

TORLON

Torlon® is a high performance amorphous (non-crystalline) engineering thermoplastic. Chemically, Torlon® is a polyamide-imide (PAI), a reaction product of trimellitic anhydride and aromatic diamines. It is called amide-imide because the polymer chain comprises amide linkages alternative with imide linkages. The combination of aromatic groups and imide linkages are responsible for the polymer's exceptional thermal stability. The amide groups impart flexibility and elongation, which results in an engineering plastic with exceptional toughness.

GENERAL PROPERTIES

Torlon® is the highest performing melt processable plastic. It has superior resistance to elevated temperatures. It is capable of performing under severe stress conditions at continuous temperatures to 500°F (260°C). Parts machined from Torlon® stock shapes provide greater compressive strength and higher impact resistance than most advanced engineering plastics. Its extremely low coefficient of linear thermal expansion and high creep resistance deliver excellent dimensional stability over its entire use range. Torlon® is an amorphous material with a Tg (glass transition temperature) of 537°F (280°C).

TORLON® GRADES**Torlon® 4203 (Electrical Grade)**

Torlon® 4203 extruded PAI offers excellent compressive strength and the highest elongation of the Torlon® grades. It also provides electrical insulation and exceptional impact strength. This grade is commonly used for electrical connectors and insulators due to its high dielectric strength.

Torlon® 4301 (Bearing Grade)

Torlon® 4301 extruded PAI is primarily used for wear and friction parts. It offers a very low expansion rate, low coefficient of friction and exhibits little or no slip-stick in use. Torlon® 4301's flexural modulus of 1,000,000 psi is higher than most other advanced engineering plastics. This grade excels in severe service wear applications such as non-lubricated bearings, seals, bearing cages and reciprocating compressor parts.

Torlon® 5530 (Glass-Reinforced Grade)

Torlon® 5530 is 30% glass reinforced, compression molded PAI. It is ideal for higher load structural or electronic applications. This grade is similar in composition to Torlon® 5030 PAI (injection molded). It is selected for larger shapes or when the greatest degree of dimensional control is required. Applications include burn-in sockets, gears, valve plates, impellers, rotors, terminal strips, and insulators.

TYPICAL PROPERTIES of TORLON® PAI

ASTM or UL test	Property	Torlon® 4203 Elect. Grade	Torlon® 4301 Bearing Grade	Torlon® 5530 Glass-Filled
PHYSICAL				
	Density (lb/in ³)	0.051	0.052	0.059
D792	(g/cm ³)	1.41	1.45	1.61
D570	Water Absorption, 24 hrs (%)	0.4	0.4	0.3
MECHANICAL				
D638	Tensile Strength (psi)	18,000	12,000	15,000
D638	Tensile Modulus (psi)	600,000	800,000	900,000
D638	Tensile Elongation at Break (%)	10	3	3
D790	Flexural Strength (psi)	24,000	23,000	20,000
D790	Flexural Modulus (psi)	600,000	800,000	900,000
D695	Compressive Strength (psi)	24,000	22,000	27,000
D695	Compressive Modulus (psi)	700,000	950,000	600,000
D785	Hardness, Rockwell	E80(M120)	E70(M106)	E85(M125)
D256	IZOD Notched Impact (ft-lb/in)	2	0.8	0.7
THERMAL				
D696	Coefficient of Linear Thermal Expansion (x 10 ⁻⁵ in./in./°F)	1.7	1.4	2.6
D648	Heat Deflection Temp (°F / °C) at 264 psi	532 / 278	534 / 279	520 / 271
D3418	Glass Transition Temp (°F / °C)	527 / 275	527 / 275	527 / 275
-	Max Operating Temp (°F / °C)	500 / 260	500 / 260	500 / 260
	Thermal Conductivity (BTU-in/ft ² -hr-°F)	1.8	3.7	2.5
C177	(x 10 ⁻⁴ cal/cm-sec-°C)	6.2	12.8	8.61
UL94	Flammability Rating	V-0	V-0	V-0
ELECTRICAL				
D149	Dielectric Strength (V/mil) short time, 1/8" thick	580	-	700
D150	Dielectric Constant at 1 MHz	4.2	6	6.3
D150	Dissipation Factor at 1 MHz	0.026	0.037	0.022
D257	Volume Resistivity (ohm-cm) at 50% RH	> 10 ¹⁶	> 10 ¹³	> 10 ¹³

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. TORLON is a registered trademark of Solvay Advanced Polymers.