PRIMAL™ PR-1045 Acrylic Emulsion
100% Acrylic Emulsion Polymer for Quality Paints

Regional Product Availability
- Asia-Pacific

Description
PRIMAL PR-1045 Acrylic Emulsion, a product of Dow Coating Materials, is a 100% acrylic emulsion suitable for use in high performance indoor and outdoor paints. This product has excellent tint retention on a variety of timbers as well as resistance to cracking, flaking & chalking. PRIMAL PR-1045 Acrylic Emulsion is capable of being formulated into a wide range of paints from low to high pigment volume concentrations (PVC).

Introduction
FORMULATING WITH PRIMAL PR-1045 Acrylic Emulsion
PRIMAL PR-1045 Acrylic Emulsion has a formulating protocol similar to other small particle sized acrylic emulsions. To maximize flow and leveling and restrict spreading on brush application, it should be formulated with rheology modifiers rather than cellulosic thickeners. When the paint is designed for direct-to-substrate use and contains zinc oxide, care must be taken to select the most appropriate rheology modifiers and surfactants, to ensure that paint stability is satisfactory.

Dispersants
OROTAN™ 731DP Dispersant is recommended for use with PRIMAL PR-1045 Acrylic Emulsion, particularly when zinc oxide is part of the paint formulation. When the paint does not contain zinc oxide, OROTAN 1124 Dispersant is also suitable and works well.

Surfactants
PRIMAL™ PR-1045 Acrylic Emulsion is well stabilized and generally compatible with universal colorants. For maximizing tinter acceptance, addition of 0.1 - 0.3% TERGITOL™ NP-13 or TERGITOL NP-40 surfactant, on total paint formula, is very effective and is recommended. Addition of TRITON™ CF-10 surfactant is also recommended to aid pigment dispersion.

Defoamer
Dehydran 1293 defoamer has been found to be a high efficiency defoamer with good persistence and colour development when used with PRIMAL PR-1045 Acrylic Emulsion.

Preservative
KATHON™ LXE Biocide is recommended for use with paints based on PRIMAL PR-1045 Acrylic Emulsion, at 0.1% on total formula weight.

Pigments
PRIMAL PR-1045 Acrylic Emulsion has very good compatibility with titanium dioxide pigments. Pigment reductions of up to 5% can be achieved while maintaining existing opacity and tint strength. Good results have been obtained generally with Tiona 595 titanium dioxide, and with Tiona 696 titanium dioxide in sheen paints, or equivalent grades from other manufacturers.

Extenders
Calcium carbonate and talc may be used for filling and gloss reduction in sheen and flat paints.
Coalescing Agent

2,2,4-Trimethylol-1,2-pentanediol monoisobutyrate coalescent is the recommended coalescent for PRIMAL™ PR-1045 Acrylic Emulsion at a level of 6-8% by weight on binder solids.

Opaque Polymer

ROPAQUE™ ULTRA Opaque Polymer is recommended for use with PRIMAL PR-1045 Acrylic Emulsion to reduce paint formulation costs of below CPVC paints while maintaining hiding and general film properties and improving dirt pick-up resistance on exterior exposure.

Mildewcide

The use of a broad spectrum mildewcide, e.g. ROZONE™ 2000 or ROCIMA™ 363 Mildewcide helps retain the good appearance of exterior paints based on PRIMAL PR-1045 Acrylic Emulsion during weathering.

Rheology and Thickening

PRIMAL PR-1045 Acrylic Emulsion interacts strongly with urethane rheology modifiers. Combinations of ACRYSOL™ RM-2020NPR and ACRYSOL SCT-275 Rheology Modifiers are recommended, with the levels and ratios varying depending on the paint type and rheology desired.

Primer-free Paints

Paints based on PRIMAL PR-1045 Acrylic Emulsion and sold for use directly over new weatherboard and timber surfaces without first applying a primer, should contain a low level of zinc oxide to aid tannin blocking, and an inhibitor, e.g. ammonium or sodium benzoate or sodium nitrite, to stop flash rusting of nail heads. French process zinc oxide, at a level of 6 grams/litre, and ammonium benzoate, at a level 1 gram/litre, are recommended. These additions provide adequate resistance to tannin bleeding and flash rusting of nail heads, in most cases. Where maximum tannin blocking is required, e.g. over dark tannin rich timbers, other Dow Coating Materials binders specially designed for this application are recommended.

PERFORMANCE PROPERTIES

The exterior durability of PRIMAL™ PR-1045 Acrylic Emulsion has been evaluated at the Allunga exposure site in North Queensland and also at Geelong, Victoria, Australia over five years and found to be comparable to the best commercially available acrylic emulsions. Tint retention and resistance to cracking, flaking and chalking, for a wide range of paints at low to high pigment volume concentrations (PVC), have been determined over pine and mountain ash timbers, and cement sheet.

