

HIGH-PERFORMANCE DSK KAPTON® TAPE

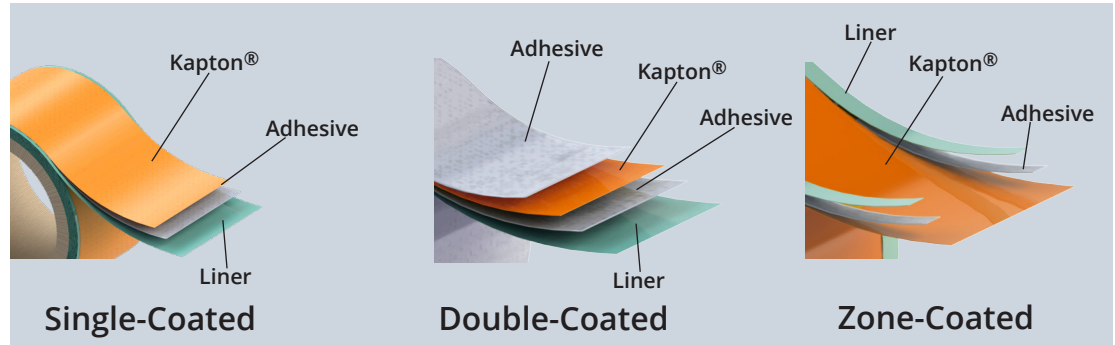
Technical Data Sheet

Fralock® DSK (Dimensionally Stabilized Kapton) tape offers robust properties for demanding applications that require resistance to thermal and physical stresses. Manufactured with DuPont™ Kapton® HPP-ST base material, DSK tape properties are similar to those of Fralock OSK tape, with additional features of low shrinkage, excellent adhesion, and superior dimensional stability. DSK tape is available with your choice of adhesives to best fit your requirements.

Applications

- Electrical insulation
- Mechanical/structural connections
- Flexible circuit bonding
- Thermal management
- Masking and protection
- Gaskets and seals

ADHESIVE CONFIGURATIONS



Film Properties (Kapton® HPP-ST)

THERMAL

Thermal Property	Typical Value	Test Condition	Test Method
Melting Point	None	None	ASTM E-794-85 (1989)
Thermal Coefficient of Linear Expansion	20 ppm/°C (11 ppm/°F)	-14 to 38°C (7 to 100°F)	ASTM D-696-91
Coefficient of Thermal Conductivity, W/m-K cal cm·sec·°C	0.12 2.87 x 10 ⁴	296 K 23°C	ASTM F-433-77 (1987)
Specific Heat, J/g K (cal/g °C)	1.09 (0.261)		Differential calorimetry
Heat Sealability	not heat sealable		
Solder Float	pass		IPC-TM-650, method 2.4.13A
Smoke Generation	D _m <1	NBS smoke chamber	NFPA-258
Glass Transition Temperature (T _g)	A second order transition occurs in Kapton® between 360°C (680°F) and 410°C (770°F) and is assumed to be the glass transition temperature. Different measurement techniques produce different results within the above temperature range.		

Properties at 23°C (73°F)

	1 mil	2 mil	3 mil	5 mil	Test Method
Flammability	94V-0				UL-94
Shrinkage (30 min at 150°C) (%)	0.03				IPC-TM-650 Method 2.2.4A
Limiting Oxygen Index (%)	37	43	46	45	ASTM D-2863-87

PHYSICAL - Measured at 23°C (73°F)

Property	1 mil	2 mil	3 mil	5 mil	Test Method
Tensile Strength - kpsi (MPa)	34 (234)				ASTM D-882-91
Elongation (%)	82				ASTM D-882-91
Tensile Modulus - kpsi (GPa)	400 (2.8)				ASTM D-882-91
Adhesion (pli) (N/mm)	10 (1.8)				IPC-TM-650 Method 2.4.9*
Density (g/cc)	1.42				ASTM D-1505-90
MIT Folding Endurance (cycles)	285,000	55,000	6,000	3,000	ASTM D-2176-89
Tear Strength-propagating (Elmendorf), N	0.07	0.21	0.38	0.58	ASTM D-1922-89
Tear Strength, initial (Graves), N	7.2	16.3	26.3	46.9	ASTM D-1004-90
	Typical Value at				
	23°C (73°F)		200°C (392°F)		
Yield Point at 3%, MPa (psi)	69 (10,000)		41 (6000)		ASTM D-882-91
Stress to produce 5% elongation, MPa (psi)	90 (13,000)		61 (9000)		ASTM D-882-91
Impact Strength - N•cm•(ft lb)	78 (0.58)				DuPont Pneumatic Impact Test
Coefficient of Friction, kinetic (film-to-film)	0.48				ASTM D-1894-90
Coefficient of Friction, static (film-to-film)	0.63				ASTM D-1894-90
Refractive Index (sodium D line)	1.70				ASTM D-542-90
Poisson's Ratio	0.34				Avg. three samples Elongated at 5%, 7%, 10%
Low Temperature Flex Life	pass				IPC-TM 650, Method 2.6.18

