

SILICON NITRIDE BALLS

Engineered for High Precision Applications

Specified for use in such high-technology industries such as hybrid bearings, aerospace and defense; Silicon Nitride ceramic balls feature these advanced characteristics:

- Excellent corrosion resistance withstands attack from harsh chemicals and demanding environmental conditions.
- Lightweight Silicon Nitride weighs 60% less than steel which reduces centrifugal force, skidding and wear under high speed and acceleration.
- Superior Surface Finish, Ra 0.1 7-0.25 micro inches may extend L-10 life to as much as 10 times that of steel bearings.
- High Temperature Hardness is twice that of steel. These all-ceramic balls retain their strength and hardness up to 1800 degrees F.

Silicon Nitride is further characterized by its low density of 3.2 g/cc, high flexural strength of 1.0 GPa, and fracture toughness of 6 MPa/M2.

These outstanding properties, together with Global Precision's exacting manufacturing standards regarding sphericity, diameter tolerance, and surface finish, make Global Precision's silicon nitride balls ideal for high performance ball bearings.

- Excellent Corrosion Resistance
- Lightweight
- Superior Surface Finish
- High Temperature Hardness

Available Grades and Sizes

Grades	Size Range in inches & millimeters
5-25	1/32" - 1" .0312 - 25.400

*Larger sizes are available upon request.

Conforms to ASTM specification F2094. Class 2 for Silicon Nitride.

Material Analysis

Grade	Allowable Lot Diameter Variation	Basic Diameter Tolerance	Allowable Ball Gage Deviation High	Allowable Ball Gage Deviation Low	Max. Surface Roughness. Arithmetical Average. Micro-meters (Micro-inches)
2C	0.08 (3)	±0.51 (±20)	+0.51 (+20)	-0.51 (-20)	0.004 (0.15)
3C	0.13 (5)	±0.51 (±20)	+0.51 (+20)	-0.51 (-20)	0.004 (0.15)
5C	0.25 (10)	±0.76 (±30)	+0.76 (+30)	-0.76 (-30)	0.005 (0.20)
10C	0.51 (10)	±2.54 (±100)	+1.27 (+50)	-1.02 (-40)	0.006 (0.25)
16C	0.80 (32)	±2.54 (±100)	+1.27 (+50)	-1.02 (-40)	0.009 (0.35)
24C	1.22 (48)	±2.54 (±100)	+2.54 (+100)	-2.54 (-100)	0.013 (0.50)
48C	2.44 (96)	N/A	N/A	N/A	0.013 (0.50)

Typical Mechanical Properties ^A :	Minimum	Maximum
Density, g/cc (lb/ft ³)	3.0 (187)	3.4 (212)
Elastic Modulus, Gpa (ksi).	270 (39150)	330 (47850)
Poisson's ration	0.23	0.29
Thermal Conductivity, W/m-°K (Btu/h-ft-°F) - @ 20°C (Room Temp.)	20 (11.5)	38 (21.9)
Specific Heat, J/kg-°K (Btu/lbm-°F)	650 (0.167)	800 (0.191)
Coefficient of thermal expansion, x10-6/°C (Room Temp. to 500°C)	2.8	4.0
Resistivity, Ohm-m	1010	1016
Compressive Strength Mpa (ksi).	3000 (435)	

^ASpecial material data should be obtained from individual suppliers.

Typical Current Markets				
	Grade 2,3	Grade 5	Grade 10, 16	Grade 24, 48
Class I	High Speed Momentum Device Space Mechanism Aircraft	Lox Pump Mainshaft Bearing	Critical Aircraft Parts	
Class II	Turbo Molecular Pump High Precision Radial Bearing Dental Drill	Vacuum Equipment High Speed Instruments machine Tool Spindle High Performance Angular Contract Ball Screw	Electric Motors Med/Low Precision Radial Bearing	Check Balls Single Balls
Class III			Sports & Recreation Food Processing	Mechanical Devices

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