DuPont High Performance Materials

High Performance Materials

Kapton® MT

thermally conductive substrate polyimide film

Description

Kapton® MT polyimide film is a homogeneous film possessing 3x the thermal conductivity and cut through strength of standard Kapton® HN. Its thermal conductivity properties make it ideal for use in controlling and managing heat in electronic assemblies such as printed circuit boards.

Kapton® MT offers an excellent combination of electrical properties, thermal conductivity and mechanical toughness for its use in electronic and automotive applications.

Kapton® MT has higher modulus than HN; this offers improved strength to the final product. As all Kapton® films, MT retains its properties for extended storage periods in original packaging at temperatures between 4–29°C (40–85°F).

Applications

Insulation pads (heat sink), heater circuits, power supplies, ceramic board replacement

Available

MT is sold in 49" maximum width rolls. It is available in 1 mil, 1.5 mil, 2 mil and 3 mil. Other thicknesses can be custom produced. It can also be slit to meet specific requirements.

Table 1
Typical Kapton® MT Properties

		MD	TD
Thermal conductivity, W/m·K		0.37	
Tensile strength, kpsi (MPa)		27 (186)	25 (172)
Modulus, kpsi (GPa)		480 (3.3)	450 (3.1)
Elongation, %		80	90
Tear strength (initial) mil (g/µm)		1.7 (30)	
Dimensional stability (400°C [752°F]), %		1	
Dielectric strength, V/mil (V/µm)			
100 MT		5,400 (212)	
300 MT		4,500 (177)	
Dielectric constant (25°C [77°F])		4.2	
Volume resistivity, ohm·sq		$>10^{14}$	
Cut through, lb		40	
Fold endurance		200,000 cycles	
		100 MT	200 MT
Permeability, cc/m²/day	O_2	443	226
	WVTR	95	85
	N_2	3	2

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Kapton®
polyimide film

Thermally Conductive MTB Film for Loudspeaker Voice Coils and Electrical Insulating Pads

Product Description

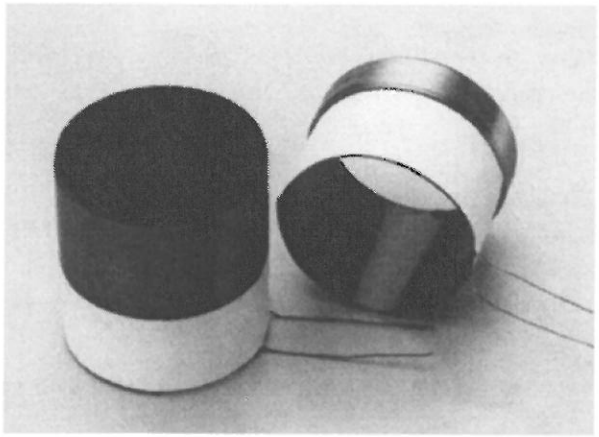
Kapton® MTB polyimide film is a black, homogeneous product with increased thermal conductivity over Kapton® HN. Three-mil and five-mil thicknesses are available. Its black color enhances its thermal radiation properties, making it ideal for applications requiring efficient thermal energy transfer, such as loudspeaker voice coils and electrical insulating pads. In addition, it has excellent adhesion properties, making it compatible with difficult adhesion applications.

The polyimide and filler materials in MTB are thoroughly combined and matrixed. Because no texturing or color coatings are required, potential contamination from processing equipment is avoided. Its uniform composition ensures consistent handling, cutting, and tooling properties from order to order.

Kapton® MTB has higher modulus than HN; its resulting stiffness offers improved strength to the finished product. It is a very durable film that is resistant to creasing, tearing, and denting. All Kapton® films retain their properties for extended storage periods.

Packaging

MTB is sold in roll form. In addition to the standard put-ups, it can be custom slit for specific requirements.



Static Electricity

Static electrical charges can accumulate during unwinding, sheeting, or handling operations. Static buildup across the surface of most thin, polymeric-based films can cause them to stick to themselves as well as to other surfaces. It may be necessary to add static elimination devices to the handling equipment.

Storage

Kapton® polyimide film will retain its original properties for several years when stored in its original packaging at temperatures between 4 and 29°C (40 and 85°F).

Disposal

Landfill disposal is currently preferred for Kapton® film.

Physical Properties of Kapton® MTB Polyimide Film vs. HN

Property	300MTB	500MTB	500HN	Test Method
Thickness	3-mil	5-mil	5-mil	—
Color	Black	Black	Amber	—
Thermal Conductivity, W/m·K	0.45	0.45	0.15	ASTM F-433-87
Modulus, kpsi	470	430	375	ASTM D-882-91
Dielectric Strength, AC V/mil (Min.)	1,800	1,600	3,200	ASTM D-149-94
Approximate Yield, ft^2/lb	36	22	27	—
Elongation, % MD and TD				ASTM D-882-91
Maximum, %	100	100	120	
Minimum, %	50	50	60	
Shrinkage, % MD and TD, Max. at 400°C (752°F)	2.0	2.0	2.0	IPC-TM-650
Moisture Absorption, %	3.0	3.0	3.0	ASTM D-570-92
Volume Resistivity, ohm·cm at 200°C (392°F) (Max.)	10^{12}	10^{12}	10^{12}	ASTM D-257-93
Dielectric Constant at 1 kHz (Max.)	5.2	5.3	3.8	ASTM D-150-94
Dissipation Factor at 1 kHz (Max.)	0.0025	0.0032	0.0035	ASTM D-150-94
Tensile Strength, psi at 23°C (73°F), MD and TD				
Maximum, psi	25,000	25,000	39,000	ASTM D-882-91
Minimum, psi	15,000	15,000	24,000	
MIT Fold Endurance, cycles	27,000	5,000	1,500	ASTM D-2176-89
Cut-Through Resistance, lb	85	105	95	DuPont #PT-0025
Initial Tear Strength, MD and TD, lb	6	10	12	ASTM D-1004-90

Packaging

Rolls of Kapton® MTB film are available in widths from 10 to 46 in and are slit to customer requirements. Slitting tolerances are $\pm 1/16$ in. Roll core sizes are 3-in and 6-in inside diameter. Labels inside the roll cores contain the lot number, DuPont order number, customer order number, material specification, and other pertinent information. Retain the labels for reference in case of inquiries.

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