

WearEver Technology for Super Precision Spindle Bearings

TIMKEN

Where You Turn

WearEver material combined with optimized design produces bearings with superior high-speed and wear-resistant properties for improved performance and productivity.

These bearings combine a special high-alloy steel with ceramic balls to provide superior performance for demanding machine tool applications.

WearEver outperforms bearings made of conventional and high-nitrogen steels. It has superior wear resistance, service life, speed, stiffness and operating temperatures, which help improve productivity and reduce total job cost.

WearEver Benefits

Superior wear resistance

This unique, wear- and debris-resistant steel was specifically incorporated into the WearEver design to withstand hard contaminants, which is one of the primary causes for bearing damage in the machine tool industry. Rigorous lab testing showed up to 100 times the wear resistance over conventional 52100 bearings. This presents a dramatic leap forward in the advancement of machine tool productivity.

Extended service life

Superior wear resistance helps to prevent bearing damage and achieve longer service life. Improved reliability, even under marginal lubrication conditions, is achievable during high-speed machining because WearEver can support rolling contact stress levels up to 10 percent higher than conventional bearings.

Improved stiffness

WearEver technology produces bearings that are stiffer than conventional and ceramic hybrid bearings. This helps to produce a more rigid spindle and yields higher-quality finished product.

Extended temperature capability

These bearings, when used with proper lubrication and retainer materials, are capable of operating at temperatures in excess of 287°C (550°F).

Increased machining speed

The stiffer WearEver material generates less heat due to sliding friction. In addition, these bearings come equipped exclusively with ceramic balls that significantly reduce centrifugal forces. When combined with Timken HX high-speed geometry,

these bearings are able to achieve speeds up to 40 percent higher and accelerations previously unattainable by conventional bearings.

Improved productivity

Optimum bearing design combined with the superior durability of WearEver material enhancements helps to improve machine performance and efficiency while reducing downtime. Increased service life can mean fewer rebuilds, resulting in overall lower maintenance cost.

Reduced total job cost

The use of Timken® super precision spindle bearings with the WearEver material promotes better machining surface finishes, helping to reduce the number of secondary finishing and inspection operations needed.



Timken® super precision spindle bearings with WearEver technology are specifically designed for maximum reliability in high-speed machining.

Applications

These advanced bearings are for use in the most demanding industrial applications, such as:

High-speed machining

- Aluminum
- Titanium
- Similar tough materials

Grinding centers

- Internal grinding spindles
- External grinding spindles
- Dressing spindles

Machine system spindles

- Turning
- Boring
- Milling

Damage Resistance

Timken engineering has extensive data on the causes of spindle bearing damage. This shows that hard contamination is the greatest single cause. True fatigue-induced bearing damage is comparatively rare in machine tool applications. It is much more likely for bearing service life to be limited by hard particulate contamination or marginal lubrication conditions. WearEver material provides

significantly greater service life than conventional 52100 and high-nitrogen steel bearings under these same application conditions.

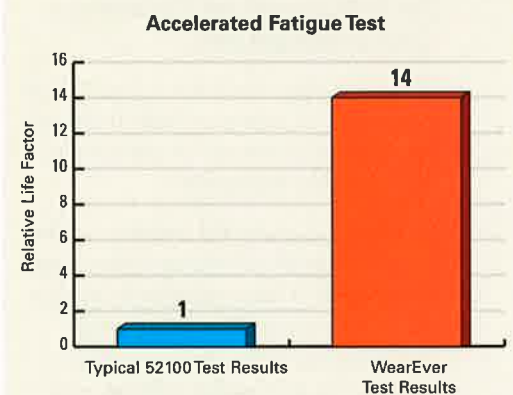
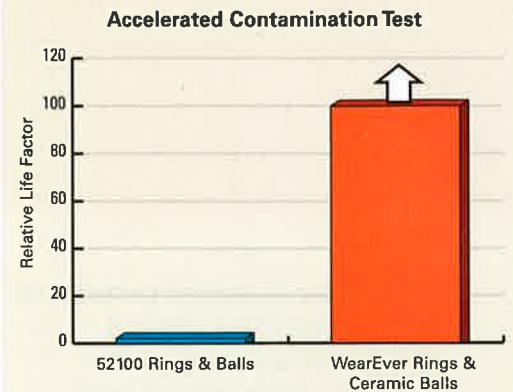
Advanced Metallurgy

WearEver bearing steel exhibits higher compressive yield strength and higher hardness than normal 52100 chrome steel and other high-nitrogen bearing steels currently available. These characteristics produce better wear resistance and fatigue life. The bearing raceway is far less susceptible to surface "peeling" damage caused by hard particles in the rolling contact zones.

Using traditional processing, tool steels tend to contain large carbides and carbide segregation, which can be detrimental to high-speed bearing performance. The advanced WearEver metallurgy used in these super precision spindle bearings produces high-uniform carbide volumes and small evenly dispersed globular carbides in a hard tempered martensitic matrix. This strengthens the bearing material against wear.

Contact your Timken sales representative to learn more about how to apply super precision spindle bearings with WearEver material to solve your demanding application requirements.

52100 vs. WearEver Test Results



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Precision Components • Lubrication •
Seals • Remanufacture and Repair •
Industrial Services

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