



CUSTOMER SUPPORT



LEADING EDGE TECHNOLOGY

# PERFORMANCE BEYOND THE CUSTOMER'S EXPECTATIONS



The Timken Company designs a growing portfolio of engineered bearings and power transmission products.

With more than a century of knowledge and innovation, they are continuously improving the reliability and efficiency of global machinery and equipment to move the world forward. Timken posted \$3.8 billion in sales in 2019 and employs more than 18,000 people globally, operating from 42 countries.

### Protecting the Customer's Business

One of the extraordinary things about The Timken Company is that it started producing bearings 120 years ago and is still doing so today. "We started as a North-American company serving predominantly automotive suppliers," says Vikram Bedekar, Materials Specialist in the Timken Technology Center. "Today, we serve diversified markets worldwide, including emerging markets like wind energy and robotics. And, in addition to engineered bearings, we have grown our portfolio of product brands to include adjacent power transmission products to increase our ability to serve the needs of global industries more fully."

Knowledge has always been the secret to The Timken Company's success. Roller bearings used in applications such as turbine main shafts and gear boxes are highly engineered to perform in extremely challenging environments. In the case of turbine bearings, the replacement or rebuild cost could be as high as \$100,000 or more if the bearing fails prematurely.

### Coated Bearings – from Almost Unknown to a Requirement

Timken started investigating the application of PVD coatings in the early 1990s. At that time, PVD technology was unknown to most of the industry. Around 2009-2010, Timken pioneered the application of diamond-like carbon (DLC) coatings on roller bearings. "Since then, our coatings have shown a great deal of promise in paper mills, cement plants, agriculture equipment such as large tractors and combines, as well as automotive applications," says Vikram.

The transition to coated bearings has been very successful. "Once we apply wear-resistant coating on our products, we rarely hear any complaints from our customers. Our DLC coatings are now widely accepted as the solution to many challenging applications that were difficult to meet before," says Vikram. "Since commercialising our proprietary DLC coatings, we have received widespread industry acclaim, including a prestigious Engineering Materials Achievement award from ASM International in 2017." This award recognised The Timken Company's engineering coatings for "significant contributions to the field of material science and evidence of industrial impact".



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Vikram Bedekar  
Materials Specialist  
Timken Technology Center

### On the Cutting Edge of Bearing Engineering

Bearing production has changed a great deal in the last 30 years, with the damage mechanism for bearings moving from subsurface issues to surface issues. "Before the 1990s, cracks would initiate around inclusions or impurities in the steel. Since then, the industry's ability to make cleaner steel and to maintain tighter geometric tolerances has greatly improved. This has resulted in a significant increase in bearing performance," says Vikram. "Of course, every breakthrough leads to a new challenges – industries are now moving toward fuel efficiency and weight reduction efforts."

For example, in early wind turbine designs, main shaft bearings were required to support loads in radial direction and wind thrust loading only on the downwind row of rollers. This uneven loading environment gave rise to unusual wear. Furthermore, wind energy manufacturers found it difficult to keep the bearing well-lubricated under complex loading conditions, which resulted in premature bearing damage. Putting a DLC coating between steel surfaces dramatically reduces steel-on-steel contact and combats adhesive wear issues. The Timken Company expects that continuing progress in coating and lubrication can further extend the lifetime of bearings.

### Ready for the Future with Hauzer

In general, Vikram has been very happy with The Timken Company's collaboration with Hauzer. "Application support, technical support and the on-time delivery, it's all exceptional," says Vikram.