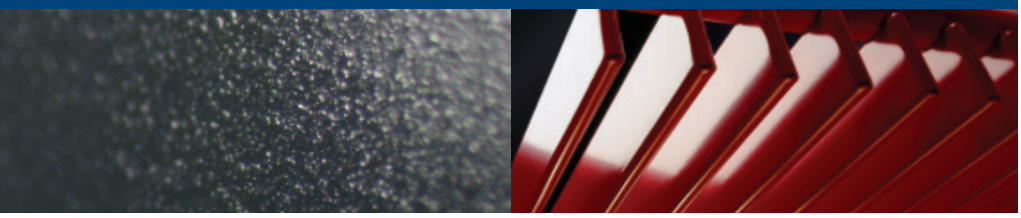

Portaryte

Improved dispersion, gloss control and viscosity using **white ground baryte**

Introduction

Baryte is available in the market in its ground form and as precipitated material. The main chemical component of both is barium sulphate ($BaSO_4$). In order to make the ground material useful for demanding applications such as paints, plastics and adhesives, several processing steps are required. These include:

- Raw material selection in the quarry;
- Bleaching and washing of the material (optional);
- Dry milling;
- Classification.

The outcome is a white ground product which resembles precipitated baryte in a lot of properties. Both are relatively soft with Mohs' hardness of 3 - 3.5. They are chemically inert and insoluble in water, acids and alkalis. Both have a density of app. 4.4 g/cm^3, making it unusually heavy for a non-metallic mineral. The high density is responsible for its added value in many applications. On other properties, white ground baryte competes or even outperforms precipitated baryte.

In this leaflet, several Portaryte grades (white ground baryte) are compared with precipitated grades in order to demonstrate the suitability of Portaryte over the more expensive synthetic products (see Table 1). Properties taken into consideration include dispersability, gloss and viscosity.

The involved baryte grades are:

Product	Nature	D50	D97
		µm	µm
Portaryte B3	ground	1.3	3.7
Portaryte B4	ground	1.5	4.5
Portaryte B5	ground	1.9	6.0
Portaryte B8	ground	2.2	8.0
Competitor 1	precipitated	1.5	4.6
Competitor 2	precipitated	1.7	6.1
Competitor 3	precipitated	1.9	7.4
Competitor 4	precipitated	2.1	6.8

Table 1

Dispersability

In order to determine the dispersability of the materials, the barytes were added to a commercially available solventborne alkyd varnish at a PVC of 30%. The dispersion process was performed using a high speed dissolver at a speed of 3000 RPM. The dispersion was evaluated using a Hegmann gauge, focusing on the number of undispersed particles and the overall fineness. The results can be seen in Figure 1.

Figure 1 shows that the ground material as well as Competitor 3 reach their final Hegmann reading within the first 10 minutes. For all other precipitated grades this takes at least 30 minutes or more. In general ground baryte products seem to disperse easier compared to the synthetic baryte products. This is confirmed when looking at the number of aggregates still available (seen as scratches in the upper part of the Hegmann reading).

Figure 2 confirms earlier findings that ground material is easier to disperse. This can be seen for all Portaryte grades. Again, complete dispersion for the Sibelco products is obtained within 10 minutes (except the finest grade, Portaryte B3, which requires a minimum of 20 minutes).

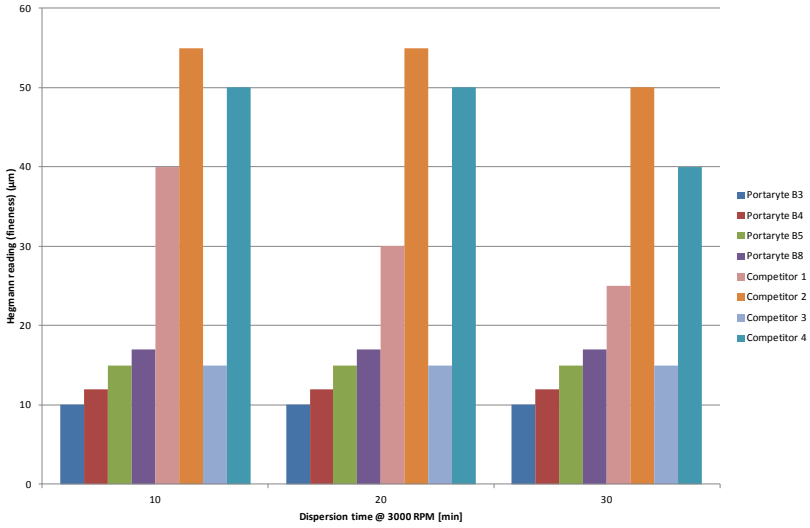

Figure 1: Hegmann reading (fineness) (µm)

