

PI (Polyimide) Material Properties Data Sheet

Comprehensive Technical Data for PI High-Performance Polymer

Introduction

This technical data sheet provides comprehensive physical, mechanical, thermal, and electrical properties of PI (Polyimide). PI is a high-performance polymer known for its exceptional thermal stability, chemical resistance, and excellent mechanical properties at elevated temperatures. It is widely used in aerospace, electronics, automotive, and industrial applications where extreme performance is required.

Material Properties

Property	Typical Value
Density (g/cm ³)	1.40-1.50
Glass Transition Temperature (°C)	250-350
Thermal Decomposition Temperature (°C)	>500
Operating Temperature Range (°C)	-269 to +260 (continuous)
Tensile Strength (MPa)	100-200
Tensile Modulus (GPa)	2.0-4.0
Elongation at Break (%)	5-50
Flexural Strength (MPa)	150-250
Flexural Modulus (GPa)	3.0-5.0
Coefficient of Friction	0.2-0.4
Dielectric Constant (@1MHz)	3.0-4.0
Dielectric Strength (kV/mm)	20-30
Volume Resistivity (Ω·cm)	>10 ¹⁶
Linear Coefficient of Thermal Expansion (10 ⁻⁵ /°C)	2.0-8.0
Thermal Conductivity (W/m·K)	0.15-0.30
Water Absorption (%)	0.2-0.5 (24 hrs)
Flammability Rating	UL94 V-0

Key Characteristics

- Exceptional thermal stability and high glass transition temperature
- Excellent chemical resistance to organic solvents and oils
- Outstanding mechanical properties at elevated temperatures
- Low outgassing properties for space applications
- Excellent dielectric and electrical insulation properties
- Good radiation resistance
- Self-extinguishing flame resistance
- Dimensional stability under thermal cycling
- Available in various forms: films, laminates, moldings

Typical Applications

- Aerospace components and thermal protection systems
- Flexible printed circuits and electronic substrates
- High-temperature electrical insulation
- Automotive engine components and sensors
- Semiconductor processing equipment
- Medical devices and implants
- Industrial filtration and separation membranes
- Nuclear and radiation shielding applications

(内容由 AI 生成, 仅供参考)