Ultra low VOCs, does not require after burners, very low CO2 footprint
Lower temperature cure reduces CO2 footprint and saves energy costs
Nearly 100% use of coating materials (Over-spray easily reused)
Low reject rates, robust process does not drip or sag, high volume production rates
Easy clean-up and maintenance
Reduced marking potential, allowing faster production rates

Coating & Plastic Applications

Finished Product

APPLICATIONS

Automotive Coatings
Clear Top Coats
Automotive Primers
Pigmented Coatings
Architectural
Outdoor Furniture
Lawn & Garden
Carbon Fiber Composites
UV Curables
Plumbing Fixtures
Industrial
Agricultural Machinery
Aluminum & Other Metal Substrates
Plastics & Other Heat Sensitive Substrates
Wood & MDF Substrates

ACRYLIC RESINS

Keeping that shine on your automobile is important to you. Our products help you maintain it.

Our innovative acrylic resins are used extensively in powder coating applications in the automotive industry. Other markets include aluminum wheels, outdoor furniture, lawn and garden equipment, and various architectural uses.

These resins contain glycidyl functional groups which, when combined with polycarboxylic acid compounds as the curing agent, exhibit excellent properties for coating materials.

Powder coating made from Almatex® GMA acrylics is especially noted for weatherability, gloss, crystal clarity, chemical resistance, and smooth finish. The resins exhibit excellent overbake tolerance, good caking stability, excellent electrical insulation properties, and an outstanding performance in electrostatic spraying equipment.

Anderson Development Company has over 30 years of experience with GMA powder coatings and full capability to tailor-make Almatex® GMA acrylic resins. We can customize resins for your specific application.

Expanding our production capacity, Anderson Development Company now has innovative production technologies in US and Japan.

ALMATEX® GMA ACRYLIC RESIN TECHNOLOGY – FOR A SUSTAINABLE FUTURE!

At Anderson Development Company, the protection of our local and global communities are critical to the long term success of our customers and to the long term success of our company. Anderson Development Company follows the principles of Responsible Care® which aims to continually improve performance related to the environment, health, safety, and security with a focus on our stakeholders.

Anderson Development Company is committed to the UNEP goals, focusing on the Triple Bottom Line. Businesses must focus on the people and on the planet, not only profit, because we cannot be successful in a world that fails. The use of Almatex® GMA acrylic resins in powder coating applications is well known to be Environmentally and Ecologically friendly, Energy and Economy saving while providing Excellent coating properties in finishing systems (known as ES). Almatex® GMA acrylic resins also can be used in bio-degradable plastics manufacturing.

Anderson Development Company is proud that Almatex® GMA acrylic resin promotes sustainability across the entire value chain.
GMA POWDER COATINGS

Since GMA acrylic powder coating resins are epoxy functional, common curing mechanisms for epoxy resins will also function with GMA acrylic resins. The most widely used curative for GMA acrylic powder resins is 1,12-dodecanedioic acid (DDDA) due to its combination of favorable melting point, cure rate, & viscosity profile. DDDA also provides cured coatings with excellent clarity, chemical resistance, and weatherability. Other polycarboxylic acids or anhydrides may be used as curatives or reactive additives to modify cure rate or coating properties.

Many additives used in the powder coating industry may also be used in GMA acrylic powder formulations. These additives include: flow control agents (FCA), de-gassing agents, UVAs, and HALS. For clearcoat applications, non-silica dispersed FCA’s or special solid FCA’s are preferred. The selection of UVA/HALS can also effect the yellowing and degree of outdoor durability.

Through special resin design or coating formulation, GMA powder coatings can be:

• Compatible with other powder coatings
• Low temperature cure
• High flexibility
• Highly pigmented
• High to low gloss finishes

FORMULATION PROCESS

PREMIX
ALMATEX® GMA acrylic resin is initially mixed with crosslinking agents, pigments, other additives and thoroughly dry blended.

MELT-Extrusion
The premix is then milled and blended with an extruder in a molten state. Properties of acrylic powder coating may vary depending on the compounding technique used.

PULVERIZING
After cooling the melt blended compound is crushed and passed through classification process for desirable particle size (typically 170-200 mesh).

APPLICATION
The powder is charged and sprayed with an electrostatic spray gun on a grounded substrate. Typical substrates include aluminum, steel, MDF, carbon fiber composites, plastic, and other heat sensitive substrates. GMA powder coatings are typically baked at 180°C for 10 to 40 minutes depending on the powder formulation.

