



THE GUND COMPANY

MANUFACTURERS & FABRICATORS OF ENGINEERED MATERIAL SOLUTIONS

PAI Series Amorphous Imidized Plastic

PAI (Polyamide-imide) is a high-performance thermoplastic and part of the imide family (containing the O=C-N-C=O group). Other members of this family are PEI (Polyetherimide) and BMI/Poly-BMI (Bismaleimide). It offers exceptionally impressive strength under load at high temperatures, maintains rigidity, and resists deformation under static load over time with its superior compressive strength and creep resistance. PAI resists wear, chemicals, and high-energy radiation. Its extraordinary performance profile makes it ideal for applications in the most severe service environments. Tecapai™ is a commercial grade of PAI.

UNFILLED PAI

- Good electrical insulation properties
- Excellent dimensional stability
- High toughness and impact strength

APPLICATIONS

- Applications where large geometries are required such as dies or thermal insulators

GLASS REINFORCED PAI

- High rigidity, retention of stiffness, a low expansion rate, and outstanding load-carrying capabilities

APPLICATIONS

- Ideal for structural applications within the semiconductor, electronics, and aerospace industries

HIGH-TEMP. REINFORCED PAI

- High stiffness, strength, and creep resistance
- Available in larger geometries
- Exhibits superior dimensional stability up to 482°F / 250°C

APPLICATIONS

- Ideal for structural applications meant to support high static loads for extended periods – especially at high temperatures
- Favored solution for precision parts in the semiconductor and electronics industry

UNFILLED AE PAI

- Most superior impact strength of all PAI grades
- Highest elongation of all grades
- Intrinsic high-temperature resistance
- Exceptional machinability

APPLICATIONS

- Used in high-tech equipment precision parts including linkages and seal rings
- Aerospace where applications involve impact loading and abrasive wear

FRICTION MODIFIED PAI

- Very low expansion rate and coefficient of friction
- Exhibits little to no slip-stick in use
- Higher wear resistance compared to Unfilled AE

APPLICATIONS

- Non-lubricated bearings, seals, bearing cages, and reciprocating compressor parts

