

DuPont™ Delrin® 511DP NC010

ACETAL RESIN

Product Information

Common features of Delrin® acetal resins include mechanical and physical properties such as high mechanical strength and rigidity, excellent fatigue and impact resistance, as well as resistance to moisture, gasoline, lubricants, solvents, and many other neutral chemicals. Delrin® acetal resins also have excellent dimensional stability and good electrical insulating characteristics. They are naturally resilient, self-lubricating, and available in a variety of colors and speciality grades.

Delrin® acetal resin typically is used in demanding applications in the automotive, domestic appliances, sports, industrial engineering, electronics, and consumer goods industries.

Delrin® 511DP is a medium viscosity acetal homopolymer with enhanced crystallization for faster cycle times and excellent creep and fatigue resistance. It has improved thermal stability, excellent dimensional stability, low warpage and fewer voids.

General information	Value	Unit	Test Standard	
Resin Identification	POM	-	ISO 1043	
Part Marking Code	POM	-	ISO 11469	
Rheological properties	Value	Unit	Test Standard	
Melt volume-flow rate	13	cm ³ /10min	ISO 1133	
Temperature	190	°C	ISO 1133	
Load	2.16	kg	ISO 1133	
Melt mass-flow rate	14	g/10min	ISO 1133	
Melt mass-flow rate, Temperature	190	°C	ISO 1133	
Melt mass-flow rate, Load	2.16	kg	ISO 1133	
Molding shrinkage, parallel	1.9	%	ISO 294-4, 2577	
Molding shrinkage, normal	1.8	%	ISO 294-4, 2577	
Mechanical properties	Value	Unit	Test Standard	
Tensile Modulus	3400	MPa	ISO 527-1/-2	
Yield stress	74	MPa	ISO 527-1/-2	
Yield strain	12	%	ISO 527-1/-2	
Nominal strain at break	25	%	ISO 527-1/-2	
Flexural Modulus	3200	MPa	ISO 178	
Flexural Stress at 3.5%	87	MPa	ISO 178	
Charpy impact strength			ISO 179/1eU	
73°F	220	kJ/m ²		
-22°F	200	kJ/m ²		
Charpy notched impact strength			ISO 179/1eA	
73°F	7	kJ/m ²		
-22°F	6.5	kJ/m ²		
Ball indentation hardness, H 961/30	175	MPa	ISO 2039-1	DS
DS: Derived from similar grade				
Thermal properties	Value	Unit	Test Standard	
Melting temperature, 18°F/min	178	°C	ISO 11357-1/-3	
Temp. of deflection under load			ISO 75-1/-2	
260 psi	107	°C		
65 psi	163	°C		
Vicat softening temperature, 90°F/h, 11 lbf	160	°C	ISO 306	
Coeff. of linear therm. expansion, parallel	100	E-6/K	ISO 11359-1/-2	
Coeff. of linear therm. expansion, normal	110	E-6/K	ISO 11359-1/-2	
RTI, electrical			UL 746B	
30mil	50	°C		
60mil	110	°C		
120mil	110	°C		
RTI, impact			UL 746B	
30mil	50	°C		
60mil	85	°C		
120mil	90	°C		

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				UL 746B
RTI, strength				
30mil	50	°C		
60mil	90	°C		
120mil	95	°C		
Flammability		Value	Unit	Test Standard
Burning Behav. at 60mil nom. thickn.	HB	class		IEC 60695-11-10
Thickness tested	1.5	mm		IEC 60695-11-10
UL recognition	yes	-		UL 94
Burning Behav. at thickness h	HB	class		IEC 60695-11-10
Thickness tested	0.8	mm		IEC 60695-11-10
UL recognition	yes	-		UL 94
FMVSS Class	B	-		ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	25	mm/min		ISO 3795 (FMVSS 302)
DS: Derived from similar grade				
Other properties		Value	Unit	Test Standard
Humidity absorption, 80mil	0.3	%		Sim. to ISO 62
Water absorption, 80mil	0.9	%		Sim. to ISO 62
Density	1420	kg/m ³		ISO 1183
Water Absorption, Immersion 24h	0.3	%		Sim. to ISO 62
VDA Properties		Value	Unit	Test Standard
Emissions	<8	mg/kg		VDA 275
Fogging, F-value (refraction)	97	%		ISO 6452
Fogging, G-value (condensate)	0.1	mg		ISO 6452
Injection		Value	Unit	Test Standard
Drying Recommended	yes	-		-
Drying Temperature	80	°C		-
Drying Time, Dehumidified Dryer	2 - 4	h		-
Processing Moisture Content	≤0.2	%		-
Melt Temperature Optimum	215	°C		-
Min. melt temperature	210	°C		-
Max. melt temperature	220	°C		-
Mold Temperature Optimum	90	°C		-
Min. mold temperature	80	°C		-
Max. mold temperature	100	°C		-
Hold pressure range	80 - 100	MPa		-
Hold pressure time	7.5	s/mm		-
Annealing time, optional	30	min/mm		-
Annealing temperature	160	°C		-
Extrusion		Value	Unit	Test Standard
Drying Temperature	75 - 85	°C		-
Drying Time, Dehumidified Dryer	2 - 4	h		-
Processing Moisture Content	≤0.2	%		-
Melt Temperature Optimum	200	°C		-
Melt Temperature Range	195 - 205	°C		-

