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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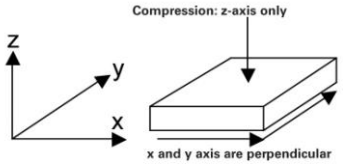
continued

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 x 10^{-6} (29 x 10^{-6}) 16 x 10^{-6} (9 x 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 x 10^{5} 9.4 x 10^{7} (3.7 x 10^{7}) Conductive
Dielectric Constant, 10^{2} Hz 10^{4} Hz 10^{6} Hz	23 °C (73 °F)	—	ASTM D-150		21.1 20.6 19.1
Dissipation Factor, 10^{2} Hz 10^{4} Hz 10^{6} 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
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	mm-sec/MPa-m-hr (in^3-min/ft-lb-hr)	4.0 x 10^{-3} (55 x 10^{-10}) 1.9 x 10^{-3} (26 x 10^{-10})
Specific Gravity	–	—	ASTM D-792	—	1.68
Water Absorption	–	—	ASTM D-570	% weight change	0.07

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