

Momentive Performance Materials HBR Hot-Pressed Boron Nitride

Category : Ceramic , Nitride

Material Notes:

Hot-pressed BN is compacted at temperatures up to 2000°C and pressures up to 2000 psi to form a dense, strong engineering material that is easily machined. It is available in standard and custom hot-pressed shapes and has several unique characteristics and physical properties which make it valuable for solving tough problems in a wide range of industrial applications. Four Material Grades HBC and HBT are the highest purity hot-pressed boron nitrides commercially available. They are diffusion bonded and feature a low dielectric constant, minimal moisture pick-up, and low loss tangent which makes them ideal for electronic applications. Grade HBT, although lower in strength and density than HBC, is available in larger sizes, at lower cost, and usually with a shorter delivery schedule. Grade HBN uses small amounts of boric oxide as a binder and should be used in applications where hydration and thermal shock are not a concern. Grade HBR uses calcium borate as a binder and is less sensitive to moisture. Thermal Management The unique combination of being both an excellent electrical insulator and thermal conductor makes BN very useful as a heat sink in high power electronic applications. Its properties compare favorably with beryllium oxide, aluminum oxide and other electronic packaging materials, yet is easier to form and finish. High Temperature Applications Temperature stability and excellent resistance to thermal shock makes BN the material of choice in the toughest high temperature applications such as equipment for plasma arc welding, diffusion source wafers, and semiconductor crystal growth equipment & processing. Molten Metal Handling BN is inorganic, inert, nonreactive with halide salts and reagents, and is not wet by most molten metals and slags. These characteristics, combined with low thermal expansion, make useful in various molten metal processes. Information provided by Momentive Performance Materials, formerly GE Advanced Ceramics.

Order this product through the following link:

http://www.lookpolymers.com/polymer_Momentive-Performance-Materials-HBR-Hot-Pressed-Boron-Nitride.php

Physical Properties	Metric	English	Comments
Density	2.00 g/cc	0.0723 lb/in ³	typical
Binder Melting Point	1150 °C	2100 °F	
Moisture Absorption at Equilibrium	1.0 %	1.0 %	400 hours, 100% RH
Open Porosity	11 %	11 %	

Mechanical Properties	Metric	English	Comments
Hardness, Knoop	26	26	100 g
Modulus of Elasticity	48.2 GPa	6990 ksi	Perpendicular to pressing direction
	62.0 GPa	8990 ksi	Parallel to pressing direction
Flexural Strength	41.3 MPa	5990 psi	Perpendicular to pressing direction
	51.7 MPa	7500 psi	Parallel to pressing direction
Compressive Strength	62.0 MPa	8990 psi	Perpendicular to pressing direction

Mechanical Properties	68.9 MPa Metric	9990 psi English	Parallel to pressing direction Comments
Thermal Properties	Metric	English	Comments
CTE, linear	4.00 $\mu\text{m}/\text{m}\cdot\text{Å}^\circ\text{C}$ @Temperature 25.0 - 1500 $\text{Å}^\circ\text{C}$	2.22 $\mu\text{in}/\text{in}\cdot\text{Å}^\circ\text{F}$ @Temperature 77.0 - 2730 $\text{Å}^\circ\text{F}$	Parallel to pressing direction
CTE, linear, Transverse to Flow	3.00 $\mu\text{m}/\text{m}\cdot\text{Å}^\circ\text{C}$ @Temperature 25.0 - 1500 $\text{Å}^\circ\text{C}$	1.67 $\mu\text{in}/\text{in}\cdot\text{Å}^\circ\text{F}$ @Temperature 77.0 - 2730 $\text{Å}^\circ\text{F}$	Perpendicular to pressing direction
Specific Heat Capacity	0.808 J/g- $\text{Å}^\circ\text{C}$	0.193 BTU/lb- $\text{Å}^\circ\text{F}$	
	1.846 J/g- $\text{Å}^\circ\text{C}$ @Temperature 700 $\text{Å}^\circ\text{C}$	0.4412 BTU/lb- $\text{Å}^\circ\text{F}$ @Temperature 1290 $\text{Å}^\circ\text{F}$	
Thermal Conductivity	33.0 W/m-K	229 BTU-in/hr-ft $\text{Å}^2\cdot\text{Å}^\circ\text{F}$	Perpendicular to pressing direction
	55.0 W/m-K	382 BTU-in/hr-ft $\text{Å}^2\cdot\text{Å}^\circ\text{F}$	Parallel to pressing direction
Maximum Service Temperature, Air	850 $\text{Å}^\circ\text{C}$	1560 $\text{Å}^\circ\text{F}$	oxidizing atmosphere
Maximum Service Temperature, Inert	1150 - 1600 $\text{Å}^\circ\text{C}$	2100 - 2910 $\text{Å}^\circ\text{F}$	Inert/Vacuum

Electrical Properties	Metric	English	Comments
Electrical Resistivity	$\geq 1.00\text{e}+15$ ohm-cm	$\geq 1.00\text{e}+15$ ohm-cm	
Dielectric Constant	4.1 @Frequency 1e+6 Hz	4.1 @Frequency 1e+6 Hz	
Dielectric Strength	53.0 kV/mm	1350 kV/in	
Dissipation Factor	≤ 0.00020 @Frequency 1e+6 Hz	≤ 0.00020 @Frequency 1e+6 Hz	

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