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Silicon Nitride Ceramic (Si_3N_4) — Technical Datasheet

Silicon nitride is the structural ceramic for thermal shock and high-speed rotation: an interlocking grain structure gives 6–7 MPa·m½ toughness, density of only 3.2 g/cm³ (60% lighter than steel), and retention of over 80% of room-temperature strength at 1,200°C. FineCer supplies GPS, HIP, and RBSN grades as finished components, blanks, and near-net preforms.

Grade Comparison

Property	GPS	HIP	RBSN
Density (g/cm³)	3.20–3.25	3.25–3.30	2.4–2.6
Flexural Strength	700–900 MPa	800–1,100 MPa	200–350
Toughness	6–7	7–8	2–3
Typical Use	Bearings, turbo rotors	Highest-performance	Large/complex shapes

Si_3N_4 vs Bearing Steel (GCr15)

Property	Si_3N_4	Steel (GCr15)
Density	3.2 g/cm³	7.8 g/cm³
Max Speed (DN)	>3,000,000	~1,500,000
Service Life	3–5× steel	Baseline
Lubrication	Self-lubricating	Required
Corrosion	Immune	Susceptible

Typical Applications

Bearing balls, races and sleeves (full-ceramic and hybrid) · turbocharger rotor blanks and turbine preforms · aluminum-foundry riser and dosing tubes · thermocouple sheaths in molten metal · high-speed spindle components · cryogenic turbopump bearings.

±0.001 mm tolerance · Ra 0.1 µm finish · MOQ 1 piece · Quote in 24 h · ISO 9001:2015

Values are typical for the material class and are provided for engineering reference only; they are not a guaranteed specification. Actual properties depend on grade, geometry, and process route — the applicable grade and acceptance criteria are confirmed in the quotation and the inspection report shipped with every order. © 2026 FineCer. All data also published at www.finecer.com.