



VTEC™ PI Polyimide Parts & Shapes

Ultra purity and long life for semiconductor process, probe & test components

VTEC PI – The Ceramic Plastic™ – excels in critical semiconductor manufacturing and test applications because of its strength and amazing purity. How do we know this is true? Convincing data appears below, but VTEC performs in an even more cleanliness critical area: human medical implants. VTEC is so pure the human body does not reject it; no virus, bacteria or organism will grow on it and bone grows around it. VTEC contains zero metal and mineral extractables. Thermal Gravimetric Analysis (TGA) on VTEC at 500°C showed no recordable weight loss. No other polymer can make these claims. Could your IC process or test application use a material as pure and long-lived as VTEC polyimide?

VTEC PROPERTIES & PERFORMANCE IN SEMICONDUCTOR APPLICATIONS

PHYSICAL PROPERTIES – VTEC v VESPEL	Test Method	Unit	Vespel® SP-1	VTEC™ PI
Specific Gravity	D792	—	1.43	1.41
Hardness	D785	Durometer D	80	86
Tensile Strength	D638	kgf/cm ²	880	910
Elongation	D638	%	7	6
Compressive Stress (10% strain)	D695	kgf/cm ²	1,357	2,560
Compressive Modulus	D695	kgf/cm ²	24,130	26,000
Compressive Creep (23°C, 24 hrs. 140 kgf/cm ²)	D621	%	0.14	0.20
Flexural Strength	D790	kgf/cm ²	1,125	2,086
Flexural Modulus	D790	kgf/cm ²	31,640	31,135
Impact Strength, Izod Notched	D256	kg cm/cm	4.4	6.95
Coefficient Of Thermal Expansion	D696	in./in. °F 10 ⁻⁶	30	25
Dimensional Stability (% change, 24 hrs@ 260°C)	—	%	—	0.00
Thermal Conductivity	Cence Fitch	kcal/m. hr. °C	0.248	0.265
Dielectric Constant (23°C, 10 ⁶ Hz)	D150	—	3.55	3.20
Dielectric Constant (23°C, 10 ¹² GHz)	D150	—	—	2.90
Dissipation Factor (23°C, 10 ⁶ Hz)	D150	—	.0034	.0030
Dissipation Factor (23°C, 10 ¹² GHz)				.001
Dielectric Strength (Short Time, .002m thick)	D149	MV/m	22	21.5
Volume Resistivity	D257	ohms-m	10 ¹⁴ -10 ¹⁵	10¹⁴-10¹⁵
Surface Resistivity	D257	ohms	10 ¹⁵ -10 ¹⁶	10¹⁵-10¹⁶
Water Absorption	D570	%	1.6	<0.1
Abrasion Coefficient	Matsubara Method	cm ³ sec x 10 ⁵ kg/m/hr	—	2.46
Dynamic Friction Coefficient	—	µm	—	0.35

PERFORMANCE IN PLASMA ETCH	Vespel® SP-1	VTEC™ PI
Helium Leak	1.0 sccm	0.9 sccm
Helium Leak Rate	1.8 mm Torr	1.1 mm Torr
Particle Count	53	53
Etch Rate (U/F : uniformity)	3,071 A/min. U/F: +2.1%	3,174 A/min. U/F: +2.6%
KLA Data	Particle Count: 4	Particle Count: 2

PERFORMANCE IN CMP SLURRY	Absorption µm	Wear Volume µm	Abrasiveness µm
Polycarbonate	0.7	1936	0
Delrin®	0.8	35	33
Techtron® PPS	0	183	0
PEEK™ 450	0.2	138	0
Al ₂ O ₃ Ceramic	0.3	0.6	60
Vespel® SP-1	1.6	26	0
VTEC™ PI	<0.1	15	0

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