GMA VS 2K CLEARCOAT

TYPICAL DSC THERMOGRAM OF GMA POWDER COATING

ANDERSON R&D SUPPORT CAPABILITIES

Global Support
Complete Powder Coating Laboratory
• Premix through Thermal/UV Oven Cure

Complete Powder Coating Testing Facility
• Thermal Analysis
• Weathering Testing
• Application Testing
• Other Property Analysis
• GPC/GC
• FTIR
• Mechanical Property Testers

Formulation Development
Problem Solving
Lab to Pilot Scale
**ALMATEX Acrylic Powder Resin Selection Guide**

**General Purpose**
- Higher Tg, Shorter gel-time: PD6300
- Balanced Tg, MW Reactivity: AP4404
- Better Pigmentation, Adhesion: PD7610
- Higher Cross-linking density: PD9200
- Lower Cost: PD1700
- Hydroxy-GMA: PD4427
- Dual Functionalit: PD6400
- Higher Hydrophobicity: AP4411
- Higher Corrosion Resistance: PD4444
- Better Polyester Compatibility: MT-2780
- Higher Cured Film Tg: MT-4715

**Automotive Clear Top Coat (Low Melt Viscosity, Rapid Cure, High Cross-linking density)**
- Better Flow, Faster Cure: PD3402
- Higher Cross-linking Density: PD4418
- Better Acid Etch Resist: PD4421

**Matting Resins**
- Better Polyester Compatibility: MT-2780
- Lower Temperature Cure: MT-4715

**Other Applications & Developmental Resins**
- UV curable solid acrylic resins (AP4410, AP4416)
- Hydroxy functional acrylic resin (HA 2001)
- High flexibility (AP8500, -COOH functional Aliphatic polyester)
- Chain Extender or Modifier for other polymers (such as PLA resins).
- Selected products can be made as masterbatch with flow agents or other additives.

**Contact us for custom Tailor-made products**
## ALMATEX® RESIN PROPERTIES

<table>
<thead>
<tr>
<th>ALMATEX® RESIN</th>
<th>EQUIVALENT WEIGHT (G/EQ.)</th>
<th>Tg (°C)</th>
<th>MELT INDEX (G/10 MIN.)</th>
<th>MELT VISCOSITY (POISE)</th>
<th>RECOMMENDED APPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PD-7950</td>
<td>450 - 500 EEW</td>
<td>46 - 51</td>
<td>43 - 54</td>
<td>200 - 250</td>
<td>General Purpose, Pigmented, Wheels, Auto Trims.</td>
</tr>
<tr>
<td>PD-5201</td>
<td>460 - 480 EEW</td>
<td>45 - 50</td>
<td>45 - 60</td>
<td>200 - 250</td>
<td>General Purpose, Pigmented, Wheels, Auto Trims.</td>
</tr>
<tr>
<td>PD-4409</td>
<td>720 - 760 EEW; 950 - 1200 OH eqv</td>
<td>39 - 44</td>
<td>&gt;110</td>
<td>75 - 125</td>
<td>QMA/urethane Hybrid Powder Coatings, Calcium UV Curable, Epoxy &amp; -OH Dual Functionality.</td>
</tr>
<tr>
<td>PD-4440</td>
<td>395 - 445 EEW</td>
<td>64 - 69</td>
<td>10 - 20</td>
<td>&gt;500</td>
<td>General Purpose, High Reactivity, Chain Extender for Other -COOH Containing Polymers.</td>
</tr>
<tr>
<td>PD-5200</td>
<td>650 - 690 EEW</td>
<td>44 - 50</td>
<td>45 - 60</td>
<td>180 - 280</td>
<td>General Purpose, Lower Cost.</td>
</tr>
<tr>
<td>PD-6400</td>
<td>275 - 335 EEW</td>
<td>46 - 51</td>
<td>30 - 63</td>
<td>210 - 300</td>
<td>General Purpose, Higher Reactivity, Matting.</td>
</tr>
<tr>
<td>MT-2780</td>
<td>760 - 810 EEW</td>
<td>55 - 60</td>
<td>6 - 10</td>
<td>&gt;500</td>
<td>Polyurea Matting.</td>
</tr>
<tr>
<td>MT-4715</td>
<td>695 - 735 EEW</td>
<td>55 - 59</td>
<td>5.5 - 10.5</td>
<td>&gt;500</td>
<td>Polyurea Matting, Improved Compatibility.</td>
</tr>
<tr>
<td>AP-4411</td>
<td>490 - 540 EEW</td>
<td>40 - 46</td>
<td>45 - 60</td>
<td>180 - 250</td>
<td>Polyurea Compatibility.</td>
</tr>
<tr>
<td>AP-4444</td>
<td>400 - 440 EEW</td>
<td>49 - 55</td>
<td>38 - 48</td>
<td>200 - 300</td>
<td>General Purpose, Wheels, Auto Trims, Higher Coating Tg.</td>
</tr>
<tr>
<td>AP-4416</td>
<td>740 - 780 EEW</td>
<td>41 - 46</td>
<td>&gt;110</td>
<td>80 - 120</td>
<td>Catonic UV Curable Powder Coatings.</td>
</tr>
<tr>
<td>AP-8500</td>
<td>970 - 1040 COOH eqv</td>
<td>60 - 100 M.P.</td>
<td>NA</td>
<td>9 - 11 (125°C)</td>
<td>Crystalline aliphatic polyester; DDDA Replacement for high flexibility.</td>
</tr>
</tbody>
</table>

Note: Data shown in this table is for resin selection guideline not for QC specification.

**SELECT CURE-CURVE OF ALMATEX® GMA RESINS**

![Select Cure-Curve of Almatex® GMA Resins](image-url)

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