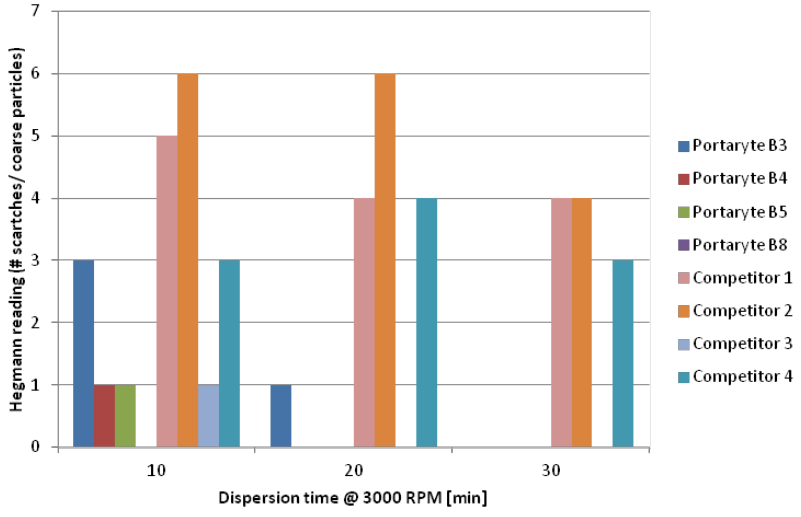

Figure 2: # scratches/coarse particles in the dispersion

Gloss

In order to determine the influence on the gloss of a commercially available solventborne alkyd varnish, the materials were added up to a PVC of 15%. The dispersion process was performed using a high speed dissolver at a speed of 3000 RPM. The final dispersion was applied on glass plates at a wet film thickness of 90 µm and stored at 30°C. The gloss level was determined after 14 days, at an angle of 20°. The results can be seen in Figure 3.

Figure 3 shows that ground barytes like Portaryte can replace precipitated grades, depending on the required property. When going for high gloss, finer grades such as Portaryte B3 and B4 can be used to replace precipitated products. Going for a matting effect, coarser grades such as Portaryte B5 and B8 can be used.

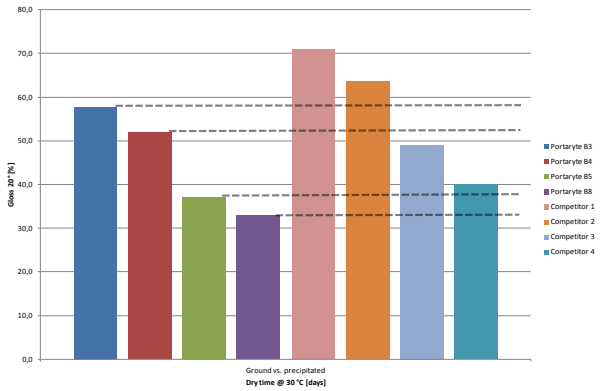

Figure 3: Gloss 20° (%) after 30 days drying

Viscosity

The viscosity of the previously described systems with a PVC of 30% was measured for all grades using a Brookfield RV-DVIII (spindle nr. 52, 10 Hz, 21°C). The results can be found in Table 2.

The results show clearly that Portaryte products have lower impact on viscosity than the precipitated grades. This allows formulators to increase the content of the filler with limited effect on the viscosity of the final product.

Product	Viscosity Pa.s
Portaryte B3	4.8
Portaryte B4	5.1
Portaryte B5	4.9
Portaryte B8	4.8
Competitor 1	5.8
Competitor 2	6.5
Competitor 3	6.5
Competitor 4	7.5

Table 2: Viscosity measurements

Conclusions

Both for high gloss and matting applications, ground barytes are an interesting alternative from both a performance and cost perspective.

When looking at dispersability of the material, ground barytes even outperform precipitated baryte products. Not only are they easier to disperse; also aggregates are broken down faster. This results in a complete dispersion of the Portaryte B products requiring less energy (i.e. within a shorter period of time).

Finally, the impact of Portaryte on the viscosity of the evaluated paint system is smaller than the impact precipitated baryte products at equal PVC, allowing formulators to increase the content of barytes, giving various potential benefits such as high specific density and better flow properties at equal loading.

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