



Delrin®

acetal resins



Responsible Care®
A Public Commitment

Product Stewardship

Delrin® acetal resins are thermoplastic polymers made by the polymerization of formaldehyde. They have gained widespread recognition for reliability in many thousands of engineering components all over the world. Delrin® has been used in the automotive, appliance, construction, hardware, electronics, and consumer goods industries, among others. For detailed molding information, refer to the Delrin® acetal resins molding guide. For additional information on safety, health, and environmental concerns, refer to the MSDS or call Dial DuPont First at (800) 441-0575. For automotive inquiries, call (800) 533-1313.

Drying Considerations

- Virgin resin is usually handled without drying.
- Opened bags or molding regrind resins are easily dried in a circulating air oven or hopper dryer unit at 85°C (185°F) for 4 hr or less.
- Toughened Delrin® acetal resins, such as Delrin® 100ST and Delrin® 500T, should be dried 2–4 hr at 80°C (175°F) for optimum physical properties.

Note: Hopper dryers have occasionally been used to preheat the resin and increase cylinder melting capacity or to decrease mold deposit and improve surface appearance when large amounts of reground resins are used.

Melt Temperatures

Delrin® acetal resin is a crystalline resin with a melting point of 177°C (350°F). The preferred melt temperature range is 205–225°C (400–440°F) for standard grades and 195–215°C (383–420°F) for impact modified grades (Delrin® 100ST and Delrin® 500T). Recommended cylinder temperatures for residence times between 3 to 5 min are as follows:

Typical Cylinder Temperature Settings

Resin Type	Temperature Setting, °C (°F)			
	Nozzle	Front	Center	Rear
Standard Grades	190 (375)	215 (420)	215 (420)	215 (420)
D100ST	190	205	205	205
D500T	(375)	(400)	(400)	(400)

Note: The proper design of the injection unit (cylinder and screw) and proper thermal settings will result in uniform melt and crystallinity, resulting in minimum internal stress and uniform mold shrinkage.

Mold Temperatures

In order to obtain maximum dimensional stability, surface gloss, flow, and minimum molded-in stress, the following mold temperatures are recommended for Delrin® acetal resins:

- Surface temperatures of 80–100°C (176–212°F) are recommended for standard grades.
- Surface temperatures of 30–50°C (86–122°F) are recommended for Delrin® 100ST and Delrin® 500T.

Notes:

- Mold temperature has a major effect on both mold shrinkage and post-molding shrinkage.
- In fast cycling operations, it may be necessary to use a lower mold coolant temperature in order to maintain a mold surface temperature in the recommended range.

Operating Conditions

- Back pressure should only be used when increasing cylinder temperature or when other changes are not effective or possible.
- Normal injection pressures lie in a range of 70–112 MPa (10–16 kpsi), but an injection pressure of 80–100 MPa (11–14 kpsi) may be necessary to obtain maximum part toughness and elongation. Delrin® 100 may require a pressure of 100 MPa or more.
- High injection rates are required for molding thin section parts. Lower injection rates are required when molding parts with thick sections and relatively small gates. Use 1 sec/mm of part thickness as first approach.

Note: Avoid hold-up spots in the machine where molten resin can accumulate and degrade, resulting in excess formaldehyde gas.

Shrinkage Considerations

The mold shrinkage of Delrin® acetal resins is dependent upon such factors as:

- Mold temperature
- Screw forward time
- Gate size
- Composition (i.e., glass, filler, colorants)
- Injection pressure
- Melt temperature
- Part thickness

Note: Good molding practices, however, lead to choices among these variables so that the mold shrinkages of Delrin® 500 and several other compositions are very often near 2.0% (0.020 mm/mm [in/in]).

Post-Molding Shrinkage

Hot molds of 90°C (194°F) or higher, measured on the cavity surface, reduce the post-molding shrinkage to an almost negligible amount.

Safety Considerations

While processing Delrin®, all of the potential hazards associated with thermoplastic elastomer resins must be anticipated and either eliminated or guarded against by following established industry procedures. Hazards include:

- Thermal burns resulting from exposure to hot molten polymer
 - Fumes generated during drying, processing, and regrind operations
 - Formation of gaseous and liquid degradation products
- Never mix or process acetal with halogenated polymers or chemicals such as PVC or flame retardant resins. The HCl or HBr given off will cause rapid degradation of Delrin®.

MSDSs include such information as hazardous components, health hazards, emergency and first aid procedures, disposal procedures, and storage information.

Note: Adequate ventilation and proper protective equipment should be used during all aspects of the molding process. Refer to the DuPont Ventilation Guide for more detailed information.

Start with DuPont

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CAUTION: Do not use in medical applications involving permanent implantation in the human body. For other medical applications, see "DuPont Medical Caution Statement," H-50102.

