Resins and Additives for Car Refinish

Innovation • Compliance • High Performance
Introduction

What is your first impression of a brand-new car? Elegant and fashionable appearance, delicate cabin design, or the advanced technology? Most people will be attracted by the brilliant coatings over the car bodies. That is a great achievement by paint manufacturers for the automotive industry. Car refinish is an important segment of automotive coatings. This leaflet outlines the product offerings of Elementis for car refinish applications and also feature innovative products to help customers design better refinish systems.

In general, a typical car refinish is as shown in figure 1.

Fig. 1 Typical car refinish system

Acrylic Polyol Resins for Primer Surfacers and Metallic Basecoats

Requirements of resins for primer surfacers and basecoats are:

• Excellent wetting of pigments
• Fast drying speed and good application property
• Good compatibility with CAB
• Good inter-coat adhesion between coating layers
• Good adhesion on substrates
• Good orientation of effect pigments (for basecoats)

<table>
<thead>
<tr>
<th>Product</th>
<th>Feature</th>
<th>Applications</th>
</tr>
</thead>
</table>
| Hypomer FX-2050 | • Very fast drying  
• Good adhesion on plastic and metal substrates  
• Good aluminium pigment orientation  
• Can be used in 1K & 2K systems | Primer surfacers, metallic basecoats |
| Hypomer FX-2060D | • Fast drying,  
• good adhesion  
• Good solvent resistance  
• For 2K systems | Primer surfacers, metallic basecoats |
| Hypomer FX-2451F | • Very fast drying  
• Fast hardness development  
• Good adhesion on plastic and metal substrates  
• Good aluminium pigment orientation | Primer surfacers, metallic basecoats |
Acrylic Polyol Resins for Coloured Topcoats and Clearcoats

In car refinish industry, the requirements for coloured topcoats and clearcoats are:

- Fast through curing speed for polishing
- Good adhesion to basecoats /metallic paints
- High build, gloss and DOI
- Good hardness, impact and stone chips resistance
- Good chemical and weathering resistance

Elementis supplies a wide range of acrylic polyols for colored topcoats and clearcoats for the auto refinish industry. These products range from medium to high solids and hydroxyl contents.

![Fig. 2 Hypomer Resins for Clearcoats and Colored Topcoats](image_url)
Wetting and Dispersing Agents for Car Refinish

Proper pigment wetting and dispersion are essential for optimum performance and appearance of coatings. NUOSPERSE® and Disponer wetting and dispersing agents not only maximize productivity, they also impart good stability and prevent pigment flocculation on storage.

Benefits that can be gained from the use of NUOSPERSE® and Disponer wetting and dispersing agents are:

- Rapid pigment wetting, efficient dispersing and stabilization of the dispersion
- High pigment loading with good mill base flow property
- Increased mill output
- Full color development in colored bases
- Maximum color acceptance of all bases
- Elimination of floating, flooding and rub-out
- Long term viscosity stability
- Optimum initial gloss and gloss retention
- Elimination of hard settling

A. Inorganic pigments & fillers

Disponer 9250 is a co-polymer containing acidic groups. It is particularly effective in wetting and dispersing of inorganic pigments especially TiO₂ & fillers and enhances pigment loading through viscosity reduction during grinding. Disponer 9250 does not cause yellowing as compared to conventional polyurethane type dispersants, therefore is highly suitable for pure white systems. Disponer 9250 is suitable for most types of titanium dioxide regardless of their surface treatments.

![Viscosity stability of TiO₂ pastes](image)

**Fig. 3** Viscosity stability of TiO₂ pastes

Notes: Test system: Ti-Pure R706, dosage of TiO₂ is 70% based on colour paste.
Resin: ETERKYD 3330-X-70-2
Non-volatilize matter of colour paste is 85%, dosage of dispersing agent is 2% based on TiO₂.
B. Organic Pigments and Carbon Black

High oil absorption makes the dispersion of organic pigments and carbon black a challenging task. An effective dispersant is critical for attaining stable system viscosity without flocculation and seeding upon storage at sufficiently high pigment loading. Disponer 9850 is a modified polyurethane specially designed for this purpose. It enhances wetting performance and prevents pigment flocculation by imparting steric hindrance through its unique structure. Disponer 9850 develops full color development and yields good color acceptance with minimum rub-up issues when color bases formulated with it are added to white bases.

