PEN-COTE D coating binders surpass the inherent limitations of other naturally derived binders

Coating formulations produced with PEN-COTE D coating binders offer technical benefits for coating operations. By imparting a high level of water-holding to the coating, PEN-COTE D increases the development of coating structure, reduces binder migration and improves coating uniformity without a loss in gloss or print performance. In addition, the design of PEN-COTE D coating binders at the molecular level promotes optimal cross-linking to achieve high binder strength.

PEN-COTE D binders are easily hydratable and do not require cooking. They can be mixed with water to produce a usable paste, mixed directly into the pigment slurry or introduced as a powder during the coating makedown process to elevate coating solids.

Features & benefits:
- Replace up to 60% of latex
- Increased water retention capability for enhanced surface appearance
- Improved coater runnability
- Increase saleable tons with improved quality and appearance
- Cross-linkable to improve print fidelity providing higher printer satisfaction

Regulatory status:
- FDA approved under 21 CFR.176.170 and 21 CFR 176.180
- Meet requirements of BFR Recommendation XXXVI
- No volatile organic compounds (VOC’s)
PEN-COTE™ D series coating binders

Dry materials for coating

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>PRODUCT VISCOSITY</th>
<th>PRODUCT MOISTURE</th>
<th>MOLECULAR WEIGHT</th>
<th>WATER RETENTION INFLUENCE/part used</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEN-COTE D – ULV</td>
<td>Ultra-low</td>
<td>5%</td>
<td>Ultra-low</td>
<td>Minimal</td>
</tr>
<tr>
<td>PEN-COTE D – LV</td>
<td>Low</td>
<td>5%</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>PEN-COTE D – MV</td>
<td>Medium</td>
<td>5%</td>
<td>Medium</td>
<td>Moderate</td>
</tr>
<tr>
<td>PEN-COTE D – HV</td>
<td>High</td>
<td>5%</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>PEN-COTE D – UHV</td>
<td>Ultra-high</td>
<td>5%</td>
<td>Ultra-high</td>
<td>Ultra-high</td>
</tr>
</tbody>
</table>

1 challenge

A coated recycled boxboard mill needed to improve their print strength to secure new business on a high speed offset press.

2 solution

PEN-COTE D UHV replaced 25% of the formulation latex and eliminated need for coating thickener used in the top coat formulation.

3 results

- **Improved board print quality**
  - Higher passes to failure on NPA print test validated improved print strength
  - Improved sheet appearance; DAV/ DAA values improved
  - Sheet brightness improved by 1.5 points
  - Cold glue and hot melt glue tests improved

- **Reduced coating costs:**
  - Top coat weight reduced by 10-12% while maintaining critical quality specifications
  - Eliminated the need for coating thickener while maintaining coating rheology and runnability

- **Secured new business on high speed offset printing press**

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