

Polyimide film

Polyimide film is the recommended choice for applications that require an excellent balance of properties over a wide range of temperatures

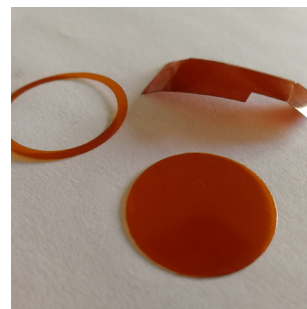
Properties

Polyimide general-purpose film has been used successfully in applications at temperatures as low as -269°C and as high as 400°C. Polyimide film can be laminated, metallized, punched, formed or adhesive coated.

Applications

Main applications of general-purpose polyimide film are mechanical parts, electronic parts, electrical insulation, pressure sensitive tapes, fiber optics cables, insulation blankets, insulation tubing, automotive diaphragms sensors and manifolds, etchings, shims.

Monolayer film



TECHNICAL DATA	UNIT	TEST METHOD				
Total thickness	µm		25	50	75	125
Physical & mechanical properties						
Density	g/cm ³	ASTM D-1505-90	1.42	1.42	1.42	1.42
Ultimate tensile strength at 23°C	MPa	ASTM D-882-91, Method A*	231	231	231	231
Ultimate tensile strength at 200°C	MPa	ASTM D-882-91, Method A*	138	138	138	138
Ultimate elongation at 23°C	%	ASTM D-882-91, Method A	72	72	78	82
Ultimate elongation at 200°C	%	ASTM D-882-91, Method A	83	83	83	83
Tensile modulus at 23°C	Gpa	ASTM D-882-91, Method A	2.76	2.76	2.76	2.76
Tensile modulus at 200°C	GPa	ASTM D-882-91, Method A	2.0	2.0	2.0	2.0
MIT folding endurance	cycles	ASTM D-2176-89	285,000	55,000	6,000	5,000
Tear strength-propagating (Elmendorf)	N	ASTM D-1922-89	0.07	0.21	0.38	0.58
Tear strength initial (Graves)	N	ASTM D-1004-90	7.2	16.3	26.3	46.9
Yield point at 3% at 23°C	MPa	ASTM D-882-91	69	69	69	69
Yield point at 3% at 200°C	MPa	ASTM D-882-91	41	41	41	41
Stress to produce 5% elongation at 23°C	MPa	ASTM D-882-92	90	90	90	90
Stress to produce 5% elongation at 200°C	MPa	ASTM D-882-92	62	62	62	62
Impact strength at 23°C	N-cm	Pneumatic impact test	78	78	78	78
Coefficient of friction, kinetic (film-to-film)		ASTM D-1894-90	0.48	0.48	0.48	0.48
Coefficient of friction, static (film-to-film)		ASTM D-1894-90	0.63	0.63	0.63	0.63
Refractive index (sodium D line)		ASTM D-542-90	1.70	1.70	1.70	1.70
Poisson's ratio		Average three samples, elongated at 5, 7, 10%	0.34	0.34	0.34	0.34
Low temperature flex life		IPC-TM-650, Method 2.6.18	pass	pass	pass	pass
Electrical						
Dielectric strength, 60Hz, 6.35 mm electrodes, 500V/sec rise	kV/mm	ASTM D-149-91	303	240	201	154
Dielectric constant, 1 kHz		ASTM D-150-92	3.4	3.4	3.5	3.5
Dissipation factor, 1 kHz		ASTM D-150-92	0.0018	0.0020	0.0020	0.0026
Volume resistivity, 1 kHz	Ω-cm	ASTM D-257-91	1.5 x 10 ¹⁷	1.5 x 10 ¹⁷	1.4 x 10 ¹⁷	1.0 x 10 ¹⁷
Thermal						
Thermal coefficient of linear expansion from -14 to 38°C	ppm/°C	ASTM D-696-91	20			
Coefficient of thermal conductivity	cal/cm-s-°C	ASTM F-433-77 (1987)	2.87 x 10 ⁴			
Specific heat	cal/g-°C	Differential calorimetry	0.261			
Solder float		IPC-TM-650, Method 2.4.13A	pass			
Smoke generation Dm, NBS smoke chamber		NFPA-258	≤1			
Shrinkage, 30 min at 150°C	%	IPC-TM-650 method 2.2.4A; ASTM D-5214-91	0.17			
Shrinkage, 120 min at 400°C	%	IPC-TM-650 method 2.2.4A; ASTM D-5214-91	1.25			
Limiting oxygen index	%	ASTM D-2863-87	37-45			
Glass transition temperature		A second order transition occurs in general-purpose polyimide film between 360°C and 410°C and is assumed to be the glass transition temperature. Different measurement techniques produce different results within the above temperature range.				

*Specimen size 25x150 mm; jaw separation 100 mm, jaw speed, 50 mm/min. Ultimate refers to the tensile strength and elongation measured at break.