ACETAL / DELRIN

Also Known As (common industry trade names):

Acetal . Acetron . Co-Polymer . Celcon . Derlin . Ensital . Pomalux . Polyacetal . PolyOxyMethylene (POM) . Sustarin . Tecaform . Ultraform . Unital . ZL 900

Material Information:

Acetal and Delrin represent a crystalline thermoplastic polymer that possesses many qualities that make them a leading choice for machined plastic parts. Acetal's properties include low water absorption, superior creep resistance, high tensile strength, and high melt point. The low water absorption, coupled with the high tensile strength and modulus, relate to an ability to maintain excellent dimensional stability in close tolerance fabricated parts. The chemical resistance of acetal includes resistance to hydrocarbons, solvents and neutral chemicals. In addition, most of the materials properties are maintained in operating temperatures up to 180° F. The combination of the physical properties and ease of fabrication makes acetal an excellent choice for machined mechanical parts.

Applications:

Bushings Gears
Seals
Wheels
Bearings
Cams
Rollers
Washers
Wear Components

Characteristics /Enhancements /Varieties / Fills:

*PTFE (Teflon) (Delrin AF)
The Teflon fill is used in applications where a lower factional coefficient along with improved wear properties is needed.
*20% Glass Filled
The addition of glass fibers increases the strength of the material and adds dimensional stability.

Standard Shapes and Sizes :

Sheet Sizes:	12" x 48", 24" x 48", up to 48" x 120" in limited thicknesses
Sheet Thicknesses:	1/32" through 6"
Rod Diameters:	1/8" through 12" Diameter, Larger available (imports)
Rod Lengths:	10' standard length
Tube:	"Bushing Stock" in many sizes - Please Call
Film:	Not Available

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TECAFORM™

TECAFORM™

(Acetal Copolymer)

TECAFORM™ is a semi-crystalline thermoplastic offering high strength, stiffness and toughness. TECAFORM™ is resistant to hot water, hydrocarbons and solvents, and it possesses good bearing and wear properties. It is available in natural and black grades. TECAFORM™ is commonly used as bushings, rollers, wear strips and other applications requiring a combination of strength, low moisture absorption, chemical resistance and dimensional stability.

- **No centerline porosity**
- **Low moisture absorption**
- **Excellent machinability**
- **Good combination of mechanical properties**
- **Chemical resistance to fuels and solvents**
  TECAFORM™ is resistant to aqueous solutions with pH values ranging from 4 to 14.
- **Good wear and abrasion properties**
- **Natural grade is FDA, USDA, NSF and 3A Sanitary compliant**
- **Good dimensional stability**
- **Good property retention at elevated temperatures**
- **Black grade is FDA compliant**

TECAFORM™ is used in a wide variety of industrial applications requiring good strength and toughness, dimensional stability, wear resistance and the ability to operate in a wet environment with little absorption. Material handling, machinery and fluid handling are some of the common industries utilizing TECAFORM™s combination of properties. Typical applications are gears, wear strips, bushings, pump parts, fittings and rollers.

TYPICAL PROPERTY VALUES

	PROPERTIES	ASTM Test Method	Units	TECAFORM™
PHYSICAL	Density	D792	lbs/in³	0.0507
	Specific Gravity	D792	g/cc	1.41
	Water Absorption, @24 hours, 73°F	D570	%	0.22
	@Saturation, 73°F	D570	%	0.8
MECHANICAL	Tensile Strength @ Yield, 73°F	D638	psi	8,800
	Tensile Modulus	D639	psi	380,000
	Elongation @ Break, 73°F	D638	%	25
	Flexural Strength, 73°F	D790	psi	11,000
	Flexural Modulus, 73°F	D790	psi	360,000
	Compressive Strength	D695	psi	4,500
	Izod Impact Strength, 73°F	D256	ft-lbs/in	1.0
	Rockwell Hardness, 73°F	D785	M Scale	86
	Shore Hardness	-	D Scale	-
	Wear Factor Against Steel, 40 psi, 50 fpm	D3702	$\frac{in^3}{hr} \times \frac{1}{PV}$	65×10^{-10}
	Static Coefficient of Friction	D3702	-	-
	Dynamic Coefficient of Friction, 40 psi, 50 fpm	D3702	-	0.21
THERMAL	Heat Deflection Temperature @ 66 psi	D648	°F	316
	@ 264 psi	D648	°F	230
	Coefficient of Linear Thermal Expansion	D696	in/in/°F	4.7×10^{-5}
	Maximum Servicing Temperature, Intermittent	-	°F	285
	Long Term	UL746B	°F	195
	Specific Heat	-	BTU/lb-°F	-
	Thermal Conductivity	-	-	-
	Vicat Softening Point	-	°F	-
	Melting Point	D2133	°F	329
	Flammability	UL94		HB
ELECTRICAL	Surface Resistivity	D257	ohm/square	-
	Volume Resistivity	D257	ohm-cm	1.0×10^{14}
	Dielectric Strength	D149	V/mil	500
	Dielectric Constant, @ 60 Hz, 73°F, 50% RH	D150	-	3.7
	@ 1 MHz	D150	-	-
	@ 20 GHz	D150	-	-
	@ 30 GHz	D150	-	-
	Dissipation Factor, @ 60 HZ, 73°F	D150	-	0.001

