Nylon 6 (Cast, Polyamide)

Tough, wear resistant, cost-efficient, and stable engineering thermoplastic than is easily machined due to the low internal stress from casting

General Information

Chemical Designation:

PA (Polyamide)

Fillers:

Unfilled

Color:

Cream (Opaque) or Black

Specific Gravity:

1.14

Nylon 6 is the casting grade of the Nylon solid polymer shapes family. Unlike Nylon 6/6 (Extrusion grade), it provides the unique opportunity to be "poured" into an open mold allowing not only standard shapes such as rod, tubing, and sheet, but custom near net shaped blanks as well. Casting shapes in this manner provides lower stress levels within the material, thereby making machining to close tolerances easier to achieve. It has been commercially available since 1948; developed by Dupont. Nylon is well known for excellent toughness, low coefficient of friction and good abrasion resistance making it an ideal replacement for a wide variety of materials from metal to rubber. Using Nylon 6 reduces lubrication requirements, eliminates galling, and corrosion. Low cost combined with improved wear resistance makes Nylon 6 an excellent choice for many bearing and wear components.

Nylon 6 is easily fabricated into precision parts using standard metalworking equipment. Tight tolerances (<+/- .002") are easily achieved with experience. It is available in a broad variety of shapes and sizes. Rod and sheet stock normally comes slightly oversized for machining purposes.

Technical Information

Specification	Test	Value	Units
Density, 73°F	D792	1.14	
Tensile Strength @ Yield, 73°F	D638	12,000	psi
Tensile Modulus of Elasticity, 73°F	D638	400,000	psi
Tensile Elongation (at break), 73°F	D638	25	%
Flexural Strength, 73°F	D790	12,500	psi
Flexural Modulus of Elasticity	D790	400,000	psi
Shear Strength, 73°F	D732		psi
Compressive Strength – Ultimate		12,000	psi
Compressive Strength at 2% Deformation	D695	8,000	psi
Compressive Strength at 10% Deformation	D695	12,000	psi
Deformation Under Load			%
Compressive Modulus of Elasticity, 73°F	D695		
Compressive Strength ⊥ to Laminate (Modulus)			psi
Compressive Strength ⊥ to Laminate (Yield)			psi
Compressive Strength ⊥ to Laminate (Ultimate)			psi
Hardness, Durometer (Shore "D" scale)	D2240		
Hardness, Rockwell (Scale as noted)	D785	115	Rockwell R
Izod Impact, Notched @ 73°F	D256 Type A	.60	ft.lbs/in. of notch
Coefficient of Friction (Dry vs Steel) Static	PTM55007	.30	
Coefficient of Friction (Dry vs Steel) Dynamic	PTM55007	.26	
Maximum Static Bearing Load (P)	PTM55007	12,000	psi
Maximum Unlubricated No Load Bearing Velocity (V)	PTM55007	20	ft/minute
Maximum Limiting PV (Unlubricated)	PTM55007	2,000	psi x ft/min.
Wear Factor "K" x 10-10	PTM55010	200 x 10^{-10}	Cubic in.-min/ft.lbs.hr
Sand Wheel Wear/Abrasion Test		80	UHMW=100
Minimum Mating Surface Hardness			Rockwell (Brinnell)
Coefficient of Linear Thermal Expansion	E-831(TMA)	4.0 x 10^{-5}	in/in/°F x 10-5
Coefficient of Thermal Expansion // to Laminates	E-831(TMA)	4.0 x 10^{-5}	in/in/°F x 10-5
Coefficient of Thermal Expansion l to Laminates	E-831(TMA)	4.0 x 10^{-5}	in/in/°F x 10-5
Heat Deflection Temperature @ 66psi	D648	370	°F
Heat Deflection Temperature 264 psi	D648	200	°F
Embrittlement Temperature			°F Min.
Continuous Service Temperature in Air		200	°F Max.
Short Term Service Temperature		300	°F Max.
Tg-Glass Transition (Amorphous)	D3418		°F
Melting Point (Crystalline Peak)	D3418	428	°F
Thermal Conductivity	F433	1.67	BTU-in/(hr/ft2°F)
Dielectric Strength Short Term	D149	500	Volts/mil
Volume Resistivity	D257	1014	ohm/cm
Surface Resistivity	D257		ohm/cm
Dielectric Constant, 106 Hz	D150	3.7	
Dissipation Factor, 106 Hz	D150		
Flammability @ 3.1mm(1/8 in.) UL94	UL94	HB	
Arc Resistance			seconds
Water Absorption, Immersion 24 Hours	D570 (2)	1.2	%
Water Absorption, Immersion Saturation	D570 (2)	6.0	%
Machinability Rating		3	1=easy, 10=difficult
Rod Diameter Availability (Off the Shelf)	1		inches
Sheet Thickness Availability (Off the Shelf)	.25		inches
Characteristics / Attributes	Excellent toughness and impact strength, easily machined, wide variety of shapes		

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