The very good all round film properties of PRIMAL PR-1045 Acrylic Emulsion are summarized in Table 1 and adhesion properties in Tables 2 and 3.
Table 1.
General Summary of PRIMAL™ PR-1045 Acrylic Emulsion Performance

<table>
<thead>
<tr>
<th>Paint Property</th>
<th>Commercial Acrylic Emulsion</th>
<th>Premium Acrylic Emulsion</th>
<th>PRIMAL™ PR-1045 Acrylic Emulsion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Film Appearance</td>
<td>Standard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow and Levelling</td>
<td>Standard</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Colour Acceptance</td>
<td>Standard</td>
<td>=</td>
<td>+</td>
</tr>
<tr>
<td>Block Resistance</td>
<td>Standard</td>
<td>=</td>
<td>= / -</td>
</tr>
<tr>
<td>Brush Drag</td>
<td>Standard</td>
<td>=</td>
<td>+</td>
</tr>
<tr>
<td>Alkyd Adhesion</td>
<td>Standard</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Metal Adhesion</td>
<td>Standard</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Heat Aging Stability</td>
<td>Standard</td>
<td>=</td>
<td>=</td>
</tr>
<tr>
<td>Mechanical Stability</td>
<td>Standard</td>
<td>=</td>
<td>+</td>
</tr>
<tr>
<td>Exterior Durability</td>
<td>Standard</td>
<td></td>
<td>=</td>
</tr>
</tbody>
</table>

Table 2.
Adhesion* of a Gloss Paint based on PRIMAL™ PR-1045 Acrylic Emulsion

<table>
<thead>
<tr>
<th>Binder</th>
<th>Adhesion to Aged Exterior Alkyd</th>
<th>Adhesion to Chalky Acrylic</th>
<th>Adhesion to Cement Sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dry</td>
<td>Wet</td>
<td>Dry</td>
</tr>
<tr>
<td>Commercial Acrylic Emulsion</td>
<td>2.0 a &amp; c</td>
<td>0.3 a</td>
<td>0.8 a</td>
</tr>
<tr>
<td>PRIMAL™ PR-1045 Acrylic Emulsion</td>
<td>2.4 c</td>
<td>1.7 a &amp; c</td>
<td>0.7 a</td>
</tr>
</tbody>
</table>

* (Report GTL 95-017) – Paints tested were 19 PVC Gloss Paints
Adhesion tested after 7 days dry time:
Units kg/25mm strip
a = adhesive failure
c = Cohesive failure

Table 3.
Adhesion* of a Low Sheen Paint based on PRIMAL™ PR-1045 Acrylic Emulsion

<table>
<thead>
<tr>
<th>Binder</th>
<th>Adhesion to Aged Interior Alkyd Enamel</th>
<th>Adhesion to Exterior Alkyd Enamel</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dry</td>
<td>Wet</td>
</tr>
<tr>
<td>Commercial Acrylic Emulsion</td>
<td>1.5 a &amp; c</td>
<td>0.3 a</td>
</tr>
<tr>
<td>PRIMAL™ PR-1045 Acrylic Emulsion</td>
<td>1.7 c</td>
<td>1.1 a &amp; c</td>
</tr>
</tbody>
</table>

* (Report GTL 95-078) – Paints tested were 32 PVC Low Sheen Paints
Adhesion tested after 7 days dry time:
Units kg/25mm strip
a = adhesive failure
c = Cohesive failure
Safe Handling Information

The Dow Chemical Company Material Safety Data Sheets (MSDS) contain pertinent information that you may need to protect your employees and customers against any known health or safety hazards associated with our products. The Dow Chemical Company recommends that you have your local Dow Coating Materials technical representatives supply you with MSDS on all our products before using them in your facilities. We also suggest that you contact the suppliers of other materials recommended for use with our products for appropriate health and safety regulations before use.

Chemical Registration

Many countries within the Asia-Pacific require the registration of chemicals, either imported or produced locally, prior to their commercial use. Violation of these regulations may lead to substantial penalties imposed upon the user, the importer or manufacturer, and/or cessation of supply. It is in your interests to ensure that all chemicals used by you are registered. The Dow Chemical Company does not supply unregistered products unless permitted under limited sampling procedures as a precursor to registration.

Note on Asia-Pacific Product Line

Product availability and grades vary throughout the countries in Asia-Pacific. Please contact your local Dow Coating Materials representative for further information and samples.

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