

TECHNICAL DATA SHEET

Polyimide

(PI)

Polyimides are known for thermal stability, good chemical resistance, excellent mechanical properties, and characteristic orange/yellow color. They exhibit very low creep and high tensile strength. Polyimides retain their properties over an extremely wide thermal range, and can withstand temperature > 600 °F (315 °C). Polyimides are also inherently resistant to flame combustion. Typical polyimide parts are not affected by commonly used solvents and oils - including hydrocarbons, esters, ethers, and alcohols. They also resist weak acids but are not recommended for use in environments that contain alkalis or inorganic acids.

Benefits

- Good performance at elevated temperature (>600 F)
- Good chemical resistance
- Easily machined from a broad range of shapes
- High strength, tough and dimensionally stable
- Lightweight
- Excellent thermal stability
- Good electrical properties
- UL94 V-0 rated
- Good radiation resistance

Applications

- Semiconductor
- Electronics manufacturing
- Automotive
- Aerospace
- Aviation
- Fixtures
- Valve and pump seats, seals and wear surfaces

SHAPES AVAILABLE



SEE NEXT PAGE FOR ADDITIONAL INFORMATION



TYPICAL PROPERTIES of DURATRON® D PI POLYIMIDE

ASTM or UL test	Property	Duratron D7000 PI unfilled	Duratron D7015G PI 15% graphite
PHYSICAL			
D792	Density (lb/in ³) (g/cm ³)	0.050 1.37	0.052 1.45
D570	Water Absorption, 24 hrs (%)	0.7	0.5
D570	Water Absorption, Saturation (%)	3.8	3.0
MECHANICAL			
D638	Tensile Strength (psi)	17,500	11,000
D638	Tensile Modulus (psi)	540,000	650,000
D638	Tensile Elongation at Break (%)	6.0	3.0
D790	Flexural Strength (psi)	25,000	16,500
D790	Flexural Modulus (psi)	550,000	640,000
D732	Shear Strength (psi)	16,000	13,000
D695	Compressive Strength (psi)	27,000	25,000
D695	Compressive Modulus (psi)	380,000	360,000
D785	Hardness, Rockwell	R128	R126)
D256	IZOD Notched Impact (ft-lb/in)	1.0	0.8
PTM 55007	Coefficient of Friction (Dry vs. Steel) Dynamic	0.29	0.25
PTM 55007	Limiting PV (4:1 Safety Factor) (ft-lb-in ² -min)	15,000	40,000
PTM 55010	Wear Factor "k" x 10 ⁻¹⁰ (in ³ -min/ft-lb-hr)	150	10
THERMAL			
E-831	Coefficient of Linear Thermal Expansion (x 10 ⁻⁵ in./in./°F)	2.25	2.25
D648	Heat Deflection Temp (°F / °C) at 264 psi	670 / 354	690 / 366
D3418	Glass Transition Temp (°F / °C)	690 / 366	700 / 371
-	Max Operating Temp (°F / °C)	500 / 260	500 / 260
C177	Thermal Conductivity (BTU-in/ft ² -hr-°F) (x 10 ⁻⁴ cal/cm-sec-°C)	1.5 5.2	2.7 9.3
UL94	Flammability Rating	V-0	V-0
ELECTRICAL			
D149	Dielectric Strength (V/mil) short time, 1/8" thick	395	186
D150	Dielectric Constant at 1 MHz	3.2	5.42
D150	Dissipation Factor at 1 MHz	0.005	0.007
EOS/ESD S11.11	Surface Resistivity (ohms/square)	> 10 ¹³	> 10 ⁴

SEE NEXT PAGE FOR ADDITIONAL INFORMATION

NOTE: The information contained herein are typical values intended for reference and comparison purposes only. They should NOT be used as a basis for design specifications or quality control. Contact us for manufacturers' complete material property datasheets. All values at 73°F (23°C) unless otherwise noted.



TYPICAL PROPERTIES of VESPEL®						
ASTM or UL test	Property	SP-1	SP-21	SP-22	SP-211	SP-3
-	Filler Material	Unfilled	15% Graphite	40% Graphite	10% PTFE, 15% Graphite	15% Moly
PHYSICAL						
D792	Density (lb/in ³) (g/cm ³)	0.051 1.43	0.055 1.51	0.060 1.65	0.056 1.55	0.058 1.60
D570	Water Absorption, 24 hrs @ 73°F (%) 48 hrs @ 122°F (%)	0.24 0.72	0.19 0.57	0.14 0.42	0.21 0.49	0.23 0.65
MECHANICAL						
D638	Tensile Strength, Ultimate @ 73°F (psi) @ 500°F (psi)	12,500 6,000	9,500 5,500	7,500 3,400	6,500 3,500	8,200 -
D638	Tensile Modulus (psi)	-	-	-	-	-
D638	Tensile Elongation, Ultimate @ 73°F (%) @ 500°F (%)	7.5 6.0	4.5 6.0	3.0 2.0	3.5 3.0	4.0 -
D790	Flexural Strength, Ultimate @ 73°F (psi) @ 500°F (psi)	16,000 9,000	16,000 9,000	13,000 6,500	10,000 5,000	11,000 5,500
D790	Flexural Modulus @ 73°F (psi) @ 500°F (psi)	450,000 250,000	550,000 370,000	700,000 400,000	450,000 200,000	475,000 270,000
D695	Compressive Strength, 10% strain @ 73°F (psi)	19,300	19,300	16,300	14,800	18,500
D695	Compressive Modulus (psi)	350,000	420,000	475,000	300,000	350,000
D785	Hardness, Rockwell	E45-60	E25-45	E5-25	E1-20	E40-55
D256	IZOD Notched Impact (ft-lb/in)	0.8	0.8	-	-	0.4
	Poisson's Ratio	0.4	0.4	-	-	-
THERMAL						
D696	Coefficient of Linear Thermal Expansion (x 10 ⁻⁵ in./in./°F)	3.0	2.7	2.1	3.0	2.9
D648	Heat Deflection Temp (°F / °C) at 264 psi	680 / 360	680 / 360	-	-	-
-	Max Continuous Operating Temp (°F / °C)	500 / 260	500 / 260	500 / 260	500 / 260	500 / 260
C177	Thermal Conductivity (BTU-in/ft ² -hr-°F) (x 10 ⁻⁴ cal/cm-sec-°C)	2.0 6.9	6.0 20.7	12.0 41.3	5.3 18.3	3.2 11.0
UL94	Flammability Rating	V-0	V-0	V-0	V-0	V-0
ELECTRICAL						
D149	Dielectric Strength (V/mil) short time, 1/8" thick	560	250	-	-	-
D150	Dielectric Constant at 1 MHz	3.55	13.2	-	-	-
D150	Dissipation Factor at 1 MHz	0.0034	0.0106	-	-	-
D257	Volume Resistivity (ohm-cm) at 50% RH	10 ¹⁴ - 10 ¹⁵	10 ¹² - 10 ¹³	-	-	-

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