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# Bearing NEWS

BEARING INDUSTRY MAGAZINE

AGENDA FOR 2020

SPECIAL EDITION

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# BEARING 2020

**2020**  
EVENTS  
EXHIBITIONS  
CONFERENCES  
**AGENDA**



CP AUTOMATION  
MARCEL DUBEY



SKF  
BERNIE VAN LEEUWEN

KUKKO // Pull forward

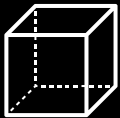


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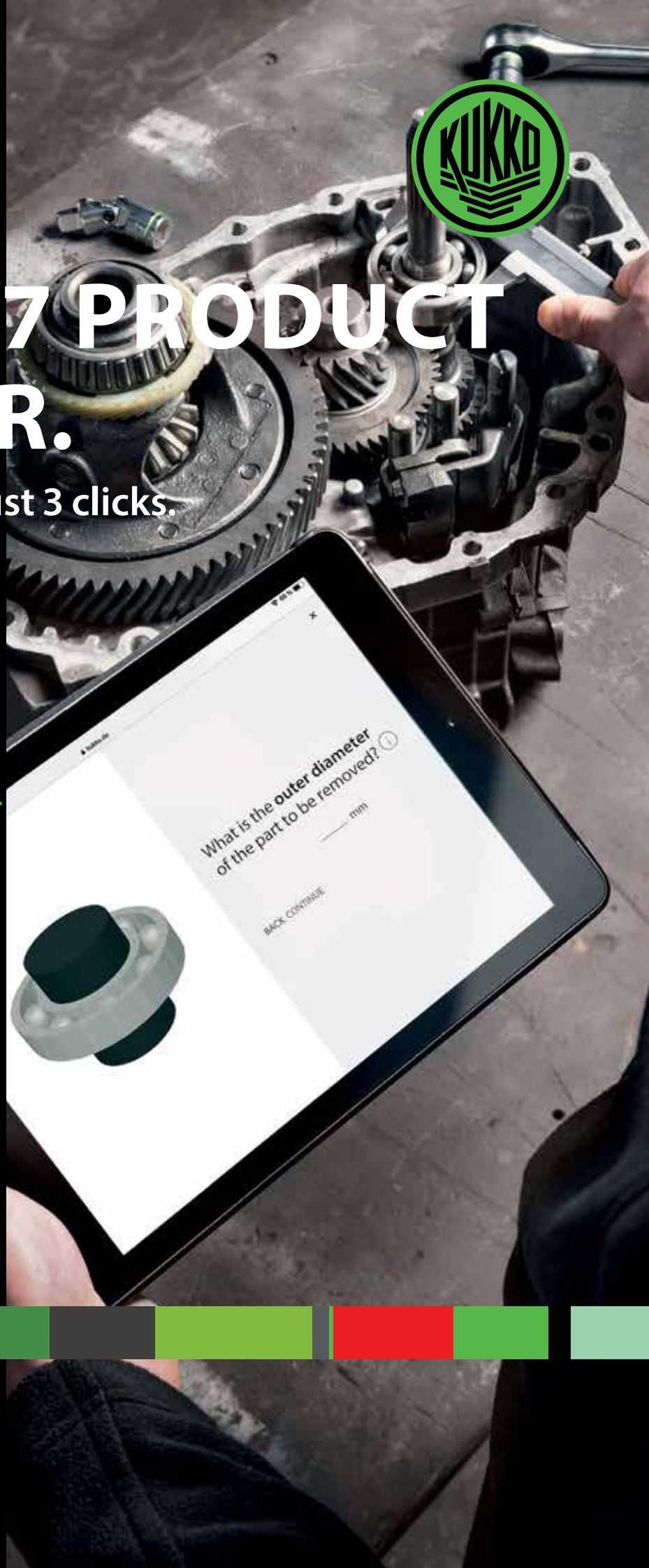
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There is no ultimate or unique high temperature solution, in order to obtain maximum operating time and reliability at reasonable cost the application needs to be analyzed in detail. The main parameters to find the optimized solution are operating temperature, speed, load and the environmental condition around the bearing.

thb has a longlasting experience in both - bearings and lubrication. Just contact us for an advanced solution!

