

Advances in materials lead bearing trends in 2019

Advances in material science have been on the rise in the last few years and bearing industry experts are expecting 2019 to continue the trend. Engineers are either developing new materials or using existing materials in new ways to meet their customer's needs. We asked some of the top thought leaders in the industry to weigh in on what's new with the materials that keep bearings running smoothly.

LUBRICATION AND REGULATIONS

Bearing lubrication can be messy, costly, and inefficient. It's no surprise that many engineers are seeking to either reduce the need for grease and oil or eliminate it outright. While many companies are developing materials to reduce lubrication dependence, the diversity and scope of global regulations creates challenges.

"Eliminating external lubrication is also a goal for many companies. There are more and more material regulations worldwide today — including Prop 65, FDA, and RoHS requirements requiring compliance. So an increasing number of engineers are looking to address these concerns upfront by having bearing materials available to meet their specific requirements," said igus North American iglide Product manager, Nicole Lang.

Engineers are also finding ways to manufacture existing materials in safer and more efficient ways. PTFE is not new. But the industry is now creating new ways to manufacture it and use it in different applications.

This is a full complement cylindrical roller bearing NCF1880-SQ94D from NKE. NKE says that in a multistage chemical process, the surface layer of the treated parts is converted into a 1 to 2 micrometer thin mixed ferrous oxide layer creating the characteristic black appearance.

"People are finding ways to manufacture PTFE more efficiently. Being able to get lead out of the equation has been a big step forward, lead does provide some lubrication benefits, but at the same time, it comes with environmental concerns and health and safety concerns. Being able to move away from it, especially with various environmental restrictions coming along, is critical," said Nik Poulakidas, Strategic Sales for CCTY Bearing Company.

BLACK OXIDE FINISH FOR STEEL BEARINGS

NKE Austria GmbH is now making bearings with black oxide finish. The protective layer improves the bearings' run-in and wear characteristics and protects against environmental effects. In applications like wind turbine gearboxes, black oxide finish is a cost-effective and technically viable means of prolonging the service life and performance of rolling bearings.

The black oxide finish forms a protective layer for steel parts. NKE says that in a multistage chemical process, the surface layer of the treated parts is converted into a 1 to 2 micrometer thin mixed ferrous oxide layer creating the characteristic black appearance. Black oxide finished bearing components have a set of unique technical characteristics, especially in the case of components that move relative to each other.

Engineers can create multiple protective effects even if only one functional element (typically the rolling elements) is treated.

Although, NKE says ideally all functional surfaces of a rolling element bearing, including the inner and outer ring as well as the rolling elements, should be black oxide finished.

Black oxide finishing is already an established method in other industries. NKE is using this technology to improve the technical properties of its rolling bearings. The method has proven itself in practice especially with full complement cylindrical roller bearings, but other



MOTION SYSTEM TRENDS



These bearings use a 100% stainless steel insert design combined with ABB's top coat, KleenTec, to protect against corrosion. The smooth housing without a grease fitting minimizes contamination harbor points and is easy to clean.

types of rolling bearing are also black oxide finished, depending on the application. At present, NKE is using this finish especially for cylindrical roller bearings.

TOP COAT FOR CORROSION RESISTANCE

ABB's Dodge Food Safe mounted ball bearings are designed to withstand caustic, high-pressure cleaning and sanitation processes. These bearings are the first industrial bearings to achieve the IP69 water protection rating without the use of an end cover.

Consumers health regulations increasingly challenge food manufacturers to guarantee higher food safety and hygiene standards. However, harsh chemicals and high-pressure sprays used in clean-in-place (CIP) procedures can quickly deteriorate bearing reliability.

These bearings use a 100% stainless steel insert design combined with ABB's top coat, KleenTec, to protect against corrosion. The smooth housing without a grease fitting minimizes contamination harbor points and is easy to clean. The bearing is sealed and lubricated for life to reduce maintenance costs.

To prevent grease wash-out, the leading cause for bearing failure in washdown environments, the Food Safe bearing has lubrication protection. The Hydro armor sealing system, with a stainless-steel flinger and four contact lip seals, prevent water and contamination from entering the bearing.

"Food Safe bearings solve the two most common reliability problems in the food industry - grease washout and corrosion," said David Kaunitz, Dodge Mounted Ball Bearing Product Manager for ABB.

ETX BEARING FOR RADIOACTIVE ENVIRONMENTS

LM76's one-piece ETX linear bearing/pillow blocks will not degrade in a radioactive environment. The LM76 team machines the bearing from a solid block of self-lubricating ETX. There are no other materials such as PTFE seals or lubricants present making these bearing-blocks maintenance free. Custom designed for use in nuclear power plants these linear bearing/pillow blocks travel on ceramic coated shafting completely submerged in radioactive water. Designed with a slight interference fit between bearing ID and shaft, contaminants are scraped from the shaft's surface. The low frictional characteristics of ETX have little impact on drive force.

ETX bearing-blocks are also FDA/USDA/3-A Dairy compliant. Common application environments include pharmaceutical, medical, food, and dairy processing. EXT has high continuous service temperatures up to 210°F (100°C) and offers good chemical and abrasion resistance, low moisture absorption, and resistance to staining. These ETX linear bearing-blocks with the slight interference fit keeps the bearing free from debris and bacterial contamination, are not affected by biological fluids, mild acids, can be washed down with cleaning agents, and steam cleaned. ⚙️

LM76's one-piece ETX linear bearing/pillow blocks will not degrade in a radioactive environment. The bearing is machined from a solid block of self-lubricating ETX.

