Dispersun DSP-OL100
Dispersun DSP-OL300

Dispersun DSP-OL100 and DSP-OL300 are highly effective dispersants for ultrafine titanium dioxide and zinc oxide.

Both products can significantly increase UV absorption of sunscreens containing pigments, in addition to reducing whitening when applied to skin.

They dramatically decrease viscosity of dispersions at dose rates of just a few percent, allowing higher concentrations of pigment to be used.

They significantly improve optical transparency and UV absorption, which enables cost savings to be made due to using lower pigment levels.

Alternatively higher sun protection factor (SPF) sunscreen can be made without increasing pigment levels.

Applications
- Sunscreens
- Barrier creams
- Baby products
- Moisturisers
- Lip protectors

Performance Benefits
- Increased pigment loading
- Potential for higher sun protection factor SPF
- Improved transparency
- Improved stability of dispersions
- Natural origin
- Compatible with Rheofine RMA thickener
- Better UV absorption
- Allows use of untreated zinc oxide in alkybenzoate
- Lower viscosity
- Reduced milling time
- Compatible with other sunscreen components

Mechanism
Dispersun DSP dispersants bind to the surface of inorganic sunscreen particles preventing their mutual attraction by steric repulsion, hence giving finer particle size.
**Test Data**

**Better UV absorption**

Dispersun dispersants give an increase in UVB absorbance with TiO$_2$ and a decreased absorbance (i.e. improved transparency) in the visible region.

Absorbance in the UVA region is dramatically increased when Dispersun dispersants are used for untreated zinc oxide in alkylbenzoate.

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**UV-visible absorption curves for TiO$_2$ (0.0025% pigment)**

(Beadmilled dispersion in C12-C15 alkylbenzoate diluted in mineral oil)

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**UV-visible absorption curves for ZnO (0.0075% pigment)**

(Beadmilled dispersion in C12-C15 alkylbenzoate diluted in mineral oil)
**Improved transparency**

Dispersun dispersants improve transparency with TiO$_2$ as shown by the drawdown.

**Lowers viscosity**

A dispersant demand curve is used to determine the optimum concentration of dispersant for a given pigment.

This type of experiment allows the optimum dispersant level to be estimated. Adding Dispersun DSP-OL100 and DSP-OL300 shows a dramatic decrease in viscosity.

Adding Dispersun DSP-OL100 or DSP-OL300 causes a dramatic decrease in viscosity. Due to varying processing methods, the viscosity for bead milled dispersions will be different to these shown.
**Increased pigment loading**

These dispersions were bead milled to a fine grind and demonstrate that pigment solids content can be more than doubled using Dispersun dispersants, while effectively controlling viscosity.

<table>
<thead>
<tr>
<th></th>
<th>TiO₂</th>
<th>ZnO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Solids (%)</td>
<td>Viscosity (mPas)</td>
</tr>
<tr>
<td>No Dispersant</td>
<td>25</td>
<td>Too thick to process</td>
</tr>
<tr>
<td>With* 'Dispersun DSP-OL300'</td>
<td>50</td>
<td>18000 [8]*</td>
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*Percentage weight on pigment*
**Improved milling time**
Dispersun dispersants allow shorter milling times and hence improved ultimate fineness of grind.

**Recommended Use Directions**
Dispersant should be dissolved in the carrier phase (e.g. alkylbenzoate) before adding pigment. The dispersant should be warmed and stirred before use to ensure a homogeneous product.

The dose rate needs to be optimised for each pigment grade. One way of doing this is a dispersant demand curve. The recommended starting dose rate would normally be the amount of dispersant required for the minimum viscosity plus about 25% extra. Final optimisation of dispersant dose must be carried out by milling dispersions on equipment that represents production.

**Packaging**
Available in 20kg and 170kg drums.
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