## BEARING MATERIAL

Using rolling bearings above their designated operating temperature (bearing producers thermally stabilize rings and rolling elements between 120 and 200°C, depending on type) will cause a change in the martensitic structure, resulting in a growth of rings.

For low speed applications, as you find them in kiln trucks, such structure change will have no impact on the bearing performance as long as the bearing has enough radial clearance to compensate the growth of rings. For higher speeds the bearings need to be thermally stabilized at least at the expected operating temperature. Higher stabilization reduces the hardness and subsequently the bearing life-time.

If the (cost-effective) standard materials are not sufficient then there is no other choice than to utilize special high-temp steel or ceramics or hybride solutions of both.

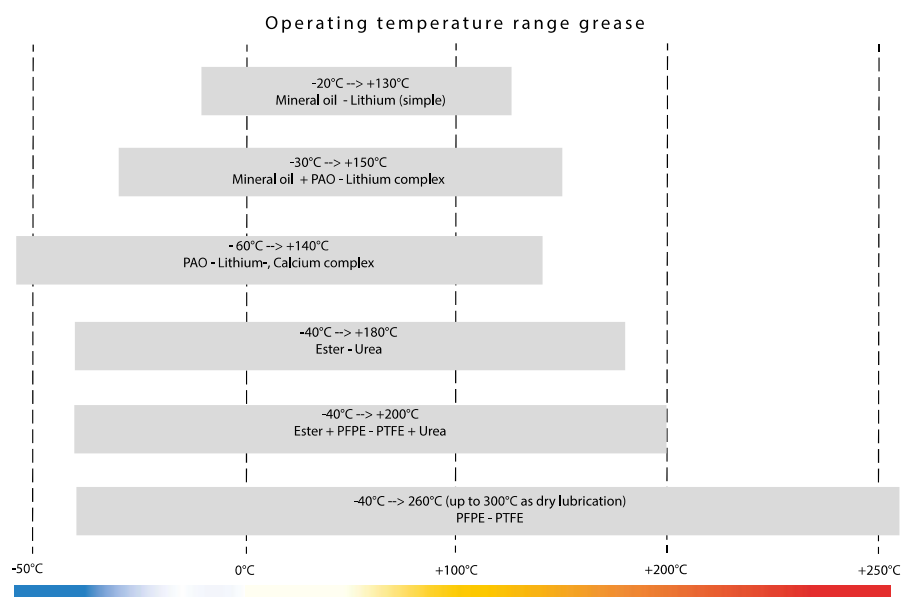
Such bearings are often difficult to get - thb cooperates with makers of special bearings in Europe and Asia and can offer modified standard bearings as well as tailor made special bearings.

## LUBRICATION

With increasing temperatures the viscosity of oil (oil in the grease) is getting lower, the oil is not anymore capable of separating the rolling elements from the raceway. The metal to metal contact increases wear and causes premature bearing failure.

Grease is ageing quickly at higher temperatures, permanent regreasing is expensive. Excessive grease will be around the bearing (danger of fire!) and old grease in the bearing tends to carbonize.

The todays absolute temperature limit for grease is 260°C, above that level solid lubricants like MoS<sub>2</sub>, PTFE or graphite Durolub SLC The Durolub SLC is a solid compound consisting of a mix of dry-lubricants with high temperature resistant bonding agents. It is filled into the free space of the bearing and thermally treated. After hardening, the solid compound is moving with the cage and the rolling elements around the bearing. While moving small quantities of the dry lubricant are transferred onto the raceway and rolling elements and build an approx. 1 µm thick layer, which avoids metal to





metal contact. The high filling volume of Durolub SLC ensures long lasting operation times at temperatures up to 350°C, even higher peak temperatures do not Baking oven / Food industry are used. Such dry lubricants can be applied dry, as sliding laquer or in combination with a synthetic oil, which evaporates at a defined temperature (e.g. Durolub G400 and Durolub kiln truck bearing suffix S201). The todays high end solution for dry lubricant application is the transfer - lubrication. There are solutions available with cage segments / cages made of graphite and compound solutions filled into bearings (see Durolub F228 and Durolub SLC). As a matter of fact the more lubricant is available in the bearing the longer the operating time will be.

