

Polyoxymethylene (POM or Delrin®)

Reference Information supplied by our sources: DELRIN is a registered trademark of DuPont

DELRIN

GENERAL PROPERTIES

Acetal is the common name for a family of thermoplastics with the chemical name "PolyOxy-Methylene". Acetal is available in a general purpose copolymer grade, a homopolymer version (Delrin®), and several filled Delrin® grades. Acetal provides high strength and stiffness, enhanced dimensional stability, and is easy to machine. As a semi-crystalline material, acetal is characterized by a low coefficient of friction and good wear properties.

FEATURES

- High strength, stiffness, dimensional stability
- Very low moisture absorption
- Good wear and abrasion resistance
- Wide range chemical resistance (including many solvents)

ACETAL GRADES

ACETAL COPOLYMER (unfilled)

The copolymer grade offers excellent performance at a slightly lower cost than Delrin®. Acetal copolymer may exhibit center line porosity, but porosity-free material is available. Certain grades are FDA, USDA, NSF, Canada AG and 3-A Dairy compliant. Low stress levels and high strength assure flatness and dimensional stability up to a maximum continuous service temperature of 180°F (80°C). Acetal copolymers are available in a wide variety of colors (see above photo), including Black, Grey, White, Blue, Green, Yellow, Orange, Rust, Red & Brown.

DELRIN® (unfilled)

Delrin® acetal homopolymer offers slightly higher mechanical properties than acetal copolymer, but may contain a low density center (also known as "center line porosity") especially in large cross-sections. The homopolymer also gives slightly less chemical resistance than copolymer acetal. For example, Delrin® is ideal for small diameter, thin-walled bushings that benefit from the additional strength and rigidity of homopolymer acetal. Delrin® is available in Black & Natural colors.

NOTE: Brand name Delrin sheet, rod and tube may be manufactured from any one of several DuPont resins, depending upon the size, cross-sectional thickness, and production equipment being used to produce the molded shapes.

In 2002, DuPont Company discontinued production of Delrin® II 550SA resin ... this has been replaced by Delrin® 511P.

In 2004, DuPont Company discontinued production of Delrin® II 150SA and Delrin® II 150E (Natural) resins ... these grades have been replaced by Delrin® 150.

DELRIN® AF (PTFE-filled)

This material is manufactured from Delrin® homopolymer resin which has been uniformly filled with a dispersion of PTFE fibers. Delrin® AF is a unique thermoplastic material for use in moving parts in which low friction and long wear life are important. It retains 90% of the mechanical strength of unfilled acetal homopolymer, while offering very low friction and almost no "slip-stick" behavior. Delrin® AF is Brown in color.

In 2006, DuPont Company changed the composition of Delrin® AF resins ... the Teflon® fiber manufacturing process has been modified to substantially reduce PFOA emissions in cooperation with EPA guidelines. The old and new materials have identical properties, except that the new polymer is a much darker brown color. For comparison, the old material was similar to a Milk Chocolate Brown and the new material looks more like a Dark Chocolate Brown.

TYPICAL PROPERTIES of ACETALS				
ASTM or UL test	Property	Acetal Copolymer	Delrin® Homopolymer	Delrin® AF PTFE-filled
PHYSICAL				
D792	Density (lb/in ³) (g/cm ³)	0.051 1.41	0.051 1.41	0.054 1.50
D570	Water Absorption, 24 hrs (%)	0.2	0.2	0.2
MECHANICAL				
D638	Tensile Strength (psi)	9,500	11,000	8,000
D638	Tensile Modulus (psi)	400,000	450,000	435,000
D638	Tensile Elongation at Break (%)	30	30	15
D790	Flexural Strength (psi)	12,000	13,000	12,000
D790	Flexural Modulus (psi)	400,000	450,000	435,000
D695	Compressive Strength (psi)	15,000	16,000	16,000
D695	Compressive Modulus (psi)	400,000	450,000	350,000
D785	Hardness, Rockwell	M88 / R120	M89 / R122	M85 / R115
D256	IZOD Impact Notched (ft-lb/in)	1.0	1.0	0.7
THERMAL				
D696	Coefficient of Linear Thermal Expansion (x 10 ⁻⁵ in./in./°F)	5.40	4.70	5.00
D648	Heat Deflection Temp (°F / °C) at 264 psi	220 / 104	250 / 121	244 / 118
D3418	Melting Point Temp (°F / °C)	335 / 168	347 / 175	347 / 175
-	Max Operating Temp (°F / °C)	180 / 82	180 / 82	180 / 82
C177	Thermal Conductivity (BTU-in/ft ² -hr-°F) (x 10 ⁻⁴ cal/cm-sec-°C)	1.6 5.5	2.5 8.6	-
UL94	Flammability Rating	HB	HB	HB
ELECTRICAL				
D149	Dielectric Strength (V/mil) short time, 1/8" thick	420	450	400
D150	Dielectric Constant at 1 MHz	3.8	3.7	3.1
D150	Dissipation Factor at 1 MHz	0.005	0.005	0.010
D257	Volume Resistivity (ohm-cm) at 50% RH	10 ¹⁵	10 ¹⁵	3.0 x 10 ¹⁶

NOTE: The information contained herein are typical values intended for reference and comparison purposes only. They should NOT be used as a basis for design specifications or quality control. Contact us for manufacturers' complete material property datasheets.

All values at 73°F (23°C) unless otherwise noted.

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