ELEMENTIS

A global specialty chemicals company

Application Leaflet

BENTONE® P 380 MS and BENTONE® P 270 CO

Preactivated Hectorite pastes as rheology modifier for non-aqueous systems

Key Benefits

- Significant reduction of the processing time
- Dust free production
- Post-addition possible
- Significantly higher efficiency in comparison to standard powdered

Introduction

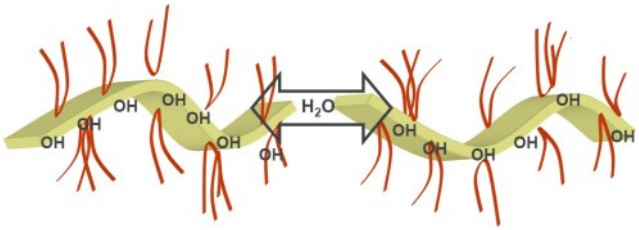
BENTONE® organoclays from Elementis are essential rheological additives that achieve high viscosities at low shear rates and optimize anti-sedimentation in non -aqueous media.

Mineralogy and mechanism

BENTONE® clay materials are based on either bentonite or hectorite, both minerals from the smectite group. They consist of microfine platelet stacks that, due to their mineralogical structure, expand in water in their natural form. In order for them to be used compatibly in non-aqueous media such as organic solvents, however, it is necessary to modify the surface of their silicate plates with quaternary ammonium compounds. The choice of modification and processing conditions also plays an important role in the practical applicability and performance capabilities of the finished end systems. The resulting organoclay will be dried and milled to achieve a powdered material. To be most rheologically effective, the size of the individual platelets and the total combined edge length following their successful activation is decisive. .

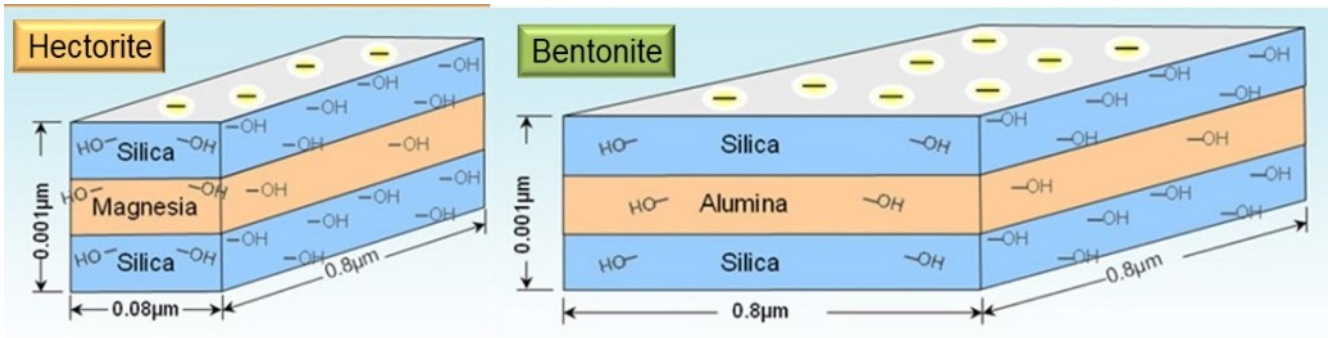
As the hectorite platelets are significantly smaller than the bentonite ones, the resulting edge length per gram of silicate in the hectorite is much larger. This makes hectorite additives able to build up a much denser and more rheologically effective network. In order to be activated, organoclays must first be exposed to high shear forces over a defined swelling period. During

the activation process, the platelet stack is first subjected to swelling and then smashed with strong shear. The delaminated, organically modified silicate platelets that result can then e effective rheologically via intermolecular forces, e.g. hydrogen bonds with the water molecules of a polar activator. These are usually short-chain alcohols combined with small amounts of water or special additives such as DAPRO® FX 2060 or DAPRO® BEZ 75.



