

Silicon nitride (Si₃N₄) Bearing Balls

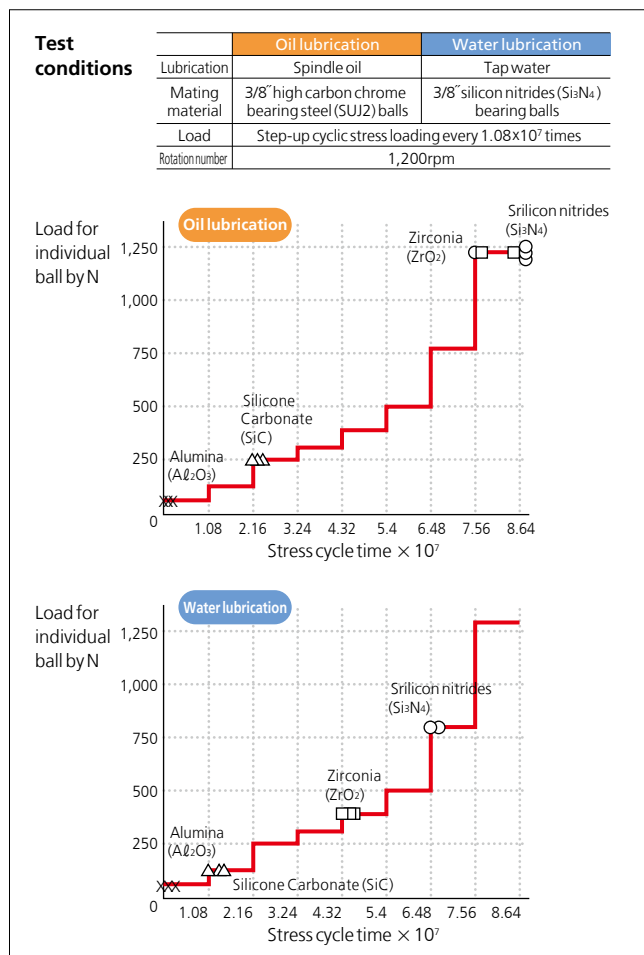
We offer light-weight, high strength and high abrasion resistant silicon nitride (Si₃N₄) ceramics for structural parts. They are especially fit for bearing balls and applied to various lines of industrial use.



Comparison of properties between silicon nitride (Si₃N₄) ceramics and high carbon chrome bearing steels; and features of ceramic bearings

Item	Unit	Silicon nitrides	Bearing steels	Features of ceramic bearings
Thermal resistance	°C	800	180	Heavy-duty bearings under elevated temperature
Density	Mg/m ³	3.24	7.8	Low centrifugal force to rolling balls, causing long life and low temperature rising
Coefficient of thermal expansion	× 10 ⁻⁶ /K	3.0	12.5	Minimum dimensional deviation in inner clearances by temperature rising, causing low vibration and small change in pressurization
Hardness	HV	1500	750	Minimum deformation in rolling contact members, causing high rigidity
Young's modulus	GPa	308	208	
Poisson's ratio		0.29	0.3	
Corrosion resistance		Good	Not good	Serviceable under chemical environments including acidic and alkaline solutions
Magnetism		Nonmagnetism	Ferromagnetic material	Minimum rotational fluctuation made by magnetization under strong magnetic field
Electric conductivity		Insulator	Conductor	No electric corrosion especially in generators and motors
Mode of bonding		Covalent bonding	Metallic bonding	Minimum adhesion of contact parts caused by oil film breaking

Results of load withstanding test for various ceramics



Courtesy of JTEKT Corporation

Results of abrasion resistance test for silicon nitrides TSN-15