Characteristics

Processing	<ul style="list-style-type: none"> Injection Molding Profile Extrusion 	<ul style="list-style-type: none"> Sheet Extrusion Other Extrusion
Delivery form	<ul style="list-style-type: none"> Pellets 	
Additives	<ul style="list-style-type: none"> Lubricants 	<ul style="list-style-type: none"> Release agent
Regional Availability	<ul style="list-style-type: none"> North America Europe 	<ul style="list-style-type: none"> Asia Pacific South and Central America
		<ul style="list-style-type: none"> Near East/Africa Global

Processing Texts

Injection molding

Drying is recommended, but not necessary for newly opened packaging stored in a dry location.

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Follow the drying guidelines above in the following cases:

- If moisture is above the Processing Moisture Content recommendation,
- When a resin container is damaged,
- When the material is not properly stored in a dry place at room temperature, or
- When packaging stays open for a significant time.

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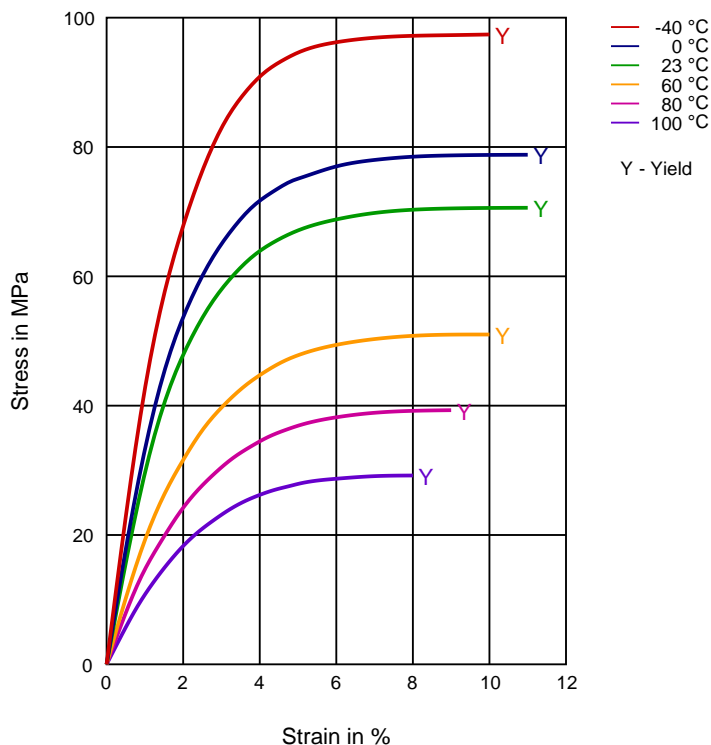


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Diagrams

Stress-strain



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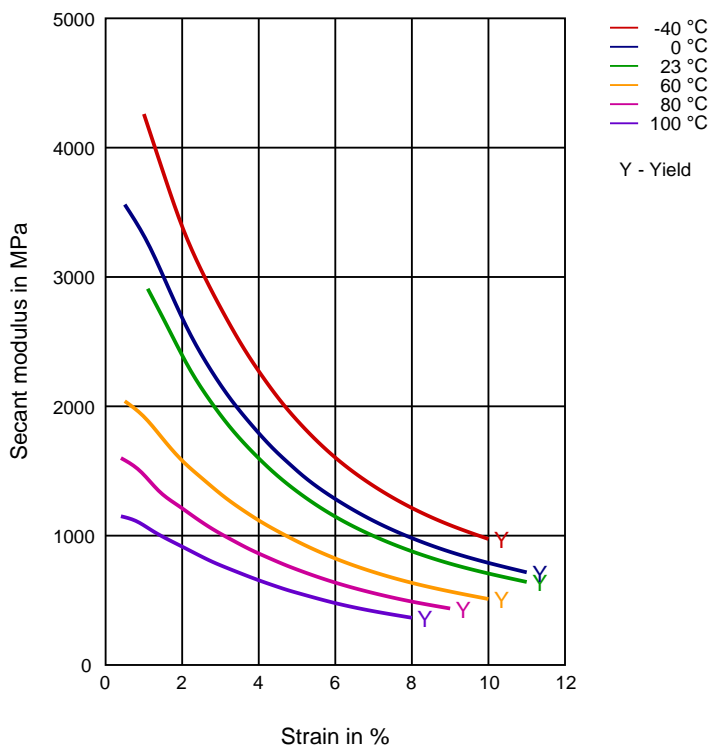
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Secant modulus-strain



