Flexible Acrylic Resin 21309-XP
Translucent Grade

Regional Availability
Global

Description
Flexible Acrylic Resin 21309-XP is a thermoplastic flexible polymer composition offered for use in a wide range of applications.

Applications
Flexible Acrylic Resin 21309-XP can be used as a base resin or as an alloy with other polymers such as PVC. Flexible Acrylic Resin 21309-XP can be injection molded, extruded, calendered or blown as film for applications requiring low stress whitening, flexibility, UV resistance, and excellent ink and paint adhesion.

Product Performance
Flexible Acrylic Resin 21309-XP can be converted into pellet form by extrusion. Flexible Acrylic Resin 21309-XP powders or pellets can be converted into flexible film, sheet, tubing, and pipe products via conventional melt processing equipment including extrusion, injection molding, thermoforming, etc. The table below includes the distinct film properties of Flexible Acrylic Resin 21309-XP.

Typical Properties

<table>
<thead>
<tr>
<th>Flexible Acrylic Resin 21309-XP Translucent Grade</th>
<th>Typical</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>White free-flowing powder</td>
<td></td>
</tr>
<tr>
<td>Density (bulk, g/L)</td>
<td>≥ 400</td>
<td></td>
</tr>
<tr>
<td>Film Properties: Mechanical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tensile Strength @ break (psi/mPa)</td>
<td>2310/15.9</td>
<td>ASTM 882</td>
</tr>
<tr>
<td>Tensile Elongation @ break (%)</td>
<td>210</td>
<td></td>
</tr>
<tr>
<td>Tensile Modulus (psi/mPa)</td>
<td>2520/173.7</td>
<td>*</td>
</tr>
<tr>
<td>Shore A Hardness</td>
<td>90 - 95</td>
<td>ASTM D2240 05</td>
</tr>
<tr>
<td>Shore D Hardness</td>
<td>50 - 55</td>
<td>*</td>
</tr>
<tr>
<td>Film Properties: Physical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vicat (°C) (1.0 kg weight)</td>
<td>74.4</td>
<td>ASTM D 1525</td>
</tr>
<tr>
<td>Melt Flow Rate (g/10 min) (230°C, 10kg weight)</td>
<td>12.5</td>
<td></td>
</tr>
<tr>
<td>Specific Gravity (g/ml)</td>
<td>1.10</td>
<td></td>
</tr>
</tbody>
</table>

These properties are typical but do not constitute specifications. For product specifications, please contact Customer Information Group (CIG) of The Dow Chemical Company:
Safe Processing
Flexible Acrylic Resin 21309-XP can be safely processed using conventional melt processing equipment. Flexible Acrylic Resin 21309-XP has been injection molded, extruded and milled on a laboratory two roll mill.

Injection Molding Conditions
Molding conditions (Arburg): plaque dimension: 70 mm x 70 mm
Barrel Temperature 225°C / 225°C / 230°C / 235°C
Mold Temperature 135°F (57.2°C)
Hold pressure 50 psi
Back pressure 100 psi
Injection Pressure
2 mm thick plaque 600 psi
1.5 mm thick plaque 1100 psi
Injection time 15 seconds
Cooling time 35 seconds

Extrusion Conditions
Leistritz 25.4mm, L/D=28 twin screw extruder with high shear screws and a strand die.
Feed rate 15 lbs/hr
Screw speed 100 rpm
Load 35%
Die pressure 810 psi
Temperature Profile

Heat Stability
Flexible Acrylic Resin 21309-XP is a heat stable polymer up to 295°C in air and higher in \( \text{N}_2 \).

![Graphs showing weight vs temperature for 21309-XPTGA in air and in \( \text{N}_2 \).]
Excellent UV and Weather Resistance
Flexible Acrylic Resin 21309-XP offer excellent UV/weather resistance without a UV/antioxidant additive package or exceptional UV/weather resistance when stabilized with a UV/antioxidant additive package. Accelerated weathering tests conducted according to ASTM 2565 reveal that thin, un-pigmented Flexible Acrylic Resin 21309-XP sheet samples have 90% mechanical property retention after 3000 hrs Xenon Arc exposure, and delta E less than 0.5.

![Graph showing UV and Weather Resistance](image)

Excellent Miscibility
Flexible Acrylic Resin 21309-XP exhibits excellent miscibility in typical rigid or flexible PVC compounds at any blend weight ratio. Flexible Acrylic Resin 21309-XP can be blended into PVC compound via typical high intensity mixing practiced in all PVC compounding operations. The powder blends of Flexible Acrylic Resin 21309-XP/PVC can then be processed into film or sheet, or articles using conventional melt processing equipment including calendering, film and sheet extrusion, thermal forming, and injection molding. Unlike conventional acrylic impact modifier products, Flexible Acrylic Resin 21309-XP/PVC blend films or sheets possess excellent stress whitening resistance. Flexible Acrylic Resin 21309-XP addition imparts only a small effect on rigid PVC heat deflection temperature measured by DTUFL (ASTM D648), as shown in the table below. Similar results were found for Vicat evaluations. Flexible Acrylic Resin 21309-XP/PVC blends exhibit the unique combination of flexibility with heat resistance.

<table>
<thead>
<tr>
<th>PVC compound Phr</th>
<th>FAR 21309-XP Phr</th>
<th>Notched Izod @ RT (ft-lbs/in)</th>
<th>DTUFL 264 psi (°C)</th>
<th>Vicat (°C)</th>
<th>Flexural Modulus (Kpsi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>0</td>
<td>0.9</td>
<td>67.5</td>
<td>89</td>
<td>474</td>
</tr>
<tr>
<td>100</td>
<td>10</td>
<td>2.5</td>
<td>66.0</td>
<td>86.4</td>
<td>402</td>
</tr>
<tr>
<td>100</td>
<td>20</td>
<td>23.7</td>
<td>64.6</td>
<td>85.7</td>
<td>354</td>
</tr>
<tr>
<td>100</td>
<td>30</td>
<td>25.0</td>
<td>65.2</td>
<td>85.4</td>
<td>315</td>
</tr>
</tbody>
</table>
Excellent Paint Adhesion
Flexible Acrylic Resin 21309-XP injection molded parts exhibit excellent paint adhesion even with water-based latex paint.

| Solvent based spray paint | Acrylic oil paint | Water based latex paint |

Storage
Store products in tightly closed original containers at temperatures recommended on the product label.

Safety Data Sheet
Before using this product, consult the Safety Data Sheet (SDS) for details on product hazards, recommended handling precautions and product storage.

Handling Precautions
Avoid high concentrations of dust in air and accumulation of dust on equipment. An airborne dust of this material can create a dust explosion. When handling and processing this material, local exhaust ventilation may be required to control dust and reduce exposure to vapors. To prevent dust explosions, employ bonding and grounding for operations capable of generating static electricity. Dispose by placing powder or pellets in airtight bags.

Disposal Considerations
Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

It is the user's responsibility to verify that treatment and disposal procedures comply with local, state (provincial) and federal regulations.

Contact your Dow Plastics Additives Technical Representative for more information.
Product Stewardship

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- use as a critical component in medical devices that support or sustain human life; or
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