Pyrogenics Group
A MiNTEQ DIVISION

TECHNICAL DATA

Pyroid® HT Pyrolytic Graphite

Introduction

Pyroid® HT is an advanced pyrolytic graphite material engineered for high-performance thermal management applications. Manufactured through our unique chemical vapor deposition (CVD) process, followed by thermal annealing, Pyroid® HT achieves exceptional thermal conductivity, making it ideal for demanding aerospace, electronics, and industrial applications.

Key Features & Benefits

- **Exceptional thermal conductivity**: Provides about 1500 W/m·K in-plane conductivity, significantly outperforming conventional materials like copper and aluminum.
- **High purity & structural integrity**: Composed of 99.999% pure carbon with a uniform, single-crystal structure, ensuring minimal impurities and high reliability.
- **Temperature stability**: Withstands extreme temperatures from cryogenic levels up to 2000°C, making it suitable for high-temperature applications.
- **Anisotropic properties**: Exhibits high in-plane thermal conductivity and lower through-plane conductivity, allowing precise thermal management in electronic and industrial applications.
- **Zero porosity & non-outgassing**: Ensures high reliability in vacuum environments and sensitive applications.
- **Machinability & customization**: Available in sizes as thin as 0.20 mm and up to 300 mm x 300 mm. Made to customer drawings and specifications.
- **Lightweight & high-strength**: Offers an excellent strength-to-weight ratio with a density of 2.25 g/cc, significantly lighter than copper (8.96 g/cc), while providing superior performance.
- **Surface coating capability**: Supports electronic-grade metallization coatings, allowing seamless integration into soldering and bonding processes.

Material Comparison

Material	Thermal Conductivity (W/m·K)	Density (g/cc)
Pyroid® HT	**1500**	**2.25**
Substrate Nucleated Pyrolytic Graphite	440	2.25
CVD Diamond	1000-2200	3.50
Copper	400	8.96
Aluminum	220	2.70

For more information, contact:

Kevin Schaefer
Kevin.schaefer@mineralstech.com
484-560-8753

MiNTEQ
A MINERALS TECHNOLOGIES COMPANY

Physical Properties

Property	Direction*	Metric Units	English Units
Density	---	2.26 g/cc	136 lb/ft^3
Yield Strength	XY	38 MPa	5,500 psi
	Z	2.4 MPa	348 psi
Ultimate Tensile Strength	XY	80 MPa	11,600 psi
	Z	3 MPa	435 psi
Flexural Modulus	XY	27 GPa	3.9x10^6 psi
	Z	1.3 GPa	188,500 psi
Young's Modulus	XY	50 GPa	7.25x10^6 psi
	Z	3 GPa	435,000 psi
Shear Modulus	XY	11 MPa	1,600 psi
	Z	7 MPa	1,000 psi
Poisson's Ratio	XY	-0.18	-
	Z	0.20	-
Coefficient Thermal Expansion			
Room Temperature	XY	-4.39 x 10^{-7} cm/cm·°C	-2.44 x10^{-7} in/in·°F
2000°C	XY	7.48 x10^{-7} cm/cm·°C	4.26 x10^{-7} in/in·°F
Room Temperature	Z	26.4x10^{-6} cm/cm·°C	14.9 x10^{-6} in/in·°F
2000°C	Z	29.8x10^{-6} cm/cm·°C	16.9x10^{-6} in/in·°F
Thermal Conductivity			
Room Temperature	XY	1500 W/m·K	866 BTU/(hr·ft·°F)
1650°C	XY	430 W/m·K	249 BTU/(hr·ft·°F)
Room Temperature	Z	7 W/m·K	4.0 BTU/(hr·ft·°F)
1650°C	Z	5.3 W/m·K	3.0 BTU/(hr·ft·°F)
Electric Resistivity			
Room Temperature	XY	693 µΩ·cm	
1650°C	XY	277 µΩ·cm	
Room Temperature	Z	0.6 Ω·cm	
1650°C	Z	0.22 Ω·cm	
Oxidation Threshold		650°C	1200°F
Permeability		Helium Leak Tight at 10^{-6} mmHg	

*XY: Along basal planes (across surface)
Z: Through basal planes (through thickness)