5/6	6/5
ES, volts	672	565
Brookfield, 0.3 RPM, cPs	13,300	15,000

Vegetable Oil Derivative Invert, Unweighted
Aged 16 hrs. @ 250°F, Tested @ 120°F

Formulation

Base Fluid	0.73
Primary Emulsifier, ppb	10
Secondary Emulsifier, ppb	8
Lime, ppb	2
BENTONE 38, ppb	6
Brine, 30% $CaCl_2$, bbl	0.18

Properties	Initial	@250°F
Plastic Viscosity, cPs	13	12
Yield Point, lbs./100ft^2	9	8
Gels, 10sec/10min, lbs/100ft^2	7/7	5/6
ES, volts	1179	1157
Brookfield, 0.3 RPM, cPs	29,500	NA

All-Oil Muds*

All-Oil, No Polar Activator
Aged 16 hrs. @ 150°F-Tested @120°F

Formulation

Base Oil, bbl (#2 Diesel or Mineral Oil)	0.78
Emulsifier, ppb	0.75
Lime, ppb	1
BENTONE 38, ppb	5 or 10
Barite, ppb	325

Properties –#2 Diesel

	Initial 5ppb
Plastic Viscosity, cPs	13
Yield Point, lbs./100ft^2	10
Gels, 10sec/10min, lbs/100ft^2	4/7
Brookfield, 0.3 RPM, cPs	15,600

Properties – Mineral Oil

	Initial 5 ppb	10 ppb
Plastic Viscosity, cPs	10	16
Yield Point, lbs./100ft^2	2	10
Gels, 10sec/10min, lbs/100ft^2	4/5	12/16
Brookfield, 0.3 RPM, cPs	4,000	16,000

*All Oil Mud Performance: Properties developed in formulations without a polar activator. Yields and Brookfields will increase if an activator is used.

Initial properties - aged 16 Hours at 150˚F

All muds tested at 120˚F.

Health and Safety Data

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