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Chemical Media Resistance

Acids

- ✓ Acetic Acid (5% by mass) (23 °C)
- ✗ Citric Acid solution (10% by mass) (23 °C)
- ✗ Lactic Acid (10% by mass) (23 °C)
- ✗ Hydrochloric Acid (36% by mass) (23 °C)
- ✗ Nitric Acid (40% by mass) (23 °C)
- ✗ Sulfuric Acid (38% by mass) (23 °C)
- ✗ Sulfuric Acid (5% by mass) (23 °C)
- ✗ Chromic Acid solution (40% by mass) (23 °C)

Bases

- ✗ Sodium Hydroxide solution (35% by mass) (23 °C)
- ✗ Sodium Hydroxide solution (1% by mass) (23 °C)
- ✗ Ammonium Hydroxide solution (10% by mass) (23 °C)

Alcohols

- ✓ Isopropyl alcohol (23 °C)
- ✓ Methanol (23 °C)
- ✓ Ethanol (23 °C)

Hydrocarbons

- ✓ n-Hexane (23 °C)
- ✓ Toluene (23 °C)
- ✓ iso-Octane (23 °C)

Ketones

- ✓ Acetone (23 °C)

Ethers

- ✓ Diethyl ether (23 °C)

Mineral oils

- ✓ SAE 10W40 multigrade motor oil (23 °C)
- ✗ SAE 10W40 multigrade motor oil (130 °C)
- ✗ SAE 80/90 hypoid-gear oil (130 °C)
- ✓ Insulating Oil (23 °C)

Standard Fuels

- ✓ ISO 1817 Liquid 1 - E5 (60 °C)
- ✓ ISO 1817 Liquid 2 - M15E4 (60 °C)
- ✓ ISO 1817 Liquid 3 - M3E7 (60 °C)
- ✓ ISO 1817 Liquid 4 - M15 (60 °C)
- ✓ Standard fuel without alcohol (pref. ISO 1817 Liquid C) (23 °C)
- ✓ Standard fuel with alcohol (pref. ISO 1817 Liquid 4) (23 °C)

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- ✓ Diesel fuel (pref. ISO 1817 Liquid F) (23°C)
- ✗ Diesel fuel (pref. ISO 1817 Liquid F) (90°C)
- ✗ Diesel fuel (pref. ISO 1817 Liquid F) (>90°C)

Salt solutions

- ✓ Sodium Chloride solution (10% by mass) (23°C)
- ✗ Sodium Hypochlorite solution (10% by mass) (23°C)
- ✗ Sodium Carbonate solution (20% by mass) (23°C)
- ✗ Sodium Carbonate solution (2% by mass) (23°C)
- ✗ Zinc Chloride solution (50% by mass) (23°C)

Other

- ✓ Ethyl Acetate (23°C)
- ✗ Hydrogen peroxide (23°C)
- ✗ DOT No. 4 Brake fluid (130°C)
- ✗ Ethylene Glycol (50% by mass) in water (108°C)
- ✓ 1% nonylphenoxy-polyethyleneoxy ethanol in water (23°C)
- ✓ 50% Oleic acid + 50% Olive Oil (23°C)
- ✓ Water (23°C)
- ✗ Water (90°C)
- ✗ Phenol solution (5% by mass) (23°C)

Symbols used:

✓ possibly resistant

Defined as: Supplier has sufficient indication that contact with chemical can be potentially accepted under the intended use conditions and expected service life. Criteria for assessment have to be indicated (e.g. surface aspect, volume change, property change).

✗ not recommended - see explanation

Defined as: Not recommended for general use. However, short-term exposure under certain restricted conditions could be acceptable (e.g. fast cleaning with thorough rinsing, spills, wiping, vapor exposure).

Contact DuPont for Material Safety Data Sheet, general guides and/or additional information about ventilation, handling, purging, drying, etc. ISO Mechanical properties measured at 160 mil (Hytrel® measured at 80 mil), IEC Electrical properties measured at 80 mil, all ASTM properties measured at 120 mil, and test temperatures are 73°F unless otherwise stated.

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