

BENTONE® 150

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

GENERAL INFORMATION

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.

CHEMICAL & PHYSICAL PROPERTIES

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

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

APPLICATIONS

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 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

INCORPORATION

Self activating of **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 of **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.

<u>Mud Type</u>	<u>Pounds per Barrel</u>	<u>Kg/m³</u>
All-Oil		
Diesel Oil	4 – 10	11 – 28
Mineral Oil	4 – 10	11 – 28
Invert Emulsions		
Diesel Oil	2 – 5	6 – 14
Mineral Oil	3 – 7	8 – 20
Alpha olefins (PAO, LAO, IAO)	3 – 7	8 – 20
Modified Vegetable Oil	3 – 7	8 – 20

continued...

BENTONE® 150**PERFORMANCE**

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 150, 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	38	39
Yield Point, lbs./100 ft ²	19	15
Gels, 10 sec/10 min, lbs./100 ft ²	12/14	12/13
ES, volts	733	615
Brookfield, 0.3 RPM, cPs	36,000	32,800

IAO Invert, 80/20, Unweighted

Aged 16 hrs. @ 300°F, Tested @ 120°F

Formulation

IAO, bbl	0.8
BENTONE 150, ppb	10
Lime, ppb	1
Primary Emulsifier, ppb	10
Secondary Emulsifier, ppb	3
Brine, 30% CaCl ₂ , bbl	0.2

Properties

	<u>Initial</u>	<u>@300°F</u>
Plastic Viscosity, cPs	18	20
Yield Point, lbs./100 ft ²	22	25
Gels, 10 sec/10 min, lbs./ 100 ft ²	19/19	16/16
ES, volts	1039	568
Brookfield, 0.3 RPM, cPs	54,400	53,800

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% CaCl ₂ , bbl	0.18

Note: Initial properties – aged 16 hours at 150°F

Properties

	<u>Initial</u>	<u>@250°F</u>
Plastic Viscosity, cPs	13	12
Yield Point, lbs./100 ft ²	16	17
Gels, 10 sec/10 min, lbs./ 100 ft ²	8/9	7/9
ES, volts	1320	1126
Brookfield, 0.3 RPM, cPs	35,000	NA

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% CaCl ₂ , bbl	0.17

Properties

	<u>Initial</u>	<u>@300°F</u>
Plastic Viscosity, cPs	51	54
Yield Point, lbs./100 ft ²	22	19
Gels, 10 sec/10 min, lbs./ 100 ft ²	13/19	12/16
ES, volts	700	695
Brookfield, 0.3 RPM, cPs	28,000	23,000

BENTONE® 150**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 150, ppb	5, 7.5 or 10
Barite, ppb	325

Properties

	Initial	
	<u>5 ppb</u>	<u>7.5 ppb</u>
Plastic Viscosity, cPs	12	21
Yield Point, lbs./100 ft ²	16	29
Gels, 10 sec/10 min, lbs./ 100 ft ²	7/9	13/12
Brookfield, 0.3 RPM, cPs	22,000	50,400

Properties – Mineral Oil

	Initial	
	<u>5 ppb</u>	<u>7.5 ppb</u>
Plastic Viscosity, cPs	14	16
Yield Point, lbs./100 ft ²	12	40
Gels, 10 sec/10 min, lbs./ 100 ft ²	20/25	48/25
Brookfield, 0.3 RPM, cPs	31,200	112,000

HEALTH AND SAFETY DATA

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

NOTE: The information herein is currently believed to be accurate. We do not guarantee its accuracy. Purchasers shall not rely on statements herein when purchasing any products. Purchasers should make their own investigations to determine if such products are suitable for a particular use. The products discussed are sold without warranty, express or implied, including a warranty of merchantability and fitness for use. Purchasers will be subject to a separate agreement which will not incorporate this document.

© Copyright 2019, Elementis Specialties, Inc. All rights reserved. Copying and/or downloading of this document or information therein for republication is not allowed unless prior written agreement is obtained from Elementis Specialties, Inc.

® Trademark of Elementis Specialties, Inc.

V01 Aug. 2019

North America

Elementis
469 Old Trenton Road
East Windsor
NJ 08512, USA
Tel.: +1 609 443 2500
Fax: +1 609 443 2422

Europe

Elementis UK Ltd.
c/o Elementis GmbH
Stolberger Strasse 370
50933 Cologne, Germany
Tel.: +49 221 2923 2066
Fax: +49 221 2923 2011

Asia

Deuchem (Shanghai) Chemical Co., Ltd.
99, Liayang Road
Songjiang Industrial Zone
Shanghai, China 201613
Tel.: +86 21 5774 0348
Fax: +86 21 5774 3563