ACUMER™ 9210 Dispersant Polymer for Mineral Slurries

**Typical Properties**
These properties are typical but do not constitute specifications.

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Clear solution*</td>
</tr>
<tr>
<td>Chemical nature</td>
<td>Acrylic homopolymer</td>
</tr>
<tr>
<td>Grade</td>
<td>Na salt</td>
</tr>
<tr>
<td>Average molecular weight (Mw)</td>
<td>2000</td>
</tr>
<tr>
<td>Total solids (%)</td>
<td>≈ 43</td>
</tr>
<tr>
<td>pH as is (at 25°C)</td>
<td>≈ 7</td>
</tr>
<tr>
<td>Bulk Density (at 25°C)</td>
<td>≈ 1.32</td>
</tr>
<tr>
<td>Brookfield Viscosity (mPa.s/cps at 25°C)</td>
<td>≈ 200</td>
</tr>
</tbody>
</table>

*A slight haze may appear, this does not affect the intrinsic properties of the product or its performance.

**Chemistry and Mode of Action**

ACUMER 9210 is the sodium salt of an acrylic homopolymer useful for dispersing a variety of inorganic pigments. Its molecular weight, structure and composition have been selected to optimize dispersant properties.

Without dispersant, the particles in a slurry aggregate, resulting in an unstable dispersion with unacceptably high viscosity. ACUMER 9210 adsors on pigment particles and the polymer negative charges stabilize the dispersion by electrostatic and steric repulsion. Inorganic dispersing agents which are small molecules only stabilize the dispersion by electrostatic repulsion.

**Performance**

ACUMER 9210 acts as dispersant and stabilizer allowing:

- Stabilizing slurries of re-dispersed Kaolin powders
- High solids concentration slurries with low viscosities
- High stability slurries

**Features and Benefits**

- Contains no phosphorus, making its use acceptable where legislation requires that discharge waters contain no or low phosphorus.
- Exhibits exceptional stability in the presence of hypochlorite.
- Exhibits a very good thermal and mechanical stability.
- Offers a very strong dispersant activity.

**Applications**

ACUMER 9210 has mainly been developed to meet the dispersancy performances requested by mixed slurries based on felspath, quartz, clay, and ceramic slurries.

**Dosage**

ACUMER 9210 is effective at low dosage between 0.1 to 0.5 % polymer solids on slurry solids depending on the nature of the slurry and on the grinding (coarse or fine particles).
**Kaolin Clay**

Without dispersant, the particles in a slurry aggregate resulting in an unstable slurry with unacceptable high viscosity.

ACUMER 9210 mining polymer stabilizes high solids slurries and allows lowering the viscosity to relatively low levels at the time of initial formulation, and maintains a low viscosity during storage.

**Re-dispersion of Dry Kaolin Clay**

Kaolin clay is sometimes dried and shipped long distances to reduce transport costs and is re-slurried at the destination. ACUMER 9210 is particularly effective for stabilizing these "re-dispersed" slurries up to 74.5% solids.

The following data shows the ability of ACUMER 9210 to effectively stabilize re-dispersed Kaolin clays at 74.5% solids level.

Graph I indicates that dosage levels of 0.16 - 0.20% (dry polymer/dry Kaolin) results in essentially the same viscosity slurry.

**Graph I**

**Dosage of ACUMER 9210 (Dry Polymer/Dry Kaolin)**
Graph II below indicates that at 74% solids (or 74.7% solids according to K.I. measurement), optimum dispersant dosage is about 0.16% (expressed as dry polymer per dry Kaolin).

Graph II

**BRAZILIAN KAOLIN DISPERSION at 74.0 % SOLIDS with ACUMER 9210**

Graph III below indicates that at 74.5% solids (or 75.2% solids according to K.I. measurement) optimum dispersant dosage is about 0.19% (expressed as dry polymer per dry Kaolin).

Graph III

**BRAZILIAN KAOLIN DISPERSION at 74.5 % SOLIDS with ACUMER 9210**
**Ceramic Application**

ACUMER 9210 is recommended in the ceramic industry to disperse and stabilize ceramic slurries.

In the production of ceramic pieces, dispersing agents are used in wet grinding of raw materials to increase solids content and improve stabilization of the slurries. Inorganic dispersants, such as, Tripolyphosphate (TPP), Sodiumhexametaphosphate (SHMP), and metasilicates (MS), have been used for a long time.

However, the introduction of a new range of polymeric dispersants gave rise to major improvements in some of the significant parameters, and in particular:

- Viscosity at low and high shear rate (relates to slurry workability).
- Thixotropy (relates to slurry stability in time).
- Yield stress value (relates to slurry workability and stability).

**Method of Use**

Polymeric organic dispersants give so great an improvement in the slurry rheological behavior that they can be used in combination with inorganic dispersant. These combinations of organic/inorganic dispersants are very cost effective.

Figures below show an optimization of the dispersant system of a ceramic slurry by the use of ACUMER 9210.

**Graph IV**
**Dispersing Agent Optimization**
68% solids ceramic blend slurry
This comparison was done with 2002 raw material prices. With the cost of TPP increasing dramatically, the use of ACUMER 9210 in this application should be even more advantageous.

**FDA Clearance**

ACUMER 9210 complies with the FDA Food Additives regulations indicated below, provided that the final formulation meets the limitations and other conditions prescribed by the regulation.

- 21 CFR 173.310 Boiler water additives
- 21 CFR 175.105 Adhesives
- 21 CFR 176.170 Components of paper, paperboard in contact with aqueous and fatty food
- 21CFR 176.180 Components of paper, paperboard in contact with dry food

**Material Safety Data Sheets**

Rohm and Haas Company maintains Material Safety Data Sheets (MSDS) on all of its products. These contain important information that you may need to protect your employees and customers against any known health and safety hazards associated with our products. We recommend you obtain copies of MSDS for our products from your local Rohm and Haas technical representative or the Rohm and Haas Company. In addition, we recommend you obtain copies of MSDS from your suppliers of other raw materials used with our products.

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