## DUROLUB SLC

The Durolub SLC is a solid compound consisting of a mix of dry-lubricants with high temperature resistant bonding agents. It is filled into the free space of the bearing and thermally treated. After hardening, the solid compound is moving with the cage and the rolling elements around the bearing. While moving

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The high filling volume of Durolub SLC ensures long lasting operation times at temperatures up to 350°C, even higher peak temperatures do not interrupt the lubrication. Furthermore Durolub SLB is extremely resistant against water, chemicals and most solvents.

Durolub SLC can be filled into many different types of bearings, typical are single row ball bearings and spherical roller bearings.

## DUROLUB KILN TRUCK BEARINGS - A READY TO USE STANDARDIZED PRODUCT

Kiln truck bearings usually operate at low speeds and high temperatures. The combination of low speed and low viscosity oil at higher temperatures reduces the lubrication performance

drastically - very often dry lubricants are the only option. We'd like to shortly introduce 2 Durolub variants for this purpose (others are available - just contact us)

The base ball bearings are made of a forged high performance bearing steel. All surfaces are manganese phosphatized, the internal radial clearance is a multiple of C5 and bearings are available open or with 2 shields (ZZ). The Durolub suffix range from 200 to 240 are reserved for these base bearings and its variants.

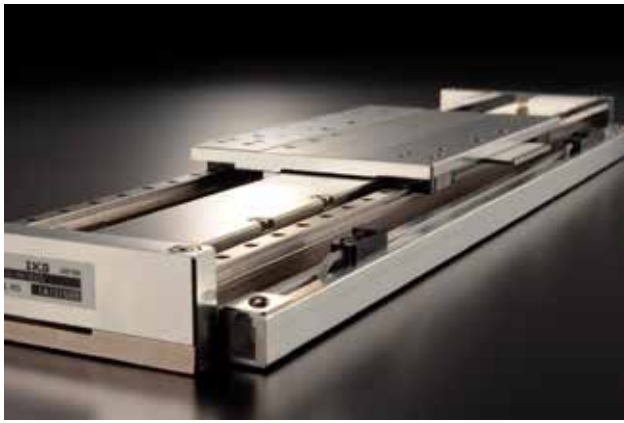
**S201** - is lubricated with a polyglcol - dry lubricant mixture, the lubricant is suitable for temperatures as high as 450°C - we recommend a max. temperature of 350°C

**S228** - is lubricated with the Durolub SLC compound suitable for temperatures up to 350°C

For any further details just contact:

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# IKO

Nippon Thompson developed Needle Roller Bearings for the first time in Japan using its own technology, and used that advanced technology as a foundation for entering into the field of linear motion rolling guides (Linear Way Series and Mechatronics Series).

Currently, we are supporting the development of technology with the first-of-its-kind C-Lube Maintenance Free Series and a rich array of other creative products that respond to diversifying customer needs.

It is with great excitement to announce that IKO Nippon Thompson Europe's Headquarters will be relocating to new premises not far from our current location in Rotterdam to accommodate our growing operations.

**Our new address will be; Keersopstraat 35, 3044EX, Rotterdam, The Netherlands.**

Our communication details will remain the same Tel : +31 (0)10 462 68 68 and e-mail: [nte@ikonet.co.jp](mailto:nte@ikonet.co.jp)

experts in  
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# The CP series laser machines for the bearing industry

In a sector of activity as technological and competitive as the laser, it is not always easy to stand out from other players. However, CP Automation has managed to succeed by offering a modular standardised automation platform that engraves, marks, welds and cuts.

Nowadays, each modern production plant integrates a multitude of different laser technologies. Laser applications come in many forms such as measuring, machining or detecting the presence of parts. Laser technology has undeniably become more and more popular.

Hence, many laser solution providers have emerged. Today, very few of them are able to provide a complete range of products, which allows, in addition to laser processes, to handle and control the parts.

The new standardised CP Series automation platform developed by CPAutomation engineers makes it easy to combine laser modules with handling, assembly and visual inspection modules.

## Marking, engraving and laser cutting module

The module combines beam shaping optics, a 2D or 3D galvanometric scanning head, a camera for imaging parts and positioning axes.

For engraving and marking applications, depending on the surface condition and the desired cycle time by the clients, femtosecond, picosecond or nanosecond lasers are used.

The intelligent vision system can achieve accuracies of a few micrometres and ensure high productivity.

— The CP Series platform has a full range of welding, engraving, marking and cutting laser modules.

The third optical axis makes it possible to machine curved components and to control engraving depth.

