

SILICON NITRIDE POWDER (Si₃N₄)

Silicon Nitride is typically used in high stressed components and lightweight applications due to its high strength and fracture toughness properties. It has the best combination of mechanical, thermal, and electrical properties of any advanced technical ceramic material. The material also possesses good electric conductivity and outstanding wear resistance.



TYPICAL APPLICATIONS

| | |
|--------------------------|--------------------|
| Highly Stressed Parts | Bearing Components |
| Lightweight Applications | Mold Release Agent |
| Ceramic Cutting Tools | Metallurgy |

TYPICAL PROPERTIES

| |
|------------------------------|
| High Strength |
| High Density |
| Wear Resistance |
| High Electrical Conductivity |



SILICON NITRIDE POWDER TECHNICAL DATA

| PROPERTIES | UNITS | TEST | VALUE |
|---------------------------------------------------------|----------------------------------|-------------------|--------------------------------|
| Physical | | | |
| Chemical Formula | - | - | Si ₃ N ₄ |
| Density, ρ | g/cm ³ | ASTM C20 | 3.31 |
| Color | - | - | dark gray |
| Crystal Structure | - | - | hexagonal (alpha&beta) |
| Water Absorption | % @R.T. | ASTM C373 | 0.0 |
| Hardness | Mohs | - | 9 |
| Hardness | knoop (kg/mm ²) | Knoop 100g | 2200 |
| Mechanical | | | |
| Compressive Strength | MPa @ R.T. | ASTM C773 | 689-2760 |
| Tensile Strength | MPa @ R.T. | ACMA Test #4 | 360-434 |
| Modulus of Elasticity (Young's Modulus) | GPa | ASTM C848 | 317 |
| Flexural Strength (MOR) | MPa @ R.T. | ASTM F417 | 679-896 |
| Poisson's Ratio, ν | | ASTM C818 | 0.23 |
| Fracture Toughness, K _{IC} | MPa x m ^{1/2} | Notched Beam Test | 5.0-8.0 |
| Thermal | | | |
| Max. Use Temperature (* denotes inert atm.) | °C | No load cond. | 1500 |
| Thermal Shock Resistance | ΔT (°C) | Quenching | 750 |
| Thermal Conductivity | W/m-K @ R.T. | ASTM C408 | 27 |
| Coefficient of Linear Thermal Expansion, α _l | μm/m-°C (~-25°C through ±1000°C) | ASTM C372 | 3.4 |
| Specific Heat, c _p | cal/g-°C @ R.T. | ASTM C351 | 0.17 |
| Electrical | | | |
| Dielectric Constant | 1MHz @ R.T. | ASTM D150 | 7.0 |
| Dielectric Strength | kV/mm | ASTM D116 | 17.7 |
| Electrical Resistivity | Ωcm @ R.T. | ASTM D1829 | 10 ¹³ |