



# THE GUND COMPANY

MANUFACTURERS & FABRICATORS OF ENGINEERED MATERIAL SOLUTIONS

## Polyimide (PI) Series

### Polymer Structure Performance

PI (Polyimide) can be a thermoset composite (NEMA G-15) or thermoplastic. PI thermoplastic is comprised of extra long chain polymers held by strong intermolecular forces instead of cross-linked. It can be unfilled thermoplastic (Kapton™ tape or Vespel® sheet) or filled to improve and optimize properties. Vespel is normally used in aerospace, semiconductors, and transportation technology. It combines heat resistance, lubricity, dimensional stability, chemical resistance, and creep resistance. It can be used in extreme heat (up to 300°C) and hostile environmental conditions.

The Gund Company custom fabricates insulation materials to the exact specifications and drawings specified by our customers. We offer our customers the proper product for their specific application. A variety of dimensions and diameter sizes are available. Product colors vary according to material type.

ASTM			TYPICAL VALUES					
PROPERTIES		Test Method	Units	Unfilled	15% Graphite	40% Graphite	10% PTFE 15% Graphite	15% Moly
PHYSICAL	Water Absorption: 24 hrs. at 73°F	ASTM D570	%	0.24	0.19	0.14	0.21	0.23
	Water Absorption: 48 hrs. at 73°F	ASTM D570	%	0.72	0.57	0.42	0.49	0.65
	Water Absorption Saturation: 50% RH at 73°F	ASTM D570	%	1 - 1.30	0.80 - 1.10	-	-	-
	Specific Gravity at 73°F	ASTM D792		1.43	1.51	1.65	1.55	1.60
	Poissons Ratio at 73°F			0.41	0.41	-	-	-
THERMAL	CLTE: From 73°F to 500°F	ASTM D696	μin/in·°F	30	27	21	30	29
	CLTE: From -80°F to +73°F	ASTM D696	μin/in·°F	25	19	-	-	-
	Thermal Conductivity at 104°F		W/m·°C	0.35	0.87	1.73	0.76	0.47
	Specific Heat		J/kg·°C	1,130	-	-	-	-
	Deformation Under 14 MPa Load (122°F)	ASTM D621	%	0.14	0.10	0.08	0.13	0.12
	Heat Deflection Temperature (2 MPa)	ASTM D648	°C	360	360	-	-	-
	Flammability: Oxygen Index	ASTM D2863	%	53	49	-	-	-
MECHANICAL	Ultimate Tensile Strength at 73°F / 500°F	ASTM D1708	KSI	12.50 / 6	9.50 / 5.50	7.50 / 3.40	6.50 / 3.50	8.5 / -
	Elongation at Break at 73°F / 500°F	ASTM D1708	%	7.50 / 6	4.50 / 3	3 / 2	3 / 3	4.0 / -
	Flexural Strength at 73°F / 500°F	ASTM D790	KSI	16 / 9	16 / 9	13 / 6.50	10 / 5	11 / 5.80
	Flexural Modulus at 73°F / 500°F	ASTM D790	KSI	450 / 250	550 / 370	700 / 400	450 / 200	475 / 270
	Compressive Stress: 1% Strain at 73°F	ASTM D695	KSI	3.60	4.20	4.60	3	5
	Compressive Stress: 10% Strain at 73°F	ASTM D695	KSI	19.3	19.30	16.3	14.80	18.50
	Compressive Stress: 0.1% Offset at 73°F	ASTM D695	KSI	7.40	6.60	6	5.40	-
	Compressive Modulus at 73°F	ASTM D695	KSI	350	420	475	300	350
	Axial Fatigue: 10 <sup>3</sup> cycles at 73°F / 500°F		KSI	8.10 / 3.80	6.70 / 3.30	-	-	-
	Axial Fatigue: 10 <sup>7</sup> cycles at 73°F / 500°F		KSI	6.10 / 2.40	4.70 / 2.40	-	-	-
	Flexural Fatigue: 10 <sup>3</sup> cycles at 73°F		KSI	9.50	9.50	-	-	-
	Flexural Fatigue: 10 <sup>7</sup> cycles at 73°F		KSI	6.50	6.50	-	-	-
	Shear Strength at 73°F	ASTM D732	KSI	13	11.20	-	-	-
	IZOD Impact Strength: Notched at 73°F	ASTM D256	J/m	42.70	42.70	-	-	21.30
	IZOD Impact Strength: Unnotched at 73°F	ASTM D256	J/m	747	320	-	-	112
	Friction Coefficient in Vacuum / Static in Air			- / 0.29	- / 0.30	- / 0.27	- / 0.20	0.03 / -
	Wear (K) Factor		m/s·10 <sup>-10</sup>	17 - 85	6.30	4.20	4.90	17 - 23
ELECTRICAL	Dielectric Constant: 10 <sup>2</sup> Hz at 73°F	ASTM D150		3.62	13.53	-	-	-
	Dielectric Constant: 10 <sup>6</sup> Hz at 73°F	ASTM D150		3.64	13.28	-	-	-
	Dielectric Constant: 10 <sup>8</sup> Hz at 73°F	ASTM D150		3.55	13.41	-	-	-
	Dissipation Factor: 10 <sup>2</sup> Hz at 73°F	ASTM D150		0.0018	0.0053	-	-	-
	Dissipation Factor: 10 <sup>4</sup> Hz at 73°F	ASTM D150		0.0036	0.0067	-	-	-
	Dissipation Factor: 10 <sup>6</sup> Hz at 73°F	ASTM D150		0.0034	0.0106	-	-	-
	Dielectric Strength Short Time: 2 mm Thick at 73°F	ASTM D149	MV/m	3.20	1.40	-	-	-
	Volume Resistivity at 73°F	ASTM D257	Ohm-m	10 <sup>14</sup> - 10 <sup>15</sup>	10 <sup>12</sup> - 10 <sup>13</sup>	-	-	-
	Surface Resistivity at 73°F	ASTM D257	Ohm	10 <sup>15</sup> - 10 <sup>16</sup>	-	-	-	-

The data supplied are typical values. They are not to be considered specification values. All of the information, suggestions, and recommendations about these properties and uses of the products herein are based on tests and data believed to be accurate; however, the final determination regarding the suitability of any material described herein for the contemplated application, the manner of such use, and whether the use infringes any patents is the sole responsibility of the user. There is no warranty - expressed or implied - including, without limitation, warranties of merchantability or fitness for a particular purpose. Under no circumstances shall we be liable for incidental or consequential loss or damage.