NSK Ceramic Ball Bearings

High Precision Ceramic Angular Contact Ball Bearings

High speed, high rigidity and high reliability are all achieved using ceramic rolling elements. Ceramic hybrid bearings have many excellent performance characteristics such as heat resistance, extended life, light weight, lower thermal expansion, electrical non-conductance and thus can be used in an infinite number of applications as a new generation material. NSK’s early experience of materials and bearing manufacturing led us to utilize one ceramic in particular, silicon nitride (Si$_3$N$_4$), for the rolling elements in ceramic hybrid bearings. These hybrid bearings have earned an excellent reputation for ultra high speed combined with ultra high accuracy; a performance combination that is not achievable in bearings with steel rolling elements.

*High Quality by Selecting the Best Materials*

**Seizure Resistance** Relative to steel rolling elements, ceramics have a higher seizure resistance.

**High Accuracy through Manufacturing Technology** NSK’s expertise in the manufacturing of balls and rollers, improvements in the sintering process and the grade of materials used enables NSK to produce higher accuracy balls and rollers.

**High Rigidity** Ceramic balls have a Youngs Modulus that is 50% higher than that of steel, making it an ideal material for use in machine tool spindles requiring high stiffness during cutting.

**High Speed Performance Characteristics of Balls and Rollers – Ceramic vs Steel Ball Bearings:**

- **Lightweight** - As the density is 40% lower than that of steel, the centrifugal force from the rolling elements is lower, thus extending bearing life
- **Low Coefficient of Linear Expansion** - In applications involving high speed operation, although the temperature of the bearing is high, this low coefficient results in lower preload and lower heat generation.
- **Low Friction** - The slip of the rolling element during operation is reduced, resulting in less heat being generated.