POLYSTEP® TSP-16PE30
a primary emulsifier for use in emulsion polymerization systems

POLYSTEP TSP-16PE30 is an arylphenol alkoxylate phosphate ester, free acid surfactant for use in emulsion polymerization. Due to the bulky nature of the surfactant, which minimizes surfactant migration to interfaces, POLYSTEP TSP-16PE30 improves coating properties in architectural DTM applications.

Key Attributes:
✓ Water resistance
✓ Latex and pigment stabilization
✓ Adhesion
✓ Washability

Improved Water Resistance & Adhesion
Surfactants can migrate to interfaces causing coating defects. Changing the hydrophilic/hydrophobic nature of the surfactant can influence migration.

Contact angle is a measurement of hydrophilicity/hydrophobicity. As the hydrophilic character of the coating increases, water spreads onto the surface decreasing the contact angle. Conversely, a more hydrophobic surface results in a higher contact angle.

The data shows the contact angle for a coating containing sodium lauryl sulfate compared to a coating containing POLYSTEP TSP-16PE30. The increased hydrophobicity (higher contact angle) of the coating with POLYSTEP TSP-16PE30 resulted in improved wet scrub resistance on alkyd and improved blister resistance. The bulky structure of the hydrophobe improves compatibility with the latex coating, which minimizes surfactant migration.

Improved Wet Scrub Resistance
Styrene-acrylic coating wet scrub resistance on alkyd after 400 cycles

Improved Blister Resistance
Styrene-acrylic coating blister resistance - 90 min at 60°C in water

1 As presented at the Waterborne Coating Show, 2007.
**Improved Corrosion Resistance**

<table>
<thead>
<tr>
<th>Primary Emulsifier</th>
<th>POLYSTEP TSP-16PE30</th>
<th>Linear Sodium Dodecylbenzene Sulfonate</th>
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</thead>
<tbody>
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<td>Polymer Type</td>
<td>Acrylic</td>
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</tr>
</tbody>
</table>

Cold-Rolled Steel Panel

Phosphate esters are known to provide corrosion protection to metals. **POLYSTEP TSP-16PE30** improved corrosion resistance to cold-rolled steel compared to a sulfonate surfactant. The coating examples include a phosphated functional monomer, **POLYSTEP HPE**, incorporated in the latex polymer.

ASTM B117, 500 Hours Exposure, 3.1 Mils DFT

**Improved Washability**

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**POLYSTEP TSP-16PE30** used as the sole primary emulsifier provides improved stain removal of hydrophobic stains such as betadine and #2 pencil compared to a sulfonate surfactant.

ASTM D4828

Stain Removal Rating

- Betadine
- #2 Pencil

Scale 0–10 (10 = best)