# Flexible Acrylic Resin 21308-XP

Transparent Grade

## Regional Availability

Global

## Description

Flexible Acrylic Resin 21308-XP is a 100% acrylic thermoplastic flexible polymer composition offered for use in crystal clear weatherable applications.

## Applications

Flexible Acrylic Resin 21308-XP can be extruded, injection molded and calendered for use in transparent, flexible applications requiring UV resistance and excellent adhesion to other polymers, paints or inks.

## Product Performance

Flexible Acrylic Resin 21308-XP can be converted into pellet form by extrusion. Flexible Acrylic Resin 21308-XP powders or pellets can be converted into flexible film, sheet, tubing, and pipe products via conventional melt processing means including extrusion, injection molding, thermo forming, etc. The table below includes the distinct film properties of Flexible Acrylic Resin 21308-XP.

## Typical Properties

| Flexible Acrylic Resin 21308-XP | Typical | Test Method |
|---|---|---|
| Appearance | White free-flowing powder | |
| Density (bulk, g/L) | ≥ 400 | |
| Optical | | |
| Film Thickness (µm) | 200 | |
| Total Light transmission (TT%) | >92 | ASTM D1004 |
| Haze (%) | <1% | ” |
| Mechanical | | |
| Tensile Strength @ break (psi/mPa) | 2100/1 4.5 | ASTM D882 |
| Tensile Elongation @ break (%) | 230 | ” |
| Tensile Modulus (psi/mPa) | 21000/144.8 | ” |
| Shore A Hardness | 90 - 95 | ASTM D2240 |
| Shore D Hardness | 50 -55 | ” |
| Physical | | |
| Vicat (°C) (1.0 kg weight) | 68.4 | ASTM D1525 |
| Melt Flow Rate (g/10 min) (230°C, 10kg weight) | ~18 | |
| Specific Gravity (g/ml) | 1.10 | |

These properties are typical but do not constitute specifications.
For product specifications, please contact Customer Information Group (CIG) of The Dow Chemical Company: http://www.dow.com/assistance/dowcig.htm.

## Laboratory Conditions

The following lab conditions were used to process Flexible Acrylic Resin 21308-XP.

**Injection Molding Conditions**

| Molding conditions (Arburg): plaque dimension: 70 mm x 70 mm | |
|---|---|
| Barrel Temperature | 190°C / 190°C / 210°C / 220°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 Compounding Conditions**

| Leistritz 25.4mm, L/D=28 twin screw extruder with high shear screws and a strand die. | | | | | | |
|---|---|---|---|---|---|---|
| Feed rate | 12 lbs/hr | | | | | |
| Screw speed | 100 rpm | | | | | |
| Load | 35% | | | | | |
| Die pressure | 530 psi | | | | | |
| Temperature Profile | | | | | | |
| ***Zone 1*** | ***Zone 2*** | ***Zone 3*** | ***Zone 4*** | ***Zone 5*** | ***Zone 6*** | ***Zone 7*** |
| 165ºC | 180ºC | 180ºC | 180ºC | 185ºC | 190ºC | 190ºC |

## Excellent Misciblity

Flexible Acrylic Resin 21308-XP exhibits excellent miscibility in typical rigid or flexible PVC compounds at any blend weight ratio. Flexible Acrylic Resin 21308-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 21308-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 21308-XP/PVC blend films or sheets possess excellent stress whitening resistance. Flexible Acrylic Resin 21308-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 21308-XP/PVC blends exhibit the unique combination of flexibility with heat resistance.

| PVC compound Phr | FAR 21308-XP Phr | Notched Izod @ RT (ft-lbs/in) | DTUFL 264 psi (°C) | Vicat (°C) | Flexural Modulus (Kpsi) |
|---|---|---|---|---|---|
| 100 | 0 | 0.9 | 67.5 | 89 | 474 |
| 100 | 10 | 2.5 | 66.0 | 86.4 | 402 |
| 100 | 20 | 23.7 | 64.6 | 85.7 | 354 |
| 100 | 30 | 25.0 | 65.2 | 85.4 | 315 |

**Tensile Stability**

Flexible Acrylic Resin 21308-XP film or sheet products exhibit broad service temperature range, maintaining excellent tensile strength at 100°C while remaining flexible and ductile at
minus 20°C.

Flexible Acrylic Resin 21308-XP Film Instrumented Dart Properties

| Test Temperature | Total energy (in.lbf/J) | Failure Mode |
|---|---|---|
| -20°C | 3.90/0.44 | Ductile |
| 0°C | 4.21/0.48 | Ductile |
| 23°C | 8.22/0.93 | Ductile |

Note: test velocity: 3.4m/s

***Flexible Acrylic Resin 21308-XP Film High Temperature Tensile Properties***

| Test Temperature | Strain at break (%) | Break stress (psi/mPa) | Elastic Modulus (psi/mPa) |
|---|---|---|---|
| 0°C | 52 | 2,769 / 19.1 | 91,995 / 634 |
| 23°C | 172 | 1,862 / 12.8 | 37,093 / 256 |
| 40°C | 184 | 1,517 / 10.5 | 26,370 / 182 |
| 60°C | 209 | 1,021 / 7.0 | 14,477 / 100 |
| 80°C | 237 | 609 / 4.2 | 7,253 / 50 |
| 100°C | 233 | 315 / 2.2 | 1,871 / 13 |

Note: ASTM D882, rate: 500mm/min

## 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

Dow has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with each and every individual involved with Dow products—from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

## Medical Applications Policy

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- use in cardiac prosthetic devices regardless of the length of time involved ("cardiac prosthetic devices" include, but are not limited to, pacemaker leads and devices, artificial hearts, heart valves, intra-aortic balloons and control systems, and ventricular bypass-assisted devices);
- use as a critical component in medical devices that support or sustain human life; or
- use specifically by pregnant women or in applications designed specifically to promote or interfere with human reproduction.

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If your application includes a sensitive application such as food contact or drinking water requirements or if you need other regulatory information, please contact your local Dow representative.

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**Contact:**
North America: 1-800-447-4369
Latin America: (+55)-11-5188-9000
Europe: (+800)-3-694-6367
(Toll) +31-11567-2626
Asia-Pacific: (+800)-7776-7776
(Toll) +60-3-7965-5392
http://www.dow.com