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)	60.1×10^{-6} (33.4×10^{-6}) 34.1×10^{-6} (18.9×10^{-6})
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)	8.96×10^{-5} (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)	2.18×10^{16} (8.57×10^{15})
Surface Resistivity	23 °C (73 °F)	—	ASTM D-257	Ohm/sq	1.56×10^{17} (6.15×10^{16})
Dielectric Constant, 10^2 Hz 10^4 Hz 10^6 Hz	23 °C (73 °F)	—	ASTM D-150		5.5 5.4 5.4
Dissipation Factor, 10^2 Hz 10^4 Hz 10^6 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^3-min/ft-lb-hr)	 1.0×10^{-3} (13×10^{-10}) 0.6×10^{-3} (8×10^{-10}) 1.2×10^{-3} (17×10^{-10})

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(11/08) Reference No. VPE-A10985-00-A0711 Previous Reference No. K-21984

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