

Dupont Vespel® SP-1 Polyimide

Unfilled

Physical Properties	Metric	English	Comments
Specific Gravity	1.43 g/cc	0.0517 lb/in ³	ASTM D792
Water Absorption	0.24 %	0.24 %	24 hrs @ 73°F.; ASTM D570
Water Absorption	0.72 %	0.72 %	48 hrs @ 122°F.; ASTM D570
Moisture Absorption at Equilibrium	1 - 1.3 %	1 - 1.3 %	50% RH
Deformation	0.14 %	0.14 %	2000 psi; 122°F.; ASTM D621
Mechanical Properties			
Hardness, Rockwell E	45 - 60	45 - 60	ASTM D785
Tensile Strength, Ultimate	86.2 MPa	12500 psi	73°F.; ASTM D1708
Tensile Strength, Ultimate at Elevated Temperature	41.4 MPa	6000 psi	500°F.; ASTM D1708
Elongation at Break	7.5 %	7.5 %	73°F.; ASTM D1708
Elongation at Break at Elevated Temperature	6 %	6 %	500°F.; ASTM D1708
Flexural Modulus	1.72 GPa	250 ksi	500°F.; ASTM D790
Flexural Modulus	3.1 GPa	450 ksi	73°F.; ASTM D790
Flexural Strength	110 MPa	16000 psi	73°F.; ASTM D790
Flexural Strength	62.1 MPa	9000 psi	500°F.; ASTM D790
Compressive Strength	133 MPa	19300 psi	@10% strain; 73°F.; ASTM D695
Compressive Strength	24.8 MPa	3600 psi	@1% strain; 73°F.; ASTM D695
Compressive Strength	51 MPa	7400 psi	@0.1% Offset; 73°F.; ASTM D695

Compressive Modulus	2.41 GPa	350 ksi	73°F; ASTM D695
Poisson's Ratio	0.41	0.41	73°F
Fatigue Strength	16.5 MPa	2400 psi	Axial Fatigue Endurance Limit; 10E+7 cycles; 500°F
Fatigue Strength	26.2 MPa	3800 psi	Axial Fatigue Endurance Limit; 10E+3 cycles; 500°F
Fatigue Strength	42.1 MPa	6100 psi	Axial Fatigue Endurance Limit; 10E+7 cycles; 73°F
Fatigue Strength	44.8 MPa	6500 psi	Flexural Fatigue Endurance Limit; 10E+7 cycles; 73°F
Fatigue Strength	55.8 MPa	8100 psi	Axial Fatigue Endurance Limit; 10E+3 cycles; 73°F
Fatigue Strength	65.5 MPa	9500 psi	Flexural Fatigue Endurance Limit; 10E+3 cycles; 73°F
Shear Strength	89.6 MPa	13000 psi	73°F; ASTM D732
Izod Impact, Unnotched	7.47 J/cm	14 ft-lb/in	73°F; ASTM D256
Coefficient of Friction	0.29	0.29	PV-25,000. Steady State; Unlubricated in air.
Coefficient of Friction, Static	0.35	0.35	In air.
Izod Impact, Notched	0.427 J/cm	0.8 ft-lb/in	73°F; ASTM D256

Electrical Properties

Volume Resistivity	1e+016 - 1e+017 ohm-cm	1e+016 - 1e+017 ohm-cm	73°F; ASTM D257
Surface Resistance	1e+015 - 1e+016 ohm	1e+015 - 1e+016 ohm	73°F; ASTM D257
Dielectric Constant	3.55	3.55	@10 ⁶ Hz; 73°F. ; ASTM

Dielectric Constant	3.62	3.62	D150 @10 ² Hz; 73°F.; ASTM D150
Dielectric Constant	3.64	3.64	@10 ⁴ Hz; 73°F.; ASTM D150
Dielectric Strength	22 kV/mm	560 V/mil	Short time; 80 mils thick; 73°F.; ASTM D149
Dissipation Factor	0.0018	0.0018	@10 ² Hz; 73°F.; ASTM D150
Dissipation Factor	0.0034	0.0034	@10 ⁶ Hz; 73°F.; ASTM D150
Dissipation Factor	0.0036	0.0036	@10 ⁴ Hz; 73°F.; ASTM D150

Thermal Properties

CTE, linear 68°F	45 μm/m-°C	25 μin/in-°F	-80-73°F; ASTM E-228
CTE, linear 68°F	54 μm/m-°C	30 μin/in-°F	73-572°F; ASTM E-228
Specific Heat Capacity	1.13 J/g-°C	0.27 BTU/lb-°F	
Thermal Conductivity	0.346 W/m-K	2.4 BTU-in/hr-ft ² -°F	104°F
Maximum Service Temperature, Air	260 °C	500 °F w/trips to 900 °F	
Deflection Temperature at 1.8 MPa (264 psi)	360 °C	680 °F	Approximate; ASTM D648
Oxygen Index	53 %	53 %	Limiting; ASTM D2863