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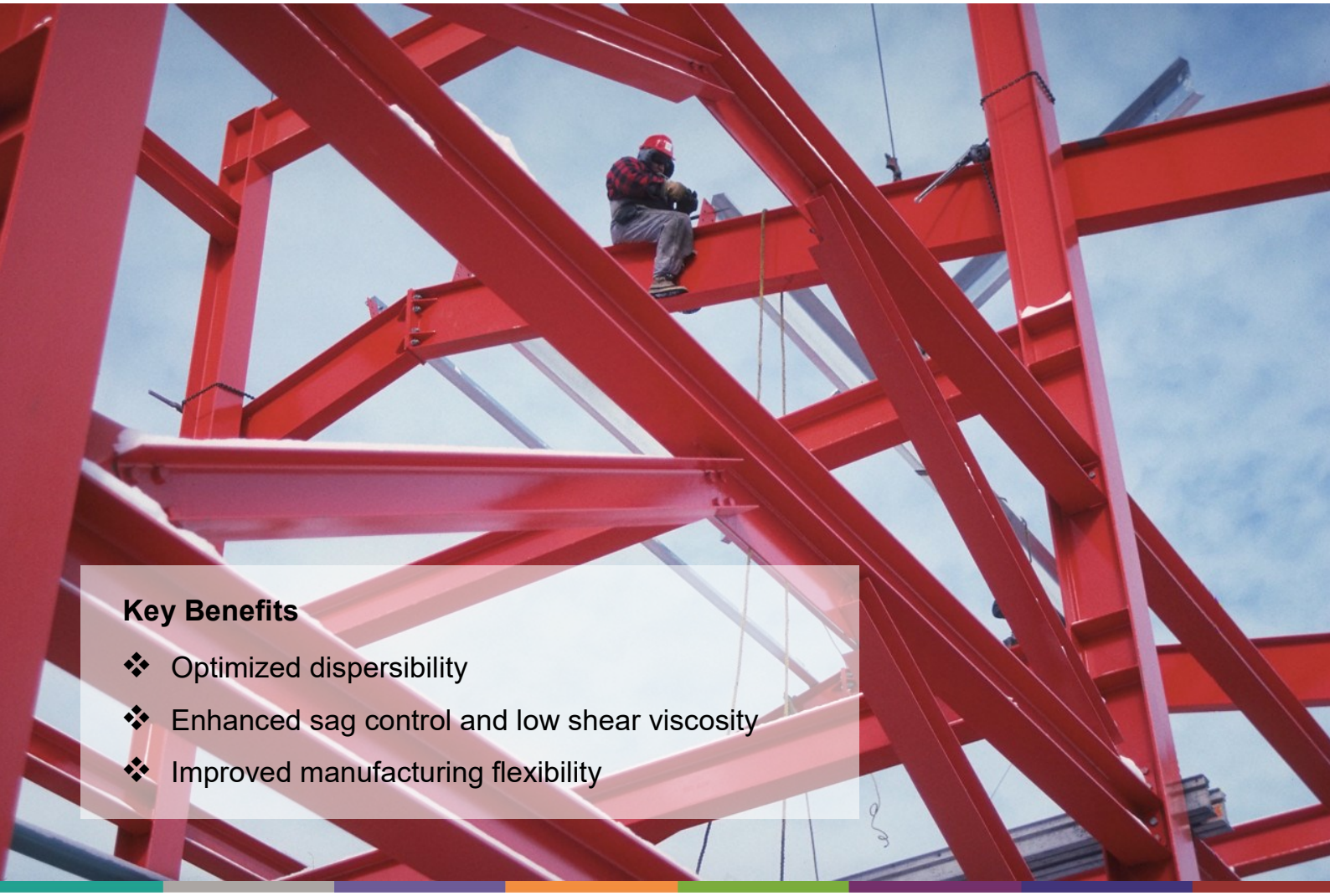
Application Leaflet

BENTONE® 54

Bentonite based organoclay with improved dispersibility for non-aqueous low - to medium polarity coating systems



Key Benefits

- Optimized dispersibility
- Enhanced sag control and low shear viscosity
- Improved manufacturing flexibility

Enhanced Performance Through Applied Innovation

Introduction

BENTONE® 54 is a general purpose, multi-functional rheological additive based on an organically modified bentonite clay. It is easier to disperse than normal organoclays and is designed for mill-base addition to aliphatic, aromatic, and low to medium polarity coating applications.

Composition

Composition	Organically modified bentonite clay
Form	Creamy white, finely divided powder
Moisture [%]	max. 3
Bulk Density, [g/cm³]	ca. 0.58

Benefits and Features

BENTONE® 54 used in non-aqueous coating systems

- Effectively improves pigment suspension on storage and during transportation.
- Improves sag stability and builds up low shear viscosity.
- Controls floatings and flooding of colorants.
- Optimizes paint manufacturing flexibility

Incorporation and Activation

BENTONE® 54 is an organically modified bentonite clay with improved dispersibility that increases flexibility in the paint manufacturing process. It is generally recommended to be added during the milling phase of pigments and extenders. It performs well under standard high-shear dispersion conditions but might benefit from the addition of a polar activator. The choice of polar activator will depend strongly on the chemistry of the system. Examples of polar activators are ethanol/water (95% / 5%) or propylene carbonate (especially for systems in which no water can be tolerated).

It is also possible to incorporate BENTONE® 54 into a system as a standard pre-gel with a concentration of 5-10%, if required.

Performance evaluation

The performance of BENTONE® 54 was evaluated against two different competitive conventional organoclay rheological additives. The evaluation was carried out in a solvent-borne long oil alkyd paint.

