



Individual rolling elements; relative sizes illustrate selection, not a stocked diameter range.

Silicon Nitride Bearing Balls

Product reference: silicon-nitride-bearing-balls

Material: Silicon Nitride

Product type: Bearing Rolling Element

Silicon nitride bearing balls are lightweight, hard, electrically insulating rolling elements for high-speed and electrically sensitive bearing systems.

95% Si₃N₄ Typical Properties

Property	95% Si ₃ N ₄	Condition / method
Density (g/cm ³)	≥3.2	-
Young's modulus (GPa)	300	-
Fracture toughness (MPa·m ^{1/2})	6.2	-
Flexural strength (MPa)	>720	25°C
Compressive strength (MPa)	2200	25°C
Thermal conductivity (W/(m·K))	15-20	25°C
Coefficient of thermal expansion (10 ⁻⁶ /K)	3.0-3.2	25-1000°C
Volume resistivity (Ω·cm)	>10 ¹⁴	25°C
Typical maximum material temperature (°C)	1200	-
Poisson's ratio	0.26	-
Dielectric strength (kV/mm)	16	-
Relative permittivity	8.2	1 MHz; 25°C
Dielectric loss tangent	0.004	1 GHz; 25°C

Product Geometry & Configuration

Product parameter	Configuration	Acceptance basis
Delivery form	Finished precision ball or oversize blank	A blank requires further finishing before rolling-contact service

Product parameter	Configuration	Acceptance basis
Ball diameter	Nominal diameter and lot size variation	Sets bearing geometry and ball matching
Precision grade	Diameter variation, spherical form and surface texture	Grade designation is paired with its governing standard and edition
Material quality	Bearing-grade Si ₃ N ₄ with surface-defect and lot controls	Separate from dimensional precision and generic structural Si ₃ N ₄ properties
Bearing system	Hybrid steel-ring or specified all-ceramic arrangement	Load, speed and life belong to the complete bearing design