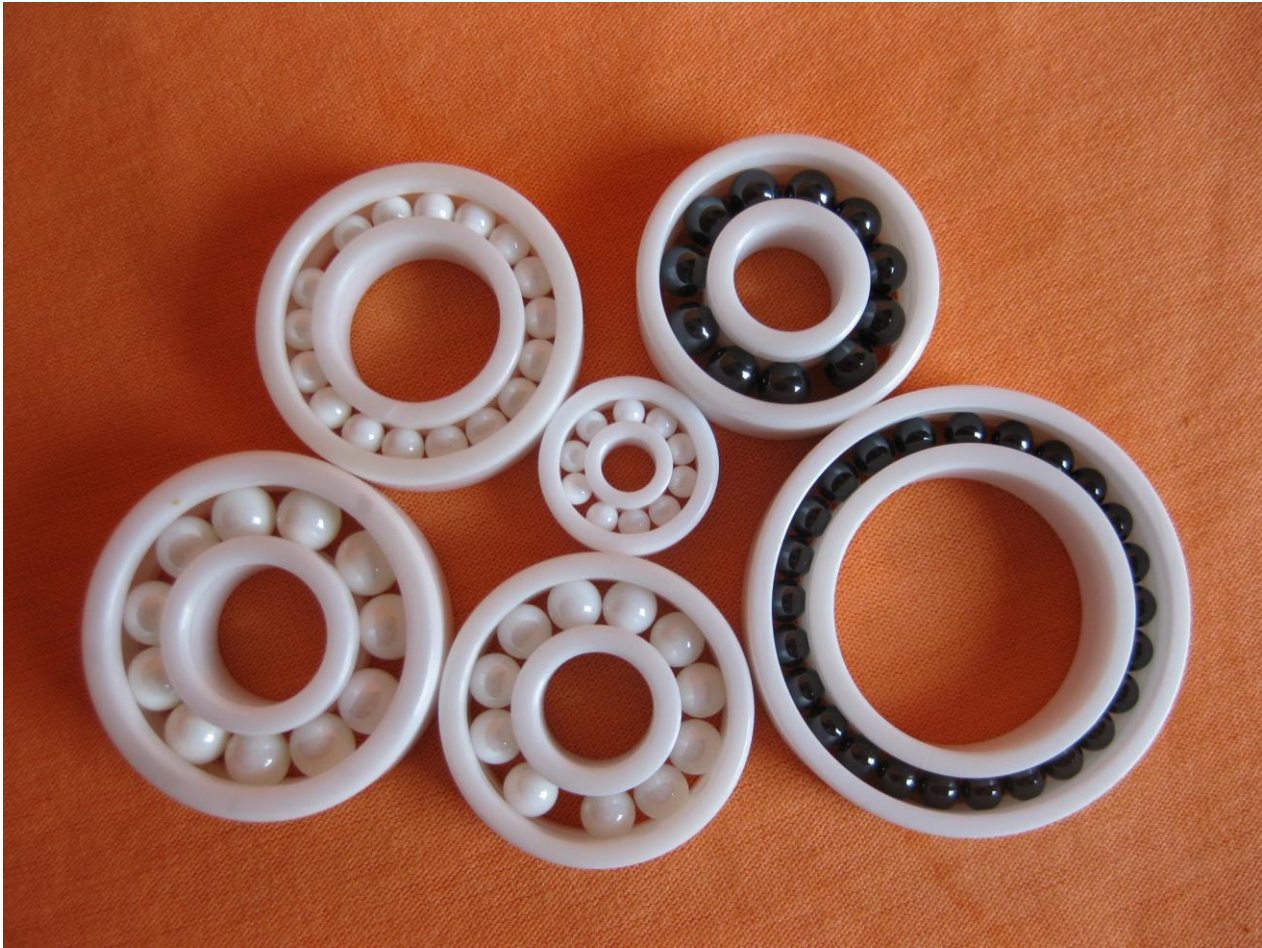


# Ceramic Ball Bearing



Full ceramic ball bearings constructed entirely of ceramic material. Inner/outer races and balls are made of Silicon Nitride ( $\text{Si}_3\text{N}_4$ ) or Zirconium Oxide ( $\text{ZrO}_2$ ). They are available as full complement (no cage) or with a cage made from PEEK or PTFE. Full ceramic bearings are for medium load and medium speed applications. It is not possible to achieve the inner and outer ring roundness that is found with precision steel bearings, so full ceramic bearings have lower speed ratings.

Because it can be used in extreme badly environment and special situation, it applies to aviation, seafaring, petroleum, chemical industry, automobile, electronic equipment, metallurgy, electric power, textile, medical device, vacuum equipment and military affairs field.

## Characteristic

High temperature resistance, corrosion resistance, anti-magnetic, electrical insulation, vacuum, light specific gravity, lubrication-free

( $\text{Si}_3\text{N}_4$  3.2g/cm<sup>3</sup>) ( $\text{ZrO}_2$  6.2g/cm<sup>3</sup>) (bearing steel 7.85g/cm<sup>3</sup>)

1. Higher hardness and better elasticity compare to standard steel bearings.
2. Full ceramic bearings can be run completely dry ◦
3. Excellent corrosion resistance allows them to run in concentrated acids, alkalis or submerged in seawater without corroding.
4. More suitable for temperature variation.
5. The life cycle of full ceramic bearings are much longer than steel bearings.
6. Prevent electrical arcing. The natural insulating properties of ceramic material eliminate this type of damage.

## Application

Semiconductor manufacturing equipment, pharmaceutical equipment, wet process equipment, chemical equipment, TFT-LCD equipment, PCB equipment, printing equipment, food equipment, optical equipment, vacuum equipment.

### Material:

Inner/outer races=> ZrO<sub>2</sub> 、 Si<sub>3</sub>N<sub>4</sub>

Balls=> ZrO<sub>2</sub> 、 Si<sub>3</sub>N<sub>4</sub> 、 Glass

Cage=>PEEK 、 PTFE 、 Bakelite 、 Nylon 、 Full complement (no cage)

### Technical Data

	Silicon Nitride Si <sub>3</sub> N <sub>4</sub>	Zirconium Oxide ZrO <sub>2</sub>
Density (g/cm <sup>3</sup> )	3.20~3.30	6.05
Coefficient of thermal expansion (10 <sup>-6</sup> /k)	3.2	10.5
Elastic modulus (Gpa)	300~320	210
Poisson's ratio	0.26	0.30
Hardness (HRC)	75~80	70
Flexural strength (Mpa)	200	300
Compressive strength (Mpa)	1400	2100
Fracture toughness (Mpa · m <sup>1/2</sup> )	6.0~7.0	10.0
Thermal conductivity (W/mk)	18	2
Electrical resistivity (Ω · mm <sup>2</sup> /m)	10 <sup>18</sup>	10 <sup>15</sup>
Max temperature (°C)	800	550
Corrosion resistance	High	High
Dimensional stability	High (Not easy to change with temp.)	-
Dry friction	Low	Low
Magnetic	Non	Non