# VTEC™ PI Polyimide Parts & Shapes

*A superior polyimide polymer that performs like a ceramic*

- High temperature resistance
- Superior mechanical properties
- Excellent chemical resistance
- Extremely dimensionally stable
- Easy machining and tolerance control
- Outstanding electrical properties
- Non-abrasive to mating parts
- Very low outgassing
- Strength at elevated temperature
- Very low thermal expansion coefficient
- Extremely low moisture absorption – 1/16th of Vespel SP-1
- Equal thermal expansion in X, Y and Z directions
- Compliant without deforming under load and temperature
- Wear resistance, low friction, self-lubricating
- High compressive strength and creep resistance
- Zero metal and mineral extractables

## VTEC PI PHYSICAL PROPERTIES

| VTEC PI — THE CERAMIC PLASTIC™ | Test Method | Unit | VTEC™ PI |
|---|---|---|---|
| Specific Gravity | D792 | — | **1.41** |
| Hardness | D785 | Durometer D | **86** |
| Tensile Strength | D638 | psi | **12,950** |
| Elongation | D638 | % | **6.5** |
| Compressive Stress (10% strain) | D695 | psi | **36,400** |
| Compressive Modulus | D695 | psi | **369,800** |
| Compressive Creep | D621 | % | **0.20** |
| Flexural Strength | D790 | psi | **29,675** |
| Flexural Modulus | D790 | psi | **442,850** |
| Impact Strength, Izod Notched | D256 | ft lb/in | **1.26** |
| Coefficient Of Thermal Expansion | D696 | in/in °F $10^{-6}$ | **25** |
| Dimensional Stability (% change, 24 hrs@ 500°F) | — | % | **0.00** |
| Thermal Conductivity | Cence Fitch | btu in/hr $ft^2$ °F | **0.27** |
| Dielectric Constant (73°F, $10^6$ Hz) | D150 | — | **3.02** |
| Dielectric Constant (73°F, $10^{12}$ GHz) | D150 | — | **2.90** |
| Dissipation Factor (73°F, $10^6$ Hz) | D150 | — | **.003** |
| Dissipation Factor (73°F, $10^{12}$ GHz) | D150 | — | **.001** |
| Dielectric Strength (Short Time, 80 mils thick) | D149 | volts/mil | **590** |
| Volume Resistivity | D257 | ohms-m | **$10^{14}$-$10^{15}$** |
| Surface Resistivity | D257 | ohms | **$10^{15}$-$10^{16}$** |
| Water Absorption | D570 | % | **<0.1** |
| Abrasion Coefficient | Matsubara Method | $\frac{cm^3\ sec}{kg/m/hr} \times 10^5$ | **2.46** |
| Dynamic Friction Coefficient | — | µm | **0.35** |

## VTEC 'CERAMIC PLASTIC' AVAILABILITIES & CAPABILITIES

| | |
|---|---|
| **• STOCK SHAPES** | Rod, sheet, tube and custom shapes for machined parts |
| **• DIRECT FORMING** | Net and near-net blanks (higher volume applications) |
| **• MACHINING** | RBI offers complete CNC machining of finished VTEC parts and components |
| **• CUSTOM COMPOUNDS** | VTEC grades can be engineered based on individual service and application needs. Fillers include glass, carbon, graphite, Teflon, $MoS_2$, minerals, etc. |



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