ELEMENTIS
A global specialty chemicals company

Enhanced Performance Through Applied Innovation

BENTONE® 910

Economical rheological additive for drilling muds and working fluids

GENERAL INFORMATION

BENTONE 910 rheological additive is an economical organobentonite viscosifier and suspending agent for oil–based muds, invert emulsion muds, completion fluids and workover fluids.

This viscosifier employs the composition most widely used through the years in oil–based muds, in a cost–effective economy form.

BENTONE 910 is suitable for drilling fluids based on diesel oil and mineral oil. It adds to the formulation the temperature stable rheology characteristic of organoclays.

CHEMICAL AND PHYSICAL DATA

Composition	organic modified bentonite clay
Color	light tan
Form	finely divided powder
Specific gravity	1.7
Moisture	4.0% 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

Based on:
- Diesel oil
- Crude oil
- Mineral oils

ATTRIBUTES

BENTONE 910 gellant:

- 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 910** into the drilling system. The amount of stirring needed will depend on the temperature of the oil, the O:W, mud weight and emulsifier package. The rate of viscosity build from this organoclay increases with increasing temperature and shear. 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 necessary. In all–oil systems, however, 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 efficiency.

The following activators have proved effective for **BENTONE 910** in waterless systems:

Suitable chemical activators	*Use level as percentage of **BENTONE 910** 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 on the type of base oil being used. Pilot trials are recommended to optimize performance before field use.

Typical loadings are:

Mud Type	Pounds per Barrel	Kg/m^3
All-Oil		
Diesel Oil	6 – 12	17 – 34
Mineral Oil	8 – 14	23 – 40
Invert Emulsions		
Diesel Oil	2 – 6	6 – 17
Mineral Oil	6 – 12	17 – 34

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PERFORMANCE

Diesel Invert, 80/20, 14 ppg
Aged 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 910, ppb	3
Fluid Loss Additive, ppb	8
Barite, ppb	325
Brine, 30% $CaCl_2$, bbl	0.17

Properties	Initial	@250°F
Plastic Viscosity, cPs	32	31
Yield Point, lbs./100 ft²	14	7
Gels, 10 sec/10 min, lbs./100 ft²	11/13	7/10
ES, volts	750	704
Brookfield, 0.3 RPM, cPs	22,000	17,600

Mineral Oil Invert, 80/20, 14 ppg
Aged @ 300°F, Tested @ 120°F

Formulation	
Mineral Oil, bbl	0.52
Primary Emulsifier, ppb	9
Secondary Emulsifier, ppb	2
Lime, ppb	5
BENTONE 910, ppb	6
Fluid Loss Additive, ppb	8
Barite, ppb	325
Brine, 30% $CaCl_2$, bbl	0.17

Properties	Initial	@300°F
Plastic Viscosity, cPs	39	47
Yield Point, lbs./100 ft²	3	11
Gels, 10 sec/10 min, lbs./100 ft²	4/6	8/13
ES, volts	580	740
Brookfield, 0.3 RPM, cPs	4800	12800

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
BENTONE 910, ppb	5 or 10
Lime, ppb	1
Barite, ppb	325

Properties - #2 Diesel	Initial	
	5 ppb	10 ppb
Plastic Viscosity, cPs	12	16
Yield Point, lbs./100 ft²	2	3
Gels, 10 sec/10 min, lbs./ 100 ft²	3/5	5/14
Brookfield, 0.3 RPM, cPs	4,800	14,000

Properties – Mineral Oil	Initial	
	5 ppb	10 ppb
Plastic Viscosity, cPs	12	15
Yield Point, lbs./100 ft²	2	3
Gels, 10 sec/10 min, lbs./ 100 ft²	3/5	5/14
Brookfield, 0.3 RPM, cPs	2,800	12,800

* 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.

Note: Initial properties - aged 16 hours 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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