ESSENTIAL R4188 WATERBORNE POLYURETHANE DISPERSION

Essential R4188 is a high-solids aliphatic polyurethane dispersion designed to impart superior abrasion resistance. R4188 delivers a combination of film hardness, flexibility and toughness which makes it an ideal PUD for topcoat applications.

R4188 is ideal for the formulation as a sealer or topcoat for masonry-type substrates to protect against the migration of soluble salts through these substrates. R4188 has shown to have excellent efflorescence resistance properties.

**KEY BENEFITS**

- Abrasion resistance
- Film toughness
- Excellent adhesion
- Exterior durability

**TYPICAL PROPERTIES***

- **Appearance** .................. Translucent
- **pH** ................................. 8.0
- **Solids, % by Weight** ........ 38.0
- **Solids, % by Volume** ....... 34.7
- **Viscosity, cP @ 25°C** -
  - Brookfield, LV2, 30rpm ........ 75
- **Density Lbs./Gal** .............. 8.80
- **VOC Level (As Supplied)**
  - Lbs./Gal. .......................... 2.0
  - G/L .................................. 242.3
- **Partial Charge** ............. Anionic
- **Partial Size** .................. Colloidal
- **Acid Number** .................. 24

*These values should not be interpreted as specifications.

DISCLAIMER: The information and recommendations contained herein are based on data believed to be correct. The information is offered solely for the customer’s consideration, investigation and verification because of numerous factors beyond our control affecting the results of the use of products, Essential Industries, INC. makes no warranty of any kind, expressed or implied, including those of merchantability and fitness for a particular purpose, other than that the product conforms to its applicable current standard specification. The manufacturer’s only obligation shall be to replace such quantity of the product proven to be defective.
Film Properties
All tests were performed on coatings kept at 77°F and 50% RH for seven days before testing.

Tensile Strength, PSI ................................................................. 2100
Elongation at Break, % .............................................................. 255

Tests Performed on Aluminum Panels (1-Mil Dry Films)
Konig Hardness (Seconds) 1 Day, 7 Day .............................. 67, 67
Grit Feed Taber Abrasion (Mg Loss, 500 Cycles, 1000g) .......... 2

Starting Point Formulation

ESSENTIAL R4188 / ESSENTIAL R5809 – Clear Formulation

<table>
<thead>
<tr>
<th>Materials</th>
<th>Pounds</th>
<th>Gallons</th>
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<tr>
<td>Essential R5809</td>
<td>501.00</td>
<td>57.45</td>
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<tr>
<td>Essential R4188</td>
<td>134.00</td>
<td>15.23</td>
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<tr>
<td>Water</td>
<td>86.90</td>
<td>10.43</td>
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Premix Next Three Items:
Water 29.00 3.48
Dowanol® DPM 7.50 0.94
Dowanol® DPnB 60.00 7.94
Jonwax® 26 19.00 2.32
Tego® Glide 440 3.90 0.46
Tego 800 10.50 1.22
Zonyl® FSJ 0.85 0.09
Acrysol® RM-825 3.80 0.44

856.45 100.00

Formulation Attributes:
Solids, % by Weight 30.05
Solids, % by Volume 27.50
Viscosity, Seconds 30-35
Density, Lbs./Gal. 8.5
Calculated VOC (Excluding Water)
G/L 255
Lbs./Gal. 2.13
Performance Information
All tests were performed on coatings kept at 77°F and 50% RH for seven days before testing.

Tests Performed on Aluminum Panels (1-Mil Dry Films)
Konig Hardness (Seconds) ............................................ 179
Grit Feed Taber Abrasion (Mg Loss, 500 Cycles, 1000g) .... 32

Tests Performed on Maple Veneer After a Seven Day Dry (2 Coats, 1-Mil Dry Per Coat) 1 Hour Covered Spot Test.

Water ................................................................. No Effect
Soda..................................................................... No Effect
Beer..................................................................... No Effect
Mustard .............................................................. No Effect
Formula 409....................................................... Slight Effect

Supplier Information

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
<th>Supplier</th>
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<tbody>
<tr>
<td>ESSENTIAL R4188</td>
<td>Polyurethane Dispersion</td>
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<tr>
<td>ESSENTIAL R5809</td>
<td>Emulsion</td>
<td>Essential Polymers</td>
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<td>Dowanol® DPM</td>
<td>Solvent</td>
<td>Dow Chemical</td>
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<tr>
<td>Dowanol DPnB</td>
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<td>Jonwax® 26</td>
<td>Wax Emulsion</td>
<td>Johnson Polymer</td>
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<td>Tego® Glide 440</td>
<td>Mar Inhibitor</td>
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<td>Tego 800</td>
<td>Defoamer</td>
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<td>Zonyl® FSJ</td>
<td>Flow Aid</td>
<td>DuPont</td>
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<tr>
<td>Acrysol RM-825</td>
<td>Thickener</td>
<td>Rohm &amp; Haas</td>
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