Fig. 4 Versatility of Disponer 9250

Fig. 5 Wetting performance of Disponer 9850

Fig. 6 Alkyd/Melamine baking enamel containing FW-200
Rheological Wax Dispersion

Improvement of effect pigments orientation (aluminium, mica and pearlescent pigments)

M-P-A® E106A and DeuRheo 556F are supplied in paste form, therefore can be easily incorporated into coating formulations. They improve the orientation of effect pigments (such as aluminum, mica and pearlescent pigments) when used in combination with CAB (cellulose acetate butyrate). They also improve workability of the spraying process, gloss, brightness and enhance the flip flop effect of metallic pigments (See Figure 7).

In addition, M-P-A® E106A and DeuRheo 556F provide excellent anti-settling property especially after dilution at application viscosity. With the use of these additives, other anti-settling agents are generally not required in formulations.

Fig. 7 Orientation performance of M-P-A® E106A
Fig. 8 Anti-settling performance
## Additives for Car Refinish Applications

<table>
<thead>
<tr>
<th>Item</th>
<th>Product</th>
<th>Composition</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dispersing Agent</strong></td>
<td>Disponer 983</td>
<td>high molecular weight polymer</td>
<td>Anti-flooding, anti-floating</td>
</tr>
<tr>
<td>Dispersing Agent</td>
<td>Disponer 904S</td>
<td>Solution of polycarboxylic acid polymer with a polysiloxane copolymer</td>
<td>Anti-flooding, anti-floating</td>
</tr>
<tr>
<td>Inorganic pigment</td>
<td>Disponer 9250</td>
<td>Solution of a copolymer with acidic groups</td>
<td>Acrylic/melamine, acrylic polyurethane</td>
</tr>
<tr>
<td>Carbon black</td>
<td>Disponer 9850</td>
<td>Modified polyurethane</td>
<td>Acrylic/melamine, alkyd/melamine, acrylic polyurethane</td>
</tr>
<tr>
<td><strong>Leveling Agent</strong></td>
<td>Levasil 432</td>
<td>Modified polysiloxane</td>
<td>PU, N/C lacquer, acid curing, waterborne</td>
</tr>
<tr>
<td>Leveling Agent</td>
<td>Levasil 882</td>
<td>Modified polysiloxane</td>
<td>Polyester/melamine, alkyd/melamine, acrylic/melamine</td>
</tr>
<tr>
<td>Leveling Agent</td>
<td>Levasil 872</td>
<td>Polyester modified polysiloxane</td>
<td>Polyester/melamine, alkyd/melamine, acrylic/melamine</td>
</tr>
<tr>
<td>Leveling Agent</td>
<td>Levelol 835</td>
<td>Acrylic copolymer</td>
<td>High polarity aromatic and oxygenated systems</td>
</tr>
<tr>
<td>Leveling Agent</td>
<td>Levelol 837</td>
<td>Fluorocarbon modified polyacrylate</td>
<td>High polarity aromatic and oxygenated systems</td>
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<tr>
<td><strong>Rheology additives</strong></td>
<td>BENGEL® 828</td>
<td>Organic derivative of a bentonite clay</td>
<td>Suitable for low-to-high polarity solvent-based coatings and inks</td>
</tr>
<tr>
<td>Rheology additives</td>
<td>BENGEL® 988</td>
<td>Organic derivative of a bentonite clay</td>
<td>Suitable for low-to-high polarity solvent-based coatings and inks</td>
</tr>
<tr>
<td>Rheology additives</td>
<td>THIXATROL® P240X</td>
<td>Special polyamide wax</td>
<td>Solvent-based systems, anti-corrosion systems</td>
</tr>
<tr>
<td>Rheology additives</td>
<td>DeuRheo 211</td>
<td>Polyethylene wax</td>
<td>Solvent-based systems, anti-corrosion systems</td>
</tr>
<tr>
<td>Rheology additives</td>
<td>DeuRheo 202SP</td>
<td>Polyethylene wax</td>
<td>Solvent-based systems, anti-corrosion systems</td>
</tr>
<tr>
<td><strong>EVA wax</strong></td>
<td>M-P-A® E106A</td>
<td>Synthetic wax</td>
<td>Car refinish, slip agent for can and coil coatings, aluminum orientation</td>
</tr>
<tr>
<td>EVA wax</td>
<td>DeuRheo 556F</td>
<td>Ethylene-vinyl acetate copolymer</td>
<td>Car refinish, slip agent for can and coil coatings, aluminum orientation</td>
</tr>
<tr>
<td><strong>PP adhesion promoter</strong></td>
<td>DAPRO® ACP-16W</td>
<td>Acrylic modified chlorinated polypropylene</td>
<td>Primer of PP or PP/EPDM substrates</td>
</tr>
<tr>
<td>PP adhesion promoter</td>
<td>Adherant PPB</td>
<td>Chlorinated PP</td>
<td>As a PP primer or additive, excellent adhesion on PP or PP/EPDM substrate, good compatibility with other resin</td>
</tr>
<tr>
<td>PP adhesion promoter</td>
<td>Adherant AP-13</td>
<td>Acrylic modified chlorinated polypropylene</td>
<td>As a PP primer or additive, excellent adhesion on PP or PP/EPDM substrate, good compatibility with other resin</td>
</tr>
<tr>
<td>PP adhesion promoter</td>
<td>Adherant AP-14</td>
<td>Chlorinated polyolefin modified acrylic resin</td>
<td>PP or other PP/EPDM substrate, 1-coat and 1K for automobile inner part, colorant basecoat with pigment/filler, primer for 2K acrylic PU</td>
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</tbody>
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### Resins and Additives Recommendations

