Borregaard LignoTech offers a range of primary and secondary dispersants for use in disperse, vat, reactive and acid dyes. Our high quality dispersants are based on a renewable, naturally occurring raw material source and offer the following benefits:

- Milling economy
- Wide range of heat stability
- Controlled fibre staining
- Azo reduction
- Lower paste viscosity in the formulation
- Improved cost/performance after standardization of dye strength
- Environmentally friendly

**MILLING ECONOMY**
Grinding efficiency is the ability to reduce the milling time required to achieve a desired particle size during milling. Grinding particles to colloidal size increases the surface energy considerably. When a dispersant is adsorbed onto the dye particle, the surface energy is decreased, thus stabilizing the system. Fast adsorption of the dispersant and good repulsion between the particles improves grinding efficiency and stability of the dispersion.

We offer several lignin-based dispersants, which provide formulation economy by enabling milling at higher solids and spray drying at higher temperatures.

**HEAT STABILITY**
The stability of a dyestuff at high temperatures is essential and often determines the success or failure of a dyeing operation. Our dye dispersants have the ability to improve heat stability, which can be attributed to the unique adsorbent and solubility groups present in the dispersants. The relationship between these groups has a direct impact on the temperature stability of a dyestuff at high temperatures.

Borregaard LignoTech dispersants are available to provide heat stability to formulations incorporating low to high energy dyes.

**STAINING**
The degree to which a dispersant shall stain fibres is a function of its colour, affinity to the fibre and the dyeing process.

Borregaard LignoTech offers light to moderately staining dispersants to be used as primary and secondary dispersants.

**AZO REDUCTION**
Color loss in azo dye systems is the result of nitrogen bond breakage in the dye structure.

Our secondary dispersants contribute to lower azo bond reduction and improved coloration due to lower interference with the dye structure.

**RECOMMENDED USE**
Borregaard LignoTech dispersants are recommended for Disperse, Vat, Reactive and Acid dyes.

<table>
<thead>
<tr>
<th></th>
<th>Disperse dyes</th>
<th>Vat dyes</th>
<th>Reactive dyes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typically offered</td>
<td>Typically offered</td>
<td>Typically offered</td>
<td>Reactive dyes have traditionally been standardized with naphthalene sulphonates. Ultrazine NA is popular in this application, due to its purity and low staining properties.</td>
</tr>
<tr>
<td>Usually require a primary dispersant</td>
<td>powder form. Classified by energy level.</td>
<td>powder form. Vanisperse CB is an ideal dispersant for liquid vat dyes.</td>
<td></td>
</tr>
</tbody>
</table>

Our dispersants are used either alone or in blended formulations to meet the specific requirements of a customer’s operation. The choice of dispersant(s) is dyestuff and process dependent. Primary dispersants, such as Ufoxane Z, Dynasperse LCD and Vanisperse CB are mainly used to enable dyeing performance at higher temperatures, while secondary dispersants, like Ultrazine NA, Borresperse 3A and Borresperse NA are used for milling and standardization. Ultrazine NA has a very low insolubles and calcium content and is among the least staining of Borregaard LignoTech’s products. Milling with dispersant combinations/blends is an effective technique to reduce cost. The combination of a primary dispersant along with Borresperse 3A or Borresperse NA at a ratio of 1:1 to 1:3 is recommended.
## PRODUCT RANGE

### PRIMARY DISPERSANTS
(HEAT STABILITY + MILLING PASTE VISCOSITY)
- Vanisperse CB, Dynaspere LCD, Ufoxane 2

### SECONDARY DISPERSANTS
- Ultrazine NA, Borresperse NA, Borresperse NA-SA, Borresperse 3A, Borresperse AM 320, Lignosol SFX-65

### DILUENTS (CUTTING AGENTS)
- Borresperse NA, Borresperse NA-SA, Borresperse AM 320, Lignosol SFX-65

### PRODUCT / PROPERTY MATRIX OF BORREGAARD LIGNOTECH DYE DISPERSANTS

<table>
<thead>
<tr>
<th>Performance Property</th>
<th>PRIMARY DISPERSANTS</th>
<th>SECONDARY DISPERSANTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dynaspere LCD</td>
<td>Ultrazine NA</td>
</tr>
<tr>
<td></td>
<td>Ufoxane 2</td>
<td>Borresperse 3A</td>
</tr>
<tr>
<td></td>
<td>Vanisperse CB</td>
<td>Borresperse NA</td>
</tr>
<tr>
<td>Heat Stability</td>
<td>Good</td>
<td>Better</td>
</tr>
<tr>
<td>Milling Efficiency</td>
<td></td>
<td>Best</td>
</tr>
<tr>
<td>High Energy Dyes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Energy Dyes</td>
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<td></td>
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<tr>
<td>Fiber Staining</td>
<td></td>
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<tr>
<td>130 °C</td>
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<tr>
<td>Thermosol</td>
<td></td>
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<tr>
<td>Azo Reduction</td>
<td></td>
<td></td>
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<tr>
<td>Foaming</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rheological Control</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend:
- Good
- Better
- Best
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