

# DuPont™ Vespel® SCP-50094

## Polyimide Direct-Formed Parts

### Typical DF Properties

DuPont™ Vespel® SCP-50094 is a proprietary polymer. It is designed for demanding applications that require extensive toughness and chemical resistance.

*Some data presented below are based on limited production runs and are subject to revision as new knowledge and experience become available.*

Mechanical Properties	Temperature	Pressure	Test Method	Units	Typical Values
Tensile Strength	23 °C (73 °F) 260 °C (500 °F)	—	ASTM D-638 E-8 Specimen	MPa (kpsi)	88 (12.8) 45 (6.6)
Tensile Elongation	23 °C (73 °F) 260 °C (500 °F)	—	ASTM D-638 E-8 Specimen	%	2.1 4.6
Young's Modulus	23 °C (73 °F) 260 °C (500 °F)	—	ASTM D-638 E-8 Specimen	MPa (kpsi)	6490 (941) 3720 (539)
Compressive Strength	23 °C (73 °F) 260 °C (500 °F)	—	ASTM D-695	MPa (kpsi)	170 (24.7) 77 (11.2)
Compressive Strain, Ultimate	23 °C (73 °F) 260 °C (500 °F)	—	ASTM D-695	%	18 31
Compressive Stress at 10% Strain	23 °C (73 °F) 260 °C (500 °F)	—	ASTM D-695	MPa (kpsi)	168 (24.4) 64 (9.3)
Flexural Modulus	23 °C (73 °F) 260 °C (500 °F)	—	ASTM D-790	MPa (kpsi)	5170 (750) 2700 (392)
Flexural Strength	23 °C (73 °F) 260 °C (500 °F)	—	ASTM D-790	MPa (kpsi)	109 (15.8) 69 (10.0)
Poisson's Ratio	23 °C (73 °F) 190 °C (374 °F)	—	ASTM D-638	—	0.25 0.32
Rockwell "E" Hardness	23 °C (73 °F)	—	ASTM D-785	—	70.4
Specific Gravity	23 °C (73 °F)	—	ASTM D-792	—	1.44
Deformation Under Load, 10 min Permanent Deformation	23 °C (73 °F)	14 MPa (2.0 kpsi)	ASTM D-621	%	0.03 0.04
Compressive Creep, 10 hr 100 hr 1000 hr	23 °C (73 °F)	10 MPa (1.50 kpsi)	ASTM D-2990	%	0.02 0.03 0.05
Compressive Creep, 10 hr 100 hr 1000 hr	23 °C (73 °F)	14 MPa (2.5 kpsi)	ASTM D-2990	%	0.04 0.06 0.09
Water Absorption	23 °C (73 °F)	—	ASTM D-570	% weight change	0.96



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Thermal Properties	Temperature	Pressure	Test Method	Units	Typical Values	
Coefficient of Thermal Expansion Parallel Perpendicular	23–300 °C (73–572 °F)	—	ASTM E-831	m/m·°C (in/in·°F)	60.1 x 10 <sup>-6</sup> (33.4 x 10 <sup>-6</sup> ) 34.1 x 10 <sup>-6</sup> (18.9 x 10 <sup>-6</sup> )	
Thermal Conductivity	50 °C (122 °F) 100 °C (212 °F) 150 °C (302 °F) 200 °C (392 °F) 250 °C (482 °F)	—	ASTM F-433	W/mK (Btu/hr in °F)	0.39 (0.02) 0.40 (0.02) 0.41 (0.02) 0.41 (0.02) 0.41 (0.02)	
Specific Heat	60 °C (140 °F)	—	DSC	J/kg·°C (Btu/lb·°F)	8.96 x 10 <sup>-5</sup> (0.214)	
Heat Deflection Temp in Tin Bismuth, Parallel Perpendicular		1.8 MPa (0.26 psi)	ASTM D-648	°C (°F)	334 (634) 336 (637)	
Electrical Properties						
Dielectric Strength	23 °C (73 °F)	—	ASTM D-149	Volts/mil	413	
Volume Resistivity	23 °C (73 °F)	—	ASTM D-257	Ohm-cm (Ohm-in)	2.18 x 10 <sup>16</sup> (8.57 x 10 <sup>15</sup> )	
Surface Resistivity	23 °C (73 °F)	—	ASTM D-257	Ohm/sq	1.56 x 10 <sup>17</sup> (6.15 x 10 <sup>16</sup> )	
Dielectric Constant, 10 <sup>2</sup> Hz 10 <sup>4</sup> Hz 10 <sup>6</sup> Hz	23 °C (73 °F)	—	ASTM D-150		5.5 5.4 5.4	
Dissipation Factor, 10 <sup>2</sup> Hz 10 <sup>4</sup> Hz 10 <sup>6</sup> Hz	23 °C (73 °F)	—	ASTM D-150		0.002 0.005 0.002	
Wear Properties	Velocity	Pressure	Test Method	Units	Typical Values	
Coefficient of Friction, Unlubricated, Air	25K PV 100K PV 300K PV	0.7 m/s (134 fpm) 2.0 m/s (400 fpm) 3.0 m/s (585 fpm)	1.3 MPa (187 psi) 1.7 MPa (250 psi) 3.5 MPa (500 psi)	Falex	0.253 0.064 0.084	
Wear Factor, Unlubricated, Air	25K PV 100K PV 300K PV	0.7 m/s (134 fpm) 2.0 m/s (400 fpm) 3.0 m/s (585 fpm)	1.3 MPa (187 psi) 1.7 MPa (250 psi) 3.5 MPa (500 psi)	Falex	mm-sec/MPa-m-hr (in <sup>3</sup> -min/ft-lb-hr)	1.0 x 10 <sup>-3</sup> (13 x 10 <sup>-10</sup> ) 0.6 x 10 <sup>-3</sup> (8 x 10 <sup>-10</sup> ) 1.2 x 10 <sup>-3</sup> (17 x 10 <sup>-10</sup> )

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