

# DuPont™ Vespel® SCP-5050

## Polyimide Direct-Formed Parts

### Typical Direct-Formed Properties

DuPont™ Vespel® SCP-5050 parts and shapes improve high temperature performance and wear resistance to allow for the replacement of metal and graphite parts. Vespel® SCP-5050 parts and shapes enable more efficient and durable systems, increased performance and reduced maintenance costs. SCP-5050 has a Coefficient of Thermal Expansion (CTE) similar to steel.

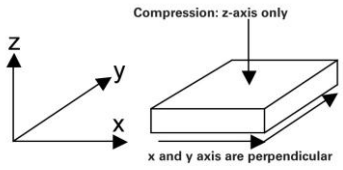
*Some data presented below are based on limited production runs and are subject to revision as new knowledge and experience become available.*

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)	79 (11.5) 41 (6.0)
Tensile Elongation	23 °C (73 °F) 260 °C (500 °F)	—	ASTM D-638 E-8 Specimen	%	2.3 3.1
Young's Modulus	23 °C (73 °F) 260 °C (500 °F)	—	ASTM D-638 E-8 Specimen	MPa (kpsi)	9590 (1390) 3860 (561)
Flexural Strength	23 °C (73 °F) 260 °C (500 °F)	—	ASTM D-790	MPa (kpsi)	120 (17) 73 (11)
Flexural Modulus	23 °C (73 °F) 260 °C (500 °F)	—	ASTM D-790	MPa (kpsi)	7820 (1130) 5270 (764)
Compressive Strength	23 °C (73 °F) 260 °C (500 °F)	—	ASTM D-695	MPa (kpsi)	154 (22) 106 (15)
Compressive Stress at 10% Strain	23 °C (73 °F) 260 °C (500 °F)	—	ASTM D-695	MPa (kpsi)	156 (23) 73 (11)
Compressive Strain, Ultimate	23 °C (73 °F) 260 °C (500 °F)	—	ASTM D-695	%	13 27
Deformation Under Load, 10 min 24 hr	23 °C (73 °F)	14 MPa (2 kpsi)	ASTM D-621	% deformation	0.00 0.04
Rockwell "E" Hardness	23 °C (73 °F)	—	ASTM D-785	—	12
Poisson's Ratio	23 °C (73 °F) 190 °C (374 °F)	—	ASTM D-638	—	0.22 0.23
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)	17 MPa (2.50 kpsi)	ASTM D-2990	%	0.05 0.07 0.09



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continued

Thermal Properties	Temperature	Pressure	Test Method	Units	Typical Values
Coefficient of Thermal Expansion parallel Z perpendicular X-Y 	23–300 °C (73–572 °F)	—	ASTM E-831	m/m·°C (in/in·°F)	$51 \times 10^{-6}$ $(29 \times 10^{-6})$ $16 \times 10^{-6}$ $(9 \times 10^{-6})$
Thermal Conductivity	50 °C (122 °F) 100 °C (212 °F) 300 °C (572 °F)	—	ASTM F-433	W/mK (Btu/hr in °F)	1.65 (0.08) 1.78 (0.09) 1.38 (0.07)
Specific Heat	60 °C (140 °F)	—	ASTM E-1269	J/kg°C (Btu/lb°F)	887 (0.212)
Electrical Properties					
Surface Resistivity Volume Resistivity Dielectric Strength	23 °C (73 °F)	—	ASTM D-257	Ohm/sq Ohm-cm (Ohm-in) Volt/m (Volt/in)	$4.1 \times 10^5$ $9.4 \times 10^7$ (3.7 x 10 <sup>7</sup> ) Conductive
Dielectric Constant, 10 <sup>2</sup> Hz 10 <sup>4</sup> Hz 10 <sup>6</sup> Hz	23 °C (73 °F)	—	ASTM D-150		21.1 20.6 19.1
Dissipation Factor, 10 <sup>2</sup> Hz 10 <sup>4</sup> Hz 10 <sup>6</sup> Hz	23 °C (73 °F)	—	ASTM D-150		0.0075 0.0112 0.0165
Wear Properties	Velocity	Pressure	Test Method	Units	Typical Values
Coefficient of Friction, Unlubricated, Air 25K PV 100K PV	0.7 m/s (134 fpm) 2.0 m/s (400 fpm)	1.3 MPa (187 psi) 1.7 MPa (250 psi)	Falex		0.20 0.08
Wear Factor, Unlubricated, Air 25K PV 100K PV	0.7 m/s (134 fpm) 2.0 m/s (400 fpm)	1.3 MPa (187 psi) 1.7 MPa (250 psi)	Falex	mm-sec/MPa-m-hr (in <sup>3</sup> -min/ft-lb-hr)	$4.0 \times 10^{-3}$ (55 x 10 <sup>-10</sup> ) $1.9 \times 10^{-3}$ (26 x 10 <sup>-10</sup> )
Specific Gravity	—	—	ASTM D-792	—	1.68
Water Absorption	—	—	ASTM D-570	% weight change	0.07

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