Boron Nitride (BN) Grade AX05

Boron Nitride is an advanced synthetic ceramic material available in powder, solid, liquid and aerosol spray forms. Its unique properties - from high heat capacity and outstanding thermal conductivity to easy machinability and superior dielectric strength - make boron nitride a truly outstanding material.

Solid Boron Nitride Grade AX05 is one of the highest purity hexagonal boron nitride solids available and a wise choice for applications where corrosion resistance is more important than wear resistance. It is a diffusion bonded ceramic and does not depend on B_2O_3 to other binders for mechanical integrity and, consequently, it is non-wet by almost all molten metals. This ultra-purity advantage allows for applications and uses not provided by other hot pressed boron nitride solids, such as crucibles for high-purity molten metals. Commonly used in applications that demand very high thermal conductivity such as nozzles with small orifices.

Typical Properties	
Binder	None
Binder Melting Point	None
Maximum Use Temperature	
Oxidizing:	850°C
Inert:	>2000°C
Specific Heat (J/g°C):	0.35
Dielectric Strength:	1000V
Pressing Direction (Para Perp)	
Resistivity Ohm-cm RT:	$>10^{14}$ ($>10^{15}$)
Loss Tangent @ 8.8 GHz:	.0012 (.0003)
Dielectric Constant @ RT	4.0 (4.0)
Thermal Conductivity	
(W/m/L) @ 25°C:	78 (130)
Thermal Expansion Coeffiecient	
(RT to 1500°C) (in/in/°C x 10^{-6})	
Flexural Strength (psi)*	
@25°C:	2600 (3100)
@1500°C:	6200 (11000)
Density (g/cc minimum):	1.85
% Open Porosity	12.57%
Oxygen - max:	1%
Carbon - max:	0.02%
Calcium - max:	0.04%
Other Impurities - max:	0.05%

**Based on 4pt bend test-Sample size = 51mm x 4mm x 3mm*

The values presented are mean and typical of those resulted from test samples. They are provided as an indication only to serve as guidance in the design of ceramic components and are not guaranteed in any way. The actual values can vary according to the shape and size of the envisaged component.

www.precision-ceramics.co.uk
Advanced Technical Ceramic Solutions

PRECISION CERAMICS
86 Lower Tower Street, Birmingham B19 3PA, England
Tel: +44 (0) 121 687 5858 Fax: +44 (0) 121 687 5857
Email: info@precision-ceramics.co.uk
www.precision-ceramics.co.uk

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Key Properties

- Extremely inert and non-wet by many molten materials such as metals, glasses, halide salts and other reagents. The chemical stability allows Grade AX05 to provide a stable, non-reactive material for nozzles, feed- throughs, crucibles and supports.
- Minimal thermal expansion, high thermal conductivity and use temperature in certain inert atmospheres over 2000°C. Thermal shock stability is excellent over a wide range of use temperatures.
- Yields increasing relative strength vs. temperature. This important feature provides higher temperature performance to applications previously unattainable with B2O3 to other bonded boron nitrides.
- Transparent to microwave energy. It also provides high resistivity and dielectric strength with a low loss tangent and dielectric constant. These characteristics make AX05 an excellent material for high power, low loss insulators, containers and fixtures.
- Can be machined to extremely close tolerances using standard high speed 'tool steel' equipment. Machining by grinding may be used if preferred or stringent tolerances are required. Threads can be machined using taps and dies. Cutting oils and coolants should not be used for any reason.

Applications

- High temperature electrical insulators and vacuum furnace supports which require electrical resistivity, high temperature strength, thermal shock resistance and low chemical reactivity.
- Crucibles and containers for high purity molten metals Insulators and source fixtures for ion implantation systems which require high temperature purity and electrical insulation.
- Setterplates for the processing of other advanced materials which require stable, inert surfaces.
- Nozzles for powdered metal spraying.

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