# Boron Nitride Grade M & M26

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 M is a truly hydrophobic advanced ceramic. Composed of boron nitride and silica, it is completely resistant to moisture and has a MIL-I-10A grade of L542, a test requiring immersion in water for 48 hours prior to testing at elevated frequencies. Grade M is suitable for the most severe electrical applications. It is an excellent refractory material at temperatures up to 1400°C, and is unparalleled in resistance to thermal shock.

## Applications

- High temperature electrical insulators and vacuum furnace supports which require electrical resistivity, high temperature strength, thermal shock resistance and low chemical resistivity
- Crucibles and containers for high purity molten metals
- Tools and refractories for glass forming which provide non-wetting, non-B2O3 containing contacts
- Radar components and antenna windows which require exacting electrical and thermal properties

**Typical Properties**

| Typical Chemical Analysis | Grade M | Grade M26 |
|---|---|---|
| Boron[1] | 18-20.25% | 26.5-28.7% |
| Nitrogen[1] | 22.5-25.5% | 32.8-35% |
| Oxygen[1] | - | - |
| Calcium[1] | .01%[3] | .01%[3] |
| Silica ($SiO_2$)[1] | 60% | 40%[1] |
| Other Inorganic[1] | .02% | .05% |
| Trace Metals | .05% | .05% |
| TOTAL | 100% | 100% |
| $B_2O_3$* | .2% | .2% |

**B203 is given for clarification and is not part of the elemental analysis*
*1 Wet Chemistry - 2 LECO Oxygen - 3 Optical Emission Spectroscopy*

**Typical Physical Properties**

| Typical Physical Properties | Grade M | | Grade M26 | |
|---|---|---|---|---|
| Percent BN: | 40 | | 60 | |
| Percent SiO2: | 60 | | 40 | |
| | Parallel | Perpendicular | Parallel | Perpendicular |
| Volume Resistivity (ohm-cm) @RT: | $1.7x10^{15}$ | $5.1x10^{15}$ | $6.4x10^{14}$ | $2.9x10^{15}$ |
| @150°C: | $2.4x10^{13}$ | $3.3x10^{13}$ | $2.4x10^{13}$ | $8.5x10^{13}$ |
| Dielectric Constant (@ IMHz) @RT: | 4.21 | 3.87 | 4.48 | 3.89 |
| microwave frequency: @ RT, 8.8 GHz: | 3.86 | 4.08 | 3.89 | 4.28 |
| Dielectric Strength: volts/mil & (volts/mm) | | | | |
| Sample thickness: 10 mil | 1670 (65748) | | 1690 (66535) | |
| Tested up to 25kV) 25 mil | >1000 (>39370) | | >1000 (>39370) | |
| Dissipation Factor (Loss tangent) | | | | |
| @RT @ 1MHz | .0016 | .0035 | .0017 | .0061 |
| @150°C @ 1MHz | .0017 | .0055 | .0094 | .0062 |
| @RT @ 8.8GHz | .0011 | .0005 | .0039 | .0006 |
| Loss Factor | | | | |
| @RT @ 1MHz | .0067 | .0140 | .0076 | .0230 |
| @150°C @ 1MHz | .0077 | .0230 | .0440 | .0250 |
| @RT @ 8.8GHz | .0042 | .0020 | .0150 | .0260 |
| Surface Resistivity (ohms/) @ RT | $8.5 \times 10^{16}$ | | $4.2 \times 10^{16}$ | |
| @ 150°C | $1.4 \times 10^{15}$ | | $1.5 \times 10^{15}$ | |

*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