

# Why SKF?

# Hybrid bearings



Hybrid bearings – a solution for improved performance and reliability under severe operating conditions.

SKF Hybrid bearings combine rings made of bearing steel and rolling elements made of bearing grade silicon nitride ( $\text{Si}_3\text{N}_4$ ) which make them electrically insulating. They are dimensionally interchangeable with similarly sized all-steel bearings and can substantially improve reliability and robustness when incorporated into new or existing industrial equipment. This is particularly true in applications where bearings are exposed to contamination by abrasive particles, poor or inadequate lubrication conditions, vibration or the passage of electric currents; any of which can potentially cause damage and premature failure of standard bearings.

## Product features

- Electrically insulating between inner and outer rings
- High wear-resistance
- Excellent tolerance to poor lubrication
- Low friction
- High speed capabilities
- Tolerant of vibration and oscillating applications
- Higher stiffness compared to equivalent all-steel bearing

## User benefits

- **Extended service life** due to lower operating temperature compared to all-steel bearings
- Insulates and eliminates electric current damage to bearings in electric motors and generators, even at very high frequencies associated with inverters.
- Extended grease life
- Reduced maintenance cost
- Energy saving
- Environmentally friendly

## Common applications

- Compressors
- Pumps
- Electric drives
- Generators
- Gear boxes
- Machine tool spindles

## Industries

- Railway
- Off-highway
- Racing
- Industrial electrical
- Electric vehicles
- Machine tool
- Wind



### Comparison of material properties bearing steel to bearing grade silicon nitride

Properties	Bearing steel	Bearing grade silicon nitride
Compressive strength [MPa]	2 300	3 000
Tensile strength [MPa]	1 900	800
Elastic modulus [GPa]	210	310
Hardness HV10 [kg/mm <sup>2</sup> ]	700	1 600
Electrical resistivity [Ωm]	0,4 × 10 <sup>-6</sup> (conductor)	10 <sup>12</sup> (insulator)
Density [g/cm <sup>3</sup> ]	7,9	3,2
Coefficient of thermal elongation [10 <sup>-6</sup> /K]	11,7	3

Industry	Prevents passage of electric current	Able to run at higher speeds	Extend bearing and grease service life, and maintenance intervals	Resists wear caused by solid contaminants	Resists false brinelling
<b>Railway</b> Traction motors	X	X	X		X
<b>Off-highway</b> Traction motors	X		X		
<b>Racing</b> Gear boxes		X	X	X	X
Engines		X	X	X	X
Wheel bearings					X
<b>Industrial electrical</b> Electric motors	X	X	X		X
<b>Electric vehicles</b> Electric motors	X	X	X		X
<b>Machine tool</b> Spindles		X	X		
<b>Wind</b> Generators	X		X		X

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