Kennametal specializes in the highly flexible production process that yields powders to meet a customer's required specifications!

Kennametal has the expertise in the field of non-oxide ceramic powders and shapes.

Our Center of Competence (CoC) for powders is in Newport, United Kingdom, and has more than 25 years of experience.

Non-Oxide Powders — Black and White

Manufacturing Process of Ceramic Powders

Major raw materials used:

- Boron Nitride (BN)
  - Boric Acid — Melamine
  - Boric Acid — Ammonia

- Titanium Diboride (TiB₂)
  - Titanium Oxide — Boric Oxide
  - Titanium Oxide — Boron Carbide

- Boron Carbide (B₄C)
  - Boric Acid — Carbon

Raw materials are mixed to produce uniform blends, which are reacted at temperatures up to 2200 °C under controlled atmosphere. After milling and final inspection of chemical and physical properties, the powders are packed for shipment.

Kennametal UK has achieved the international quality standard ISO 9001:2008.

We use the knowledge gained by manufacturing powders for our own use — and also work closely with our global customers — to produce optimum powders for a specific application.
Boron Nitride — The White Graphite

Characteristics
• High electrical resistivity.
• Good thermal conductivity.
• High temperature stability.
• Oxidation-resistant:
  — Up to 850 °C in air.
  — Up to 1400 °C under vacuum.
  — Up to 2200 °C under inert atmosphere.
• High chemical inertness.
• Corrosion resistant against many molten metals.
• Excellent lubricant.
• Non-toxic.

Applications
• Electrical insulator.
• Release agent.
• High-temperature lubricant.
• Hexagonal BN used to manufacture CBN.
• Additive in cosmetics.
• Filler for silicone and resins to improve thermal conductivity.

Titanium Diboride (TiB₂) — Hard and Conductive

Characteristics
• High electrical conductivity.
• High chemical inertness.
• Excellent hardness.
• Corrosion resistant against many molten metals.
• Non-toxic.

Applications
• Hot pressing powder.
• Additive in refractories.
• Major component in intermetallic composites.
• Basic material for armor plates.
• High-performance brake pads.

Sprays and Paints

Applications
• Release agent for the metal and metallizing industry.
• Protective layer for variable applications and for the sintering industry.
• Coating for lower friction and higher chemical inertness.
• Dry lubricant, also in vacuum.

<table>
<thead>
<tr>
<th>Short name</th>
<th>Crystal Structure</th>
<th>Typical Chemical Properties</th>
<th>Typical Physical Properties</th>
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<tbody>
<tr>
<td>Crystal Size μm</td>
<td>O%</td>
<td>C%</td>
<td>B%</td>
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<tr>
<td>M120</td>
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<tr>
<td>P100</td>
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<tr>
<td>D500</td>
<td>Hexagonal</td>
<td>10</td>
<td>&lt;1.5</td>
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</table>

NOTE: All powders are customizable per individual specifications.
Boron Carbide (B₄C) — Our Hardest Material

Characteristics
• Hardest material other than diamonds.
• Low specific weight.
• High neutron absorption.
• High temperature stability.

Applications
• Abrasive.
• Shotblast nozzles.
• Lightweight personal armor.
• Lapping.

Typical Chemical Properties

<table>
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<tr>
<th>grade</th>
<th>N (typical)</th>
<th>B₂O₃ (SOL)</th>
<th>C</th>
<th>B</th>
<th>O</th>
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<tbody>
<tr>
<td>BM B₄C</td>
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<td>20.91</td>
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Our standard production program conforms to FEPA:

<table>
<thead>
<tr>
<th>grit designation</th>
<th>median grain size in μm ds50-value</th>
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<tbody>
<tr>
<td>F230</td>
<td>53.0 ± 3.0</td>
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<tr>
<td>F240</td>
<td>44.5 ± 2.0</td>
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<tr>
<td>F280</td>
<td>36.5 ± 1.5</td>
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<td>F320</td>
<td>29.2 ± 1.5</td>
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<td>F380</td>
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<td>F460</td>
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<tr>
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<td>F1000</td>
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<tr>
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<tr>
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<tr>
<td>F2000</td>
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