The smaller particle size of the hectorite-based products requires that these be subjected to far higher shear forces than their bentonite-based counterparts in order to achieve the high performance level described. For the organoclays to be activated completely – and especially the hectorite based grades – the use of correspondingly powerful production equipment is necessary. Such machinery is, however, not available in every manufacturing facility.

With fully-activated BENTONE® organoclay pastes, the need for this type of activation is eliminated. Using a special process carried out by Elementis, the clays in the products are made available in various solvents and in a fully activated state.



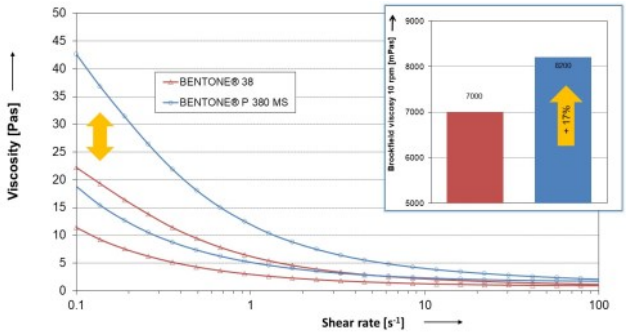
Performance

Using BENTONE® P 380 MS and BENTONE® P 270 CO provides a number of advantages over powdered products, including:

- Significant reduction in overall processing time
- Reduction in the amount of raw materials necessary, e.g. by eliminating the need for polar activators
- Dust-free production
- Fewer processing steps and higher processing stability
- Post incorporation with only low shear forces possible
- Dedicated for easy dispersing formulations

BENTONE® P 380 MS

BENTONE® P 380 MS, an organoclay paste in aromatic free isoparrafin, is considerably more effective than conventionally used powdered organoclays. The following chart clearly illustrates the difference in viscosity between BENTONE® 38 and the new BENTONE® P 380 MS.

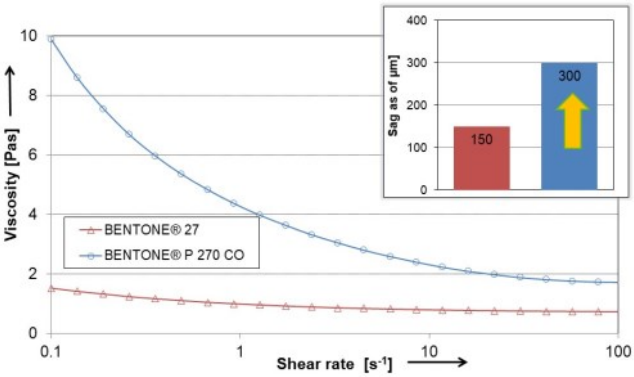


The results show that at equal active clay content the viscosity of an alkyd-based coating system that incorporates BENTONE® P 380 MS will be substantially higher at lower and medium shear rates than one which uses a conventional organoclay pre-gel. Tests showed that other properties of the coatings, e.g. sag resistance, were improved significantly and without any negative impact on flow properties.

BENTONE® P 270 CO

BENTONE® P 270 CO is an organoclay paste formulated in castor oil. This product has been dedicated for systems of higher polarity and especially those based on poly urethane. Due to the OH functionality of the castor oil it is able to react with the isocyanate component of polyurethane systems, so that no free castor oil will remain in the film.

With respect to the performance a similar picture as with BENTONE® P 380 MS can be seen in the below chart. In a two component polyurethane based systems, BENTONE® P 270 CO shows a noticeably more effective build of low shear viscosity in comparison to BENTONE® 27 when added at equal clay concentration.



Comparing the sagging stability provided by both samples clearly displays that with the use of BENTONE® P 270 CO a significant improvement can be achieved.

On the other hand, as castor oil might act as a natural plasticizer, the hardness of the resulting coating film need to be checked carefully.

Product overview

Product	Solvent	OH number [mg KOH/g]
BENTONE® P 380 MS	Isoparrafin	Not applicable
BENTONE® P 270 CO	Castor oil	145

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, Lianyang Road
Songjiang Industrial Zone
Shanghai, China 201613
Tel:+86 21 5774 0348
Fax:+86 21 5774 3563