



DuPont High Performance Films

Kapton® JP

polyimide film for forming

Product Description

The Kapton® JP family of polyimide films has been designed to give optimum forming characteristics. JP films have higher elongations at elevated temperatures while maintaining the combination of excellent physical, electrical, and mechanical properties inherent in Kapton® HN and HA. JP polymer properties enable drawing deeper parts at lower temperatures and shorter cycle times. After forming, parts exhibit excellent shape retention and minimum shrinkage. Property comparisons are shown in **Table 1** and **Figures 1** and **2**.

Application Examples

Parts may be formed from JP film that were previously difficult or impossible to form with Kapton® HN and HA:

- Diaphragms for automotive and heating and ventilating sensors and switches
- Speaker cones, domes, spiders, and surrounds
- Other applications including appliances, electronics, and aerospace

Available Film Thicknesses

Kapton® Grade	mil	µm
100JP	1	25
200JP	2	50
300JP	3	75
500JP	5	125

Maximum width: 48 in

Table 1
Typical Properties of Kapton® JP Polyimide Film versus Kapton® 500HA

Property	100JP	200JP	300JP	500JP	500HA	Test Method
Physical						
Ultimate Tensile Strength, kpsi at 23°C (73°F) at 200°C (392°F)	28.8 14.7	30.5 16.2	31.4 15.3	28.5 14.1	25.0 14.9	ASTM D-882
Yield Point at 3%, kpsi at 23°C (73°F) at 200°C (392°F)	10.9 5.5	10.6 5.6	11.4 4.6	10 4.2	9.5 4.8	ASTM D-882
Stress to Produce 5% Elongation, kpsi at 23°C (73°F) at 200°C (392°F)	14.7 7.2	14.4 7.3	15.1 6.9	13.9 6.3	15.0 6.8	ASTM D-882
Ultimate Elongation, % at 23°C (73°F) at 200°C (392°F)	89 142	99 148	115 155	120 170	115 126	ASTM D-882
Tensile Modulus, kpsi at 23°C (73°F) at 200°C (392°F)	412 205	410 220	405 188	370 173	400 204	ASTM D-882
Density, g/cc or g/mL	1.3973	1.4001	1.3997	1.3999	1.4170	ASTM D-1505
Yield, ft ² /lb	137.8	68.9	45.9	27.6	27	
Thermal						
Coefficient of Linear Expansion, ppm/C	41	41	41	41	47	ASTM D-696
Specific Heat, J/g·K	1.21	1.19	1.23	1.28	1.26	Diff. Calor.
Glass Transition Temperature (T _g), C	300	300	300	300	420	Diff. Calor.
Dimensional Stability, MD/TD at 400°C (752°F) at 250°C (482°F)	— 0.18/0.13	— 0.30/0.24	2.34/1.89 0.24/0.20	2.78/2.10 0.31/0.22	2.66/2.22 0.28/0.16	ASTM D-5214
Electrical						
Dielectric Strength, V/mil	6870	5500	4300	3500	3500	ASTM D-149
Dielectric Constant, 50% RH, 1 kHz at 25°C (77°F)	3.34	3.44	3.46	3.46	3.40	ASTM D-150
Dissipation Factor	0.0013	0.0011	0.0018	0.0019	0.0025	ASTM D-150
Chemical						
Moisture Absorption, % 24 hr in boiling water	1.5	1.8	1.9	2.1	3.3	ASTM D-570

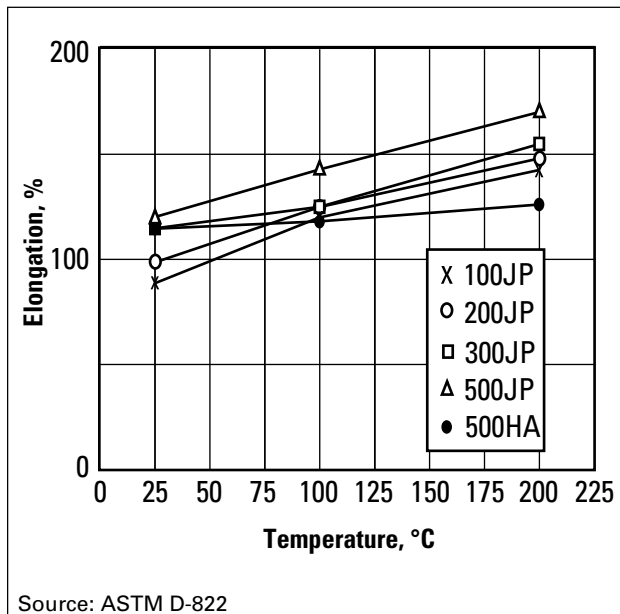
Forming Information

JP films can be thermoformed using high temperature forming technology developed by DuPont. JP films can be formed at temperatures approximately 93°C (200°F) lower than those needed to form conventional Kapton® films such as HN and HA.

Some guidelines for forming JP films include:

- forming temperature of 280–300°C (535–570°F)
- 400–500 psi pressure
- annealing of the part

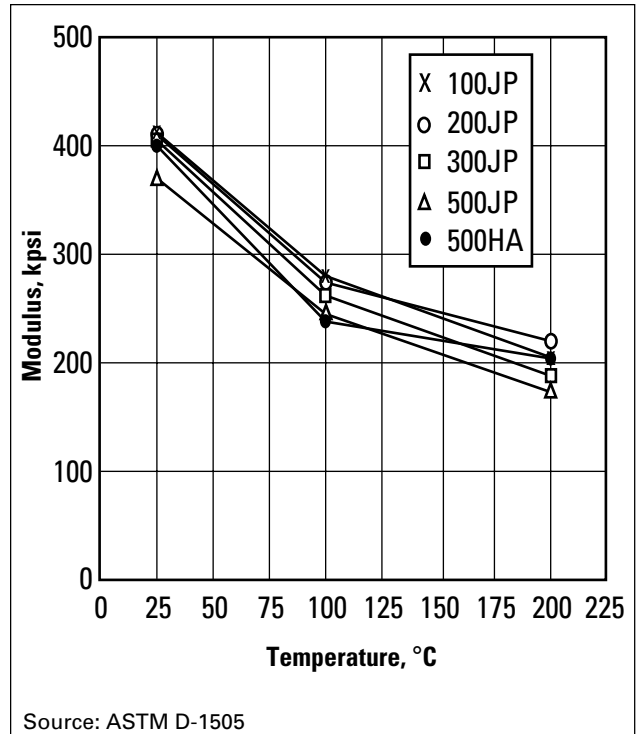
Figure 1. Elongation of Kapton® JP Films as a Function of Temperature



Parts formed using optimum forming conditions have shrinkage of <4% after 8 hr exposure to temperatures up to 260°C (500°F).

DuPont can provide additional forming information for specific applications if requested. DuPont has also established a list of experienced forming partners to provide parts to customers.

Figure 2. Modulus of Kapton® JP Films as a Function of Temperature



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