Dispersibility

Both organoclays, BENTONE® 54 and a market reference, were post added to a standard long oil alkyd paint formulation at a tip speed of 14 m/s and an active loading of 1 %. The easier dispersibility of BENTONE® 54 compared to the conventional competitive organoclay is shown in *Figure 1*.

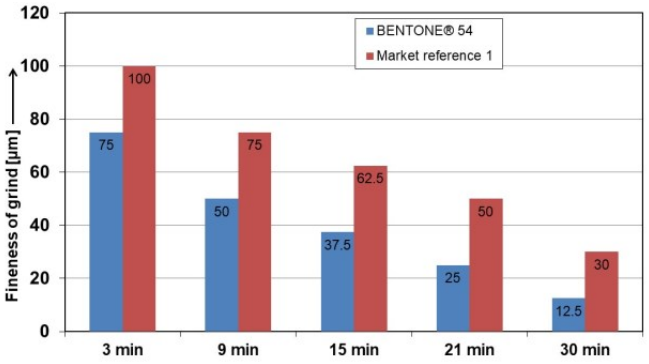
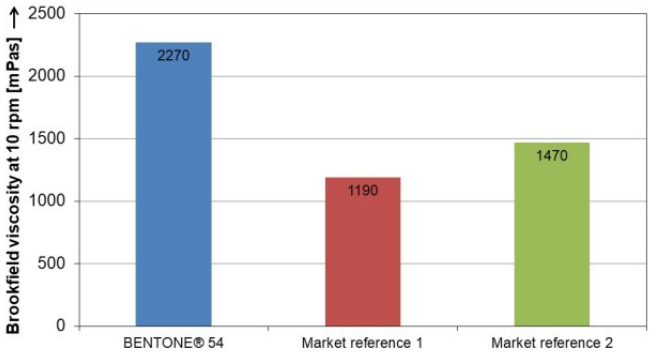


Figure 1: Dispersibility in long oil alkyd paint

Viscosity and sag control

All organoclays were incorporated directly into the mill-base of the conventional air dry alkyd paint at a tip-speed of 14 m/s. A polar activator was not used in this study.

BENTONE® 54 developed a noticeably higher low shear viscosity than either competitive product using the direct powder activation method (see *igure 2*).



Sag resistance was also excellent with BENTONE® 54 and markedly better compared to the results with both market reference products. (see *Figure 3*).

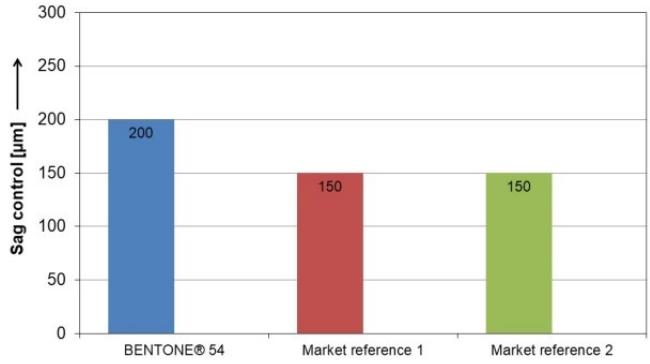


Figure 3: Sag resistance

BENTONE® 54 gave a higher low shear viscosity development and stronger shear thinning flow behaviour than the competitive organoclays (see Graph 4).

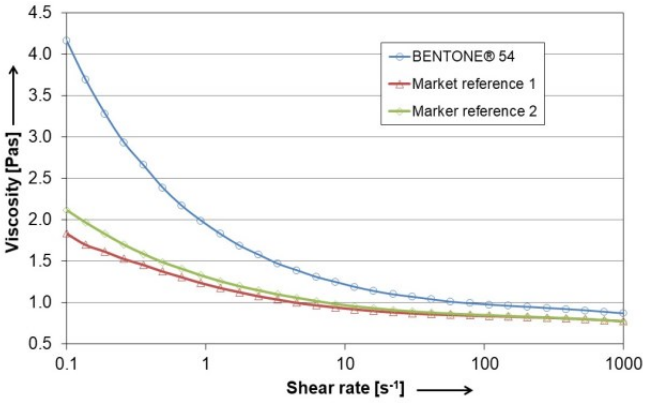


Figure 4: Flow behaviour

Conclusion

BENTONE® 54 shows significantly improved efficiency and dispersibility compared to typical organoclays when directly incorporated into the mill-base as is commonly practiced in the coatings industry.

BENTONE® 54 is generally not recommended for post addition.

Appendix

Test methods:

Rheology data

Determined using the Anton-Paar MCR 301 rheometer, equipped with PP 50 measuring geometry at a gap width of 1 mm, at a temperature of 23°C. KU viscosity.

Sag control

Sag was tested using a test blade with applicable layer thicknesses of 50 - 500 µm. The displayed values indicate the maximum applicable layer thickness without runners.

Brookfield viscosity

Measured with the Brookfield RVT viscometer, equipped with Spindle 5, at 10 rpm and a temperature of 23°C.

Fineness of grind

Determined in a standard grindometer draw down.

Test system

Raw material	Concentration [%]	Supplier
Worleekyd B 870 ; 75% in white spirit	56.8	Worlee
White spirit	9.0	
Rheological additive	1.0	Elementis
Kronos 2310	30.4	Kronos Titan
Durham VX 82	1.4	Huntsman
Exkin 2	1.4	Huntsman
	100.0	

- Conventinal long-oil alkyd paint
- Organoclays directly dispersed (no pregelling)

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