

## EXTREME PERFORMANCE MATERIALS

			Torlon 4503	Torlon 4203	Torlon 4203L	Torlon 4501	Torlon 4301	Torlon 4301	Torlon 5530	Torlon 5030	Celazole PBI	Duratron HP	Vespel SP-1	Duratron 150		
			Compression Molded Polyamideimide	Extruded Polyamideimide	Injection Molded Polyamideimide	Compression Molded Bearing Polyamideimide	Extruded Bearing Grade Polyamideimide	Injection Molded Bearing Polyamideimide	Compression Molded 30% GF Polyamideimide	Injection Molded 30% GF Polyamideimide	Polybenzimidazole	High Purity Polyimide	Dupont Polyimide	Graphite Filled Polyimide		
			Units	ASTM Test Method												
MECHANICAL	1	Strength to Weight Ratio	ksi	-												
	2	Specific Gravity @ 73 F	-	D792	1.40	1.41	1.41	1.45	1.45	1.45	1.61	1.60	1.30	1.34	1.43	1.38
	3	Tensile Strength @ 73 F, (ult)/(yld)	psi	D638	18000 (ult)	18000 (ult)	22000 (ult)	10000 (ult)	12000 (ult)	19000	14000 (ult)	24000 (ult)	23000 (ult)	13500 (ult)	12500 (ult)	9600 (ult)
	4	Tensile Modulus of Elasticity @ 73 F	psi	D638	500000	600000	600000	440000	900000	760000	500000	1200000	850000	578000	-	650000
	5	Tensile Elongation at Break @ 73 F	%	D638	5	5	15	3	3	7	3	4	3	3	8	2
	6	Flexural Strength @ 73 F	psi	D790	24000	24000	28000	20000	31000	25000	20000	36000	32000	23000	16000	13000
	7	Flexural Modulus of Elasticity @ 73 F	psi	D790	600000	600000	700000	650000	1000000	750000	800000	1000000	950000	530000	450000	610000
	8	Shear Strength @ 73 F	psi	D732	-	16000	15000	-	16400	13000	-	24500	-	-	13000	-
	9	Compressive Strength, (% Deformation) @73 F	psi	D695	17000 (10)	28000 (10)	32000 (10)	18000 (10)	24000 (10)	24000 (10)	18000 (10)	38000 (10)	50000 (10)	19000 (10)	19300 (10)	17000 (10)
	10	Compressive Modulus of Elasticity @ 73 F	psi	D695	350000	700000	700000	350000	950000	950000	350000	600000	900000	410000	350000	390000
	11	Hardness, Rockwell, Scale as noted @73 F	-	D785	M119 (E80)	M120 (E80)	M120 (E80)	M106 (E70)	M106 (E70)	M106 (E70)	M120 (E77)	M125 (E77)	M125 (E105)	M120	(E45)	M110
	12	Hardness, Durometer, Shore D @73 F	-	D2240	D90	-	-	D90	-	-	D90	-	-	-	-	-
	13	Izod Impact, (Notched) @73 F	ft-lb/in of notch	D256 TypeA	1.5	2.0	2.5	0.5	0.8	1.1	0.7	1.3	0.5	0.6	0.8	0.5
	14	Coefficient of Friction, (Dry vs. Steel) Dynamic	-	-	0.30	0.27	0.35	0.20	0.20	0.20	0.20	0.19	0.24	0.23	0.29	0.27
	15	Limiting PV, (with 4 to 1 factor of safety applied)	psi-ft/min	-	-	17500	-	22500	22500	30000	20000	-	37500	32500	-	41500
THERMAL	16	Coefficient of Linear Thermal Expansion @73 F	in/in/F	E-831 (TMA)	1.5E-05	1.7E-05	1.7E-05	2.0E-05	1.4E-05	1.4E-05	2.5E-05	1.0E-05	1.3E-05	2.0E-05	3.0E-05	1.9E-05
	17	Heat Deflection Temperature @ 264 psi	F	D648	532	532	532	534	534	534	520	539	800 (DMA)	592	680	599
	18	Tg-Glass transition temperature, (Amorphous)	F	D3418	527	527	527	527	527	527	527	527	750 (DMA)	613	-	613
	19	Melting Point, (VS=Vicat Softening Temp.)	F	D3418	-	-	-	-	-	-	-	-	-	-	-	-
20	Continuous Service Temperature in Air, (Max.)	F	-	500	500	500	500	500	500	500	500	650	580	-	580	
21	Thermal Conductivity	BTU-in/hr-ft2-F	-	1.80	1.80	1.80	3.70	3.70	3.70	2.50	2.50	2.80	1.53	2.40	3.74	
ELECTRICAL	22	Dielectric Strength, Short Term	Volts/mil	D149	580	580	580	-	-	-	700	840	550	-	560	-
	23	Volume Resistivity	ohm-cm	D257	2.0E+17	2.0E+17	2.0E+17	8.0E+15	3.0E+15	8.0E+15	2.0E+17	2.0E+17	1.0E+14	>1E14	1E15-1E16	>1E13
	24	Dielectric Constant @ 10E6 Hz	-	D150	3.9	3.9	3.4	5.4	6.0	5.4	6.3	6.5	-	-	3.6	-
	25	Dissipation Factor @ 10E6 Hz	-	D150	0.031	0.031	0.031	0.042	0.037	0.042	0.220	0.023	-	-	0.003	-
	26	Flammability @ 3.1 mm unless noted	-	UL94	V-O	V-O	V-O	V-O	V-O	V-O	V-O	V-O	V-O	V-O	-	V-O
H <sub>2</sub> O	27	Water Absorbtion, Immersion, 24 Hrs	% by wt.	D570(7)	0.35	0.40	0.33	0.30	0.28	0.28	0.30	0.30	0.40	0.62	0.24	0.65
	28	Water Absorbtion, Saturation	% by wt.	D570(7)	1.70	1.70	1.70	1.50	1.50	1.50	1.50	1.50	-	-	1.30	-