MATERIAL AVAILABILITY

Rods: Diameters: Up to 4 3/4", 10' length
Length: 5" and greater, 5' length

Plates: 1/4" to 2" thickness inclusive are 2' x 4', 4' x 8', 4' x 10'
2-1/4" to 4" thickness inclusive are 2' x 4'

Primary Specification (Resin) (Typical)
Natural ASTM-D-4181 POM211
Black ASTM-D-4181 POM211

Shapes Specification (Typical)
Natural ASTM-D-6100 S-POM0211
Black ASTM-D-6100 S-POM0211

Profiles, tubes, and special sizes are custom-produced on request.

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DELRIN®

DELRIN®

(Acetal Homopolymer)

DELRIN® is a crystalline plastic which offers an excellent balance of properties that bridge the gap between metals and plastics. DELRIN® possesses high tensile strength, creep resistance and toughness. It also exhibits low moisture absorption. It is chemically resistant to hydrocarbons, solvents and neutral chemicals. These properties along with its fatigue endurance make DELRIN® ideal for many industrial applications.

- **Good dimensional stability**
- **Low moisture absorption**
  DELRIN® can operate in wet environments with little effect on performance or dimensions.
- **Excellent machinability**
- **High fatigue endurance**
- **High strength and stiffness properties**
- **Superior impact and creep resistance**
- **Chemical resistance to fuels and solvents**
- **Natural grade is FDA, NSF and USDA compliant**
- **Good wear and abrasion properties**
  With its low coefficient of friction and hard and resilient surface, DELRIN® is the material of choice in many wear applications.

DELRIN®s overall combination of physical, tribological and environmental properties make it ideal for many industrial wear and mechanical applications. Parts exposed to a moist or wet environment, such as pump and valve components, are especially appropriate. Other common uses for DELRIN® include gears, bearings, bushings, rollers, fittings and electrical insulator parts.

TYPICAL PROPERTY VALUES

	PROPERTIES	ASTM Test Method	Units	Delrin® 150
PHYSICAL	Density	D792	lbs/in³	0.0513
	Specific Gravity	D792	g/cc	1.42
	Water Absorption, @24 hours, 73°F	D570	%	0.25
	@Saturation, 73°F	D570	%	0.9
MECHANICAL	Tensile Strength @ Yield, 73°F	D638	psi	9,000
	Tensile Modulus	D639	psi	350,000
	Elongation @ Break, 73°F	D638	%	25
	Flexural Strength, 73°F	D790	psi	11,500
	Flexural Modulus, 73°F	D790	psi	420,000
	Compressive Strength	D695	psi	5,200
	Izod Impact Strength, 73°F	D256	ft-lbs/in	1.5
	Rockwell Hardness, 73°F	D785	M (R) Scale	M 94 (120)
	Shure Hardness	-	D Scale	-
	Wear Factor Against Steel, 40 psi, 50 fpm	D3702	$\frac{in^3}{hr} \times \frac{1}{PV}$	55×10^{-10}
		-		-
	Static Coefficient of Friction	D3702		-
	Dynamic Coefficient of Friction, 40 psi, 50 fpm	D3702		0.2
THERMAL	Heat Deflection Temperature @ 66 psi	D648	°F	336
	@264 psi	D648	°F	257
	Coefficient of Linear Thermal Expansion	D696	in/in/°F	6.8×10^{-5}
	Maximum Servicing Temperature, Intermittent	-	°F	300
	Long Term	UL746B	°F	185
	Specific Heat	-	BTU/lb-°F	0.35
	Thermal Conductivity	-	-	-
	Vicate Softening Point	-	°F	-
	Melting Point	D2133	°F	347
	Flammability	UL94		HB (1.47)
ELECTRICAL	Surface Resistivity	D257	ohm/square	-
	Volume Resistivity	D257	ohm-cm	10^{15}
	Dielectric Strength	D149	V/mil	500
	Dielectric Constant, @ 60 Hz, 73°F, 50% RH	D150		3.7
	@ 1 MHz	D150		3.7
	@ 20 GHz	D150		-
	@ 30 GHz	D150		-
	Dissipation Factor, @ 60 HZ, 73°F	D150		0.005

MATERIAL AVAILABILITY

Rods: Diameters: 4 3/4", 10' length
Length: 5" and greater diameter, 5' length

Plates: 1/4" to 2" thickness inclusive are 2' x 4', 4' x 8', 4' x 10'
2-1/4" to 4" thickness inclusive are 2' x 4'

Primary Specification (Resin) (Typical)
ASTM-D-4181 POM110B34330

Shapes Specification (Typical)
ASTM-D-6100 S-POM0111

Profiles, tubes, and special sizes are custom-produced on request.

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