

BENTONE® 34

Rheological Additive for drilling muds and working fluids

GENERAL INFORMATION

BENTONE 34 rheological additive is the pioneering organoclay first used by the oil service industry to take advantage of the temperature resistant rheology characteristic of organoclays.

BENTONE 34 is a moderate temperature performance bentonite based organoclay. In use for over forty years, **BENTONE 34** is a cost-effective product, particularly in all-oil, invert diesel and mineral oil based fluids, where sufficient shear is available to achieve full dispersion.

CHEMICAL AND PHYSICAL DATA

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

These are typical properties not to be used for specification purposes.

APPLICATIONS

Viscosifying drilling fluids including:

- Oil-based drilling muds
- Invert emulsion muds
- Packer fluids
- Completion fluids
- Workover fluids

Based on:

- Mineral oils
- Low toxicity oils and fluids
- Synthetic Oils
- Diesel oil
- Crude oil

ATTRIBUTES

BENTONE 34 gellant:

- Confers superior downhole stability to muds and cost-effectively builds viscosity and yield point
- Suspends weighting materials and other solids
- Improves cuttings carrying capacity and hole cleaning
- Increases emulsion stability
- Aids control of fluid loss to the formation
- Confers temperature stability to the fluid
- Is not harmful to the environment

INCORPORATION

Good agitation should be used when incorporating **BENTONE 34** into the drilling fluid. The amount of stirring required will depend on the temperature of the oil, with the rate of organoclay gelation increasing with increasing temperature, and the level of shear available. Circulation downhole after the initial mixing will aid in achieving the full viscosity and yield.

A chemical polar activator is 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 enhance its efficiency.

The following activators have proved effective for **BENTONE 34** in waterless systems:

<i>Suitable chemical activators</i>	<i>Use level as percentage of BENTONE 34 weight</i>
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 34** in typical all-oil and 80/20 inverts muds. Recognize, that other ingredients can influence ultimate YP/PV values and the **BENTONE 34** level should be optimized to the target YP in the full formulation.

Mud Type

	<u>Pounds per Barrel</u>	<u>Kg/m³</u>
All-Oil		
Diesel Oil	6 - 12	17 - 34
Mineral Oil	8 - 12	23 - 34
Invert Emulsions		
Diesel Oil	2 - 6	6 - 17
Mineral Oil	5 - 9	14 - 25
Synthetic Fluids	4 - 8	11 - 23

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BENTONE® 34**PERFORMANCE****Invert Muds****Diesel Invert, 80/20, 14 ppg****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 34, ppb	3
Fluid Loss Additive, ppb	8
Barite, ppb	325
Brine, 30% CaCl ₂ , bbl	0.17

Properties

	<u>Initial</u>	<u>@250°F</u>
Plastic Viscosity, cPs	35	35
Yield Point, lbs./100 ft ²	15	11
Gels, 10 sec/10 min, lbs./100 ft ²	10/11	9/11
ES, volts	604	454
Brookfield, 0.3 RPM, cPs	22,000	24,000

Mineral Oil Invert, 80/20, 14 ppg**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 34, ppb	6
Fluid Loss Additive, ppb	8
Barite, ppb	325

Properties

	<u>Initial</u>	<u>300°F</u>
Plastic Viscosity, cPs	43	45
Yield Point, lbs./100 ft ²	13	14
Gels, 10 sec/10 min, lbs./100 ft ²	9/12	9/18
ES, volts	725	845
Brookfield, 0.3 RPM, cPs	16,000	24,000

All-Oil Muds***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 34, ppb	5 or 10
Barite, ppb	325

Properties - #2 Diesel

	Initial	
	<u>5 ppb</u>	<u>10 ppb</u>
Plastic Viscosity, cPs	19	32
Yield Point, lbs./100 ft ²	4	30
Gels, 10 sec/10 min, lbs./ 100 ft ²	5/8	6/22
Brookfield, 0.3 RPM, cPs	15,200	104,000

Properties – Mineral Oil

	Initial
	<u>10 ppb</u>
Plastic Viscosity, cPs	13
Yield Point, lbs./100 ft ²	17
Gels, 10 sec/10 min, lbs./ 100 ft ²	21/22
Brookfield, 0.3 RPM, cPs	40,000

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

All muds tested at 120°F.

Initial Properties - Aged 16 hrs. at 150°F

HEALTH AND SAFETY DATA

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

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