

# SILICON NITRIDE POWDER (Si<sub>3</sub>N<sub>4</sub>)

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

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### SILICON NITRIDE POWDER TECHNICAL DATA

PROPERTIES	UNITS	TEST	VALUE
Physical			
Chemical Formula	-	-	Si <sub>3</sub> N <sub>4</sub>
Density, ρ	g/cm <sup>3</sup>	ASTM C20	3.31
Color	-	-	dark gray
Crystal Structure	-	-	hexagonal (alphaβ)
Water Absorption	% @R.T.	ASTM C373	0.0
Hardness	Mohs	-	9
Hardness	knoop (kg/mm <sup>2</sup> )	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, υ		ASTM C818	0.23
Fracture Toughness, K <sub>IC</sub>	MPa x m <sup>1/2</sup>	Notched Beam Test	5.0-8.0
Thermal			
Max. Use Temperature (* denotes inert atm.)	°C	No load cond.	1500
Thermal Shock Resistance	∆T (°C)	Quenching	750
Thermal Conductivity	W/m-K @ R.T.	ASTM C408	27
Coefficient of Linear Thermal Expansion, $\alpha_{\text{I}}$	μm/m-°C (~25°C through ±1000°C)	ASTM C372	3.4
Specific Heat, c <sub>p</sub>	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 <sup>13</sup>

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