PROPERTIES	ISO/IEC*							ASTM*							
	Test Method	Units	Unfilled	Glass Reinforced	High-Temperature Reinforced	Unfilled AE	Friction Modified AE	Test Method	Units	Unfilled	Glass Reinforced	High-Temperature Reinforced	Unfilled AE	Friction Modified AE	
PHYSICAL	Density	ISO 1183-1	g/cm ³	1.41		1.61	1.41		lb/in ³						
	Specific Gravity							ASTM D 792		1.4	1.6	1.61	1.4	1.45	
	Water Absorption: 24 hrs. in water @ 73°F	ISO 62	%	0.35		0.26	0.35	0.30	ASTM D 570	%	0.35	0.30	0.30	0.40	0.40
	Water Absorption: Saturation in water @ 73°F			4.4		3.2	4.4	3.8	ASTM D 570	%	1.7	1.5	1.5	1.7	1.5
	Wear Rate	ISO 7148-2	µm/km	5			5	1	QTM 55010	in ³ .min/ft.lbs.hr*10 ⁻¹⁰	500			35	10
	Dynamic Coefficient of Friction (-)	ISO 7148-2		0.35 - 0.6		0.35 - 0.6	0.35 - 0.6	0.25 - 0.4	QTM 55007		0.3		0.2	0.4	0.2
Limiting PV at 100 FPM		MPa.m/s						QTM 55007	ft.lbs/in ² .min	4,000		20,000	12,000	40,000	
Limiting PV at 0.1 / 1 (m/s)		MPa.m/s	0.32 / 0.2			0.32 / 0.2	1.1 / 0.69								
THERMAL	Glass Transition Temperature (DMA- Tanδ)		°C	280		280	280	280	ASTM E 831 (TMA)	°F	527	527	527	527	527
	Thermal Conductivity at 23°C (73°F)		W/m-K	0.26		0.36	0.26	0.54		BTU-in/ft ² .hr.°F	1.8	2.5	2.5	1.8	3.7
	CLTE (-40 to 150°C) (-40 to 300°F)									µin/in-°F	15	9	26	21	14
	CLTE (23 to 100°C) (73°F to 210°F)		µm/m-°K	40		35	40	35							
	CLTE (23 to 150°C) (73°F to 300°F)		µm/m-°K	40		35	40	35	ASTM D 648						
	CLTE (>150°C) (>300°F)		µm/m-°K	50		40	50	40	UL 94						
	Heat Deflection Temperature (264 PSI)	ISO 75-1/-2	°C	280		280	280	280		°F	532	530	520	532	534
	Continuous Service Temperature in Air 20 hrs.		°C	250		250	250	250		°F	500	500	500	500	500
Min. Service Temperature		°C	-20		-20	-50	-20		°F						
Flammability: UL94 (3 mm (1/8 in.))			V-0	V-0	V-0	V-0	V-0			V-0	V-0	V-0	V-0	V-0	
Flammability: Oxygen Index	ISO 4589-1/-2	%	44		50	45	45								
MECHANICAL	Ultimate Tensile Strength	ISO 527-1/-2	MPa	150		125	150	110	ASTM D 638	PSI	16,000	23,000	11,500	20,000	15,000
	Tensile Strain at Yield	ISO 527-1/-2	%	9			9		ASTM D 638	%	13.10			10.10	6.60
	Tensile Strain at Break	ISO 527-1/-2	%	20		3	20	5	ASTM D 638	%	14.40	4.00	3.00	29.20	6.80
	Tensile Modulus of Elasticity	ISO 527-1/-2	MPa	4,200		6,400	4,200	5,500	ASTM D 638	KSI	500	1,000	900	600	900
	Shear Strength			124			110	113	ASTM D 732	PSI	18,000			16,000	16,400
	Compressive Stress: 1% nominal strain	ISO 604	MPa	34		55	34	39							
	Compressive Stress: 2% nominal strain	ISO 604	MPa	67		104	67	72							
	Compressive Stress: 5% nominal strain	ISO 604	MPa	135		190	135	130							
	Compressive Strength								ASTM D 695	PSI	22,000	40,000	27,000	24,000	22,000
	Charpy Impact Strength - Unnotched	ISO 179-1/1eU	kJ/m ²	NB		30	NB	45							
	Charpy Impact Strength - Notched	ISO 179-1/1eA	kJ/m ²	15.0		3.5	15.0	4.0							
IZOD Impact Notched	ISO 180	kJ/m ²						ASTM D 256	ft-lb/in	1.50	1.00	0.70	2.00	0.80	
Flexural Strength	ISO 178	MPa	178		170	178	155	ASTM D 790	PSI	18,000	30,000	20,000	24,000	23,000	
Flexural Modulus	ISO 178	GPa						ASTM D 790	KSI	600	980	900	600	800	
Rockwell Hardness: M Scale	ISO 2039-2							ASTM D 785		119		125	120	106	
ELECTRICAL	Dielectric Strength	IEC 60243-1	kV/mm	24		28	24		ASTM D 149	V/mil	600	700	700	580	
	Volume Resistivity	IEC 62631-3-1	Ohm-cm	10 ¹³		10 ¹³	10 ¹²		ASTM D 257	Ohm-cm					
	Surface Resistivity	ANSI/ESD STM 11.11	Ohms/sq	10 ¹²		10 ¹²	10 ¹⁵	10 ¹²	ANSI/ESD STM 11.11	Ohms/sq	10 ¹²	10 ¹²	10 ¹²	10 ¹⁵	10 ¹²
	Dielectric Constant @ 1 MHz	IEC 62631-2-1		3.9		4.2	3.9	5.4	ASTM D 150		4.2		6.3	4.2	6.0
Dissipation Factor @ 1 MHz	IEC 62631-2-1		0.03		0.05	0.03	0.04	ASTM D 150		0.03		0.05	0.03	0.04	

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.

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.