<table>
<thead>
<tr>
<th>Coating layer</th>
<th>Resin proposals</th>
<th>Additive proposals</th>
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| Clearcoat     | 2K systems based on acrylic polyol blends e.g.  
• Hypomer FX-3060 / Hypomer FX-4365  
• Hypomer FX-3071 / Hypomer FX-4365  
• Hypomer FX-3270 / Hypomer FS-4470  
• Hypomer FX-2860A / Hypomer FX-3270  
• Hypomer FS-3566F  | • Catacure TIN-18  
• Defom 5600  
• Levaslip 879  
• Levelol 835  
• Levelol TSP |
| Basecoat      | 1K systems based on acrylic polyol e.g.  
• Hypomer FX-2050 + CAB  
• Polyester resin + CAB  | • M-P-A® 10X  
• M-P-A® E106A  
• DeuRheo 211  
• DeuRheo 556F  
• Levaslip 432 |
| Primer surfer | 2K systems based on acrylic polyol e.g.  
• Hypomer FX-2050  
• Hypomer FX-2060D  | • M-P-A® 2000X  
• Defom 5800F  
• Disponer 9250  
• DeuRheo 202SP |
| Putty         | Unsaturated polyester resin  | • THIXCIN® E  
• THIXCIN® R  
• Disponer 912A |

### Resin and Additives Recommendations for PP Bumper Coatings

- **Clearcoat**  
  • Hypomer FX-4365 (impact resistance)  
  • Hypomer FS-3071 (drying speed & film build)  
  • Hypomer FX-2820 or Hypomer FS-4070F (weathering resistance)  
  • Hypomer FX-2860A (gasoline resistance)

- **Basecoat**  
  • Hypomer FX-2050 (metallic)  
  • Hypomer FX-2060A (solid color)

- **Primer**  
  • Adherant CP-7540 / Adherant AP-14  
  • For improving water resistance, use with Hardlen® CY-9124P or F2P  
  • Recommended dispersants: NUOPSERSE® FX 9086 & Disponer 9850

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The information in this publication is intended to serve as a guide but is not necessarily complete and is given without warranty. We recommend all users to determine the suitability of our products for their intended uses and caution them to comply with statutory obligations and to avoid infringing rights of third parties. We encourage users to contact us to discuss problems involving our products in order to facilitate their use.

**Elementis Specialties**

**Asia Head Office China**  
Deuchem (Shanghai) Chemical Co., Ltd.  
99, Lianyang Road,  
Songjiang Industrial Zone,  
Shanghai, China 201613  
Tel.: +86 21 57740348  
Fax.: +86 21 57743563

**Taiwan**  
Deuchem Co., Ltd.  
92, Kuang-Fu North Road,  
Hsinchu Industrial Park,  
Hukou, Hsinchu, Taiwan  
Tel.: +886 3 5984035  
Fax.: +886 3 5983301

**Malaysia**  
(1095766-X)  
62-1, Jalan Tasik Utama 5,  
Medan Niaga Tasik Damai,  
Sungai Besi, 57000 Kuala Lumpur,  
Wilayah Persekutuan, Malaysia  
Tel.: +603-9054 6690  
Fax: +603-9054 6698

**India**  
Elementis Specialties (India) Pvt. Ltd.  
Unit B, Ground Floor,  
Jaswanti Landmark,  
Mehra Industrial Estate,  
L.B.S Marg, Vikhroli (West),  
Mumbai  400 079, India  
Tel: +91 22 67421251  
Fax: +91 22 67421252

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