Thermal Coefficient of Expansion, of 1 mil TSK Thermally Exposed

Temperature Range °C (°F)	ppm/°C
30-100 (86-212)	17
100-200 (212-392)	32
200-300 (392-572)	40
300-400 (572-752)	44
30-400 (86-752)	34

ELECTRICAL

Property Film Gage	Typical Value	Test Condition	Test Method
<u>Dielectric Strength</u>	V/m kV/mm (V/mil)		
25 µm (1 mil)	303 (7700)	60 Hz	ASTM D-149-91
50 µm (2 mil)	240 (6100)	1/4 in electrodes	
75 µm (3 mil)	205 (5200)	500 v/sec rise	
125 µm (5 mil)	154 (3900)		
<u>Dielectric Constant</u>			
25 µm (1 mil)	3.4	1 kHz	ASTM D-150-92
50 µm (2 mil)	3.4		
75 µm (3 mil)	3.5		
125 µm (5 mil)	3.5		
<u>Dissipation Factor</u>	Ω		
25 µm (1 mil)	0.0018	1 kHz	ASTM D-150-92
50 µm (2 mil)	0.0020		
75 µm (3 mil)	0.0020		
125 µm (5 mil)	0.0026		
<u>Volume Resistivity</u>	•cm		
25 µm (1 mil)	1.5 x 10 ¹⁷		ASTM D-257-91
50 µm (2 mil)	1.5 x 10 ¹⁷		
75 µm (3 mil)	1.4 x 10 ¹⁷		
125 µm (5 mil)	1.0 x 10 ¹⁷		

Properties at 23°C (73°F)

	1 mil	2 mil	3 mil	5 mil	Test Method
Dielectric Strength - kV/mil (kV/mm)	7.7 (303)	6.1 (240)	5.2 (205)	3.9 (154)	ASTM D-149-91
Dielectric Constant - 1 kHz	3.4	3.4	3.5	3.5	ASTM D-150-92
Dissipation Factor at 1 kHz	0.0018	0.0020	0.0020	0.0026	ASTM D-150-92
Volume Resistivity - ohm-cm	1.5 x 10 ¹⁷	1.5 x 10 ¹⁷	1.4 x 10 ¹⁷	1.0 x 10 ¹⁷	ASTM D-257-91

Kapton® Film Certifications

Kapton® HPP-ST meets ASTM D-5213 (type 1, item A) requirements, and is manufactured according to the product specifications listed in H-38479, Bulletin GS-96-7.

Adhesives - Pressure-Sensitive

Adhesive ID #	A	B	C	D	E*	F
Temp range Min/Max	-40°F (-40°C) to 450°F (232°C)	-40°F (-40°C) to 450°F (232°C)	-40°F (-40°C) to 500 °F (260 °C)	-40°F (40°C) to 203°F (95°C)	Up to 400°F (204°C)	-100°F (-38°C) to 500°F (260°C)
Adhesive Material	Acrylic	Acrylic	Acrylic	Acrylic	Silicone	Silicone
Adhesive Thickness	2 mil	1 mil	2 mil	2 mil	4 mi	2 mil
Key Features	Exceptional shear values Low outgassing	Exceptional shear values Low outgassing	UV and solvent resistant	Anisotropically electrically conductive Good adhesion to common PCB substrates	Low surface energy Isotropically electrically conductive Performs at high temperatures	Electrically Conductive in the Z axis Excellent bond strength Chemically resistant Temperature extremes

Fralock® offers complex precision laminating, adhesive coating, and a variety of cutting services for high-performance tapes. Our application engineers are available to assist with design and production of custom products that fulfill your performance requirements.

With manufacturing in the U.S.A., Fralock® offers product design, development, prototyping, converting, manufacturing, and automated placement services with ISO 9001:2015, AS9100D and ISO 13485:2016 Registered Quality Management system. ITAR compliant.

Ordering Information

Part Numbering System: FRT1002-X.X-YY.YYY-Z-Type

Sample Part Number: FRT1002-2.0-4.5-2-B



Film Part Number	X.X = Film Thickness	YY.YYY = Width of roll	Z = Location of Adhesive	Type = Adhesive Material
FRT1002	Specify in mils	Specify in inches	0 - No Adhesive 1 - Adhesive one side only 2 - Adhesive both sides 3 - Custom (i.e. zone coating)*	A B C D E F ZZ - Other (Specify on PO)
	Thickness available: Thickness: available: 0.5, 1.0, 2.0, 3.0, and 5.0.	Width: available from 0.5" to 50". If outside of this range please contact Fralock.		

Standard length is 100 ft. roll. Custom lengths available.

*Custom zone coating: Please specify areas for coating

Warranty: User is responsible for determining whether the product is fit for a particular purpose and suitable for user's application. Limitation of Liability: Fralock® will not be liable for any loss or damage arising from the product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability. The above values are averaged values and should not be used in writing specifications.