Torlon® 4203 (Polyamide-imide)

High-Performance polymer with excellent mechanical properties at extreme temperatures.. It is commonly used in structural and bearing applications.

General Information

Chemical Designation:

PAI (Polyamide-imide)

Fillers:

Unfilled

Color:

Pale Green/Brown

Specific Gravity:

1.41

Torlon® 4203 is an extruded grade of polyamide-imide. 4203 offers excellent compressive strength and the highest elongation of the Torlon grades. Several manufacturers offer bearing grade versions by the tradenames Duratron® PAI, and Tecator®. It provides electrical insulation and exceptional impact strength.

Torlon® 4203 is commonly used for electrical connectors and insulators due to its high dielectric strength. It is also an excellent choice for bearing and wear applications involving impact loading and abrasive environments. Its ability to carry high loads over a broad temperature range makes it ideal for structural components such as linkage bearings and seal rings.

Annealing is considered critical to the final performance properties of Torlon parts. Slow "post-curing" allows the water inherently in the material to be released in a controlled manner. Post-cured components have superior mechanical and temperature properties.

Technical Information

Specification	Test	Value	Units
Specific Gravity, 73°F	D792	1.41	–
Tensile Strength @ Yield, 73°F	D638	20,000	psi
Tensile Modulus of Elasticity, 73°F	D638	600,000	psi
Tensile Elongation (at break), 73°F	D638	10	%
Flexural Strength, 73°F	D790	24,000	psi
Flexural Modulus of Elasticity	D790	600,000	psi
Shear Strength, 73°F	D732	16,000	psi
Compressive Strength – Ultimate			psi
Compressive Strength at 2% Deformation	D695		psi
Compressive Strength at 10% Deformation	D695	24,000	psi
Deformation Under Load			%
Compressive Modulus of Elasticity, 73°F	D695	478,000	
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	E80 (M120)	Rockwell M
Izod Impact, Notched @ 73°F	D256 Type A	2.0	ft.lbs/in. of notch
Coefficient of Friction (Dry vs Steel) Static	PTM55007		
Coefficient of Friction (Dry vs Steel) Dynamic	PTM55007	0.35	
Maximum Static Bearing Load (P)	PTM55007		psi
Maximum Unlubricated No Load Bearing Velocity (V)	PTM55007		ft/minute
Maximum Limiting PV (Unlubricated)	PTM55007	12,000	psi x ft/min.
Wear Factor "K" x 10-10	PTM55010	35	Cubic in.-min/ft.lbs.hr
Sand Wheel Wear/Abrasion Test			UHMW=100
Minimum Mating Surface Hardness			Rockwell (Brinnell)
Coefficient of Linear Thermal Expansion	E-831(TMA)	1.7	in/in/°F x 10-5
Coefficient of Thermal Expansion // to Laminates	E-831(TMA)		in/in/°F x 10-5
Coefficient of Thermal Expansion l to Laminates	E-831(TMA)		in/in/°F x 10-5
Softening Point			°F
Heat Deflection Temperature 264 psi	D648	532	°F
Embrittlement Temperature			°F Min.
Continuous Service Temperature in Air		500	°F Max.
Short Term Service Temperature			°F Max.
Tg-Glass Transition (Amorphous)	D3418	527	°F
Melting Point (Crystalline) Peak	D3418	N/A	°F
Thermal Conductivity	F433	1.80	BTU-in/(hr/ft2°F)
Dielectric Strength Short Term	D149	580	Volts/mil
Volume Resistivity	D257		ohm/cm
Surface Resistivity	D257	>1013	ohm/cm
Dielectric Constant, 106 Hz	D150	4.2	
Dissipation Factor, 106 Hz	D150	0.026	
Flammability @ 3.1mm(1/8 in.) UL94	UL94	V-O	
Arc Resistance			seconds
Water Absorption, Immersion 24 Hours	D570 (2)	0.4	%
Water Absorption, Immersion Saturation	D570 (2)	1.7	%
Machinability Rating		5	1=easy, 10=difficult
Rod Diameter Availability (Off the Shelf)		.093-2.0	inches
Sheet Thickness Availability (Off the Shelf)		.187-1.0	inches
Characteristics / Attributes	Very high compressive and impact strength / Great insulation properties / Excellent Bearing Properties		

Thank you for your interest in our materials. All statements, technical information and recommendations presented are in good faith, based upon tests believed to be reliable and practical field experience. Poly-Tech is not responsible for its accuracy or completeness. It is our recommendation and the customer's responsibility to determine the suitability of any material for any given application.