ACUMER™ 9000 Mineral Slurry Dispersant

ACUMER 9000 is a sodium salt of an acrylic acid-based polymer. It is a highly effective dispersant for aqueous calcium hydroxide and magnesium hydroxide slurries. ACUMER 9000 dispersant offers benefits to the calcium hydroxide user when preparing slurries by: controlling phase separation, reducing caking and clogging of equipment and aiding the remixing of slurries after settling.

**Table 1**
**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, light amber solution</td>
</tr>
<tr>
<td>Total solids, %</td>
<td>44</td>
</tr>
<tr>
<td>pH</td>
<td>7.5</td>
</tr>
<tr>
<td>Density (lb/gal, @ 25°C)</td>
<td>10.8</td>
</tr>
<tr>
<td>Brookfield Viscosity, (mPa.s/cps @ 25°C)</td>
<td>500</td>
</tr>
</tbody>
</table>

**Performance**

Many problems can be encountered in producing calcium hydroxide or magnesium hydroxide slurries including:

- Wettability
- Phase Separation
- Caking
- Pumping
- Pipe Clogging
- Remixing After Setting
- Slurry Viscosity

**I. Calcium Hydroxide**

Figure 1 shows the efficiency of ACUMER 9000 as a dispersant for 30% calcium hydroxide slurry.

**Figure 1. ACUMER 9000 Dosage vs. Viscosity (30% Lime Slurry)**

Table 2 shows the positive effect of ACUMER 9000 dosage on lime slurry stability. Lower dosage (0.2%) gives higher slurry viscosity and lower syneresis (liquid phase separation). The desired slurry properties can be controlled by optimizing the dispersant dosage.
Table 2
Effect of ACUMER 9000 Dispersant on 30% Lime Slurry Stability

<table>
<thead>
<tr>
<th>Dosage, % (solids basis)</th>
<th>Initial Make-Down Viscosity²</th>
<th>After 8 Days at Room Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Syneresis</td>
<td>Gel³</td>
</tr>
<tr>
<td>0.2</td>
<td>2080</td>
<td>1.7</td>
</tr>
<tr>
<td>0.4</td>
<td>810</td>
<td>12.0</td>
</tr>
<tr>
<td>0.6</td>
<td>382</td>
<td>16.5</td>
</tr>
</tbody>
</table>

¹ 30% lime slurry was prepared by mixing 210 grams of slaked lime with 490 grams of deionized water (including additives) for five minutes in a Waring blender at high speed.

² Brookfield RVT, #2 spindle, 20 rpm, 23°C

³ Slurry phase

⁴ Percent weight flowed when container is inverted for two minutes

II. Magnesium Hydroxide

Figure 2 shows the efficiency of ACUMER 9000 as a dispersant for 50% magnesium hydroxide slurry. ACUMER 9000 dispersant allows slurry properties to be maximized according to the mixing environment and the type of magnesium hydroxide.

Figure 2. ACUMER 9000 Dosage vs. Viscosity (50% magnesium hydroxide slurry)
III. Ceramic Applications Replacement for Phosphates (STPP)

Performance

ACUMER dispersants benefit most ceramic applications whether it be kaolin slurries, ball clay slurries, or ceramic slip grinding and dispersion. ACUMER dispersants aid in:

- wettability
- slip viscosity
- grinding
- slip stability

Figures 3 and 4 show the relationship of slip viscosity versus slip solids for two ceramic tile manufacturers.

Conclusion:

1. In both cases, the ACUMER polymers outperformed STPP even at the higher STPP dosage.
2. The rapidly increasing cost of phosphates make the ACUMER polymer option even more attractive.

Figure 3. Ceramic Slip A - Effect of Slurry Solids on Viscosity
Figure 4. Ceramic Slip B - Effect of Slurry Solids on Viscosity

Figure 5 shows the relationship of specific gravity to solids for a typical ceramic slip. The ceramic mix was wet ground to 5% retained on 200 mesh screen. This relationship held for all dispersants tested on this particular slip.

Figure 5. Ceramic Slip A - Effect of Slurry Solids on Slurry Density

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