The module is used, for example, for marking without microcracking inside glass, intense black marking of medical components and deep engravings of watch parts.

For cutting applications, the use of the femtosecond laser makes it possible to obtain machining of microtechnical parts without heat-affected zones with clean, burr-free sides.



— Ultrafast Laser Module in CP Series



## Laser welding module

The laser welding module combines laser beam shaping optics, a 2D galvanometric scanning head, a camera for imaging parts and positioning axes.

The module is assisted by a smart vision system. It automatically identifies the orientation of the parts and therefore adjusts the position of the laser beam to ensure the weld is always in the correct position.

In order to guarantee excellent welds on all types of materials, infrared or visible, continuous or semi-continuous lasers are commonly used on CP Series platform equipment.

The unique aesthetic inspection technology using artificial intelligence algorithms allows automatic control of the quality of the weld.

The laser welding module is used

for precision laser micro-welding applications, such as welding of watch, medical or electronic parts, with materials as varied as stainless steel, aluminium, copper, titanium or precious materials.

## Smart data advisor for monitoring laser processes

The Smart Data Advisor platform is a tool for storing, analysing and displaying data from connected machines. This tool installed on a local or remote server, allows real-time visualisation of the strategic data of the equipment or a set of machines. With this interconnected device, it is possible to monitor machine data anywhere and on any medium. The Smart Data Advisor platform leverages machine data to create value to improve the quality and productivity of CP Series devices.

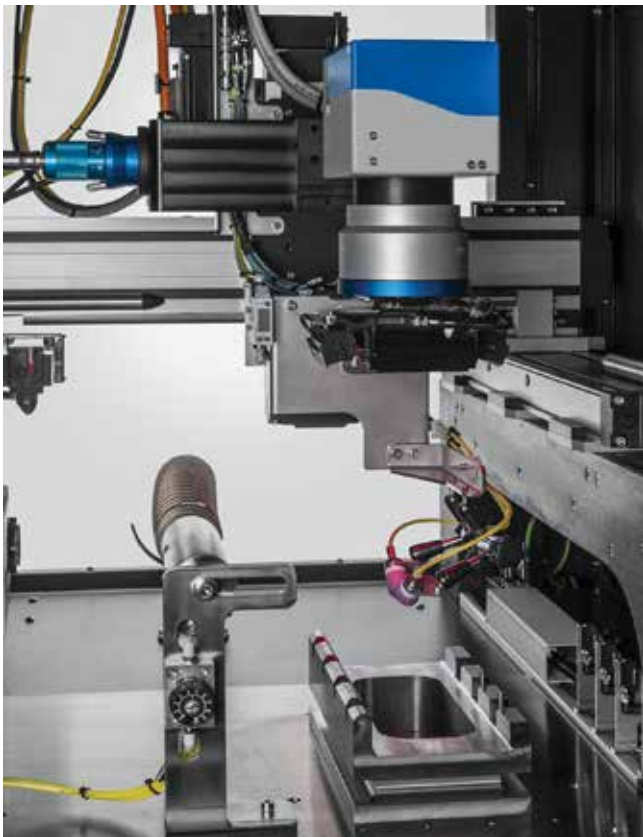
In today's world, the digital revolution is having a big impact on all industries. They must adapt and take advantage of

disruptive innovations, such as artificial intelligence, big data, collaborative robotics or inter-connectivity of devices. "For our clients, the use of new digitisation technologies must not be an end in itself, but must help improve the quality of parts produced and optimise the productivity of the company," says Marcel Dubey, CEO of CPAutomation.

In order to ensure the quality of the machined parts, the Smart Data Advisor tool allows to monitor and supervise important process parameters via graphs, values with thresholds and logfiles.

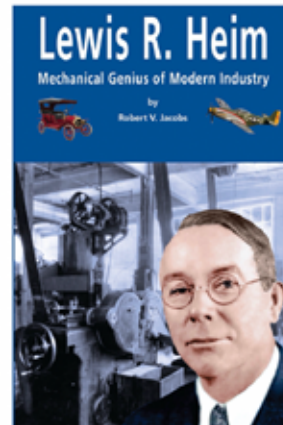
Depending on the applications, the following machining parameters are supervised and generate alarms if their values deviate:

**Internal Laser Power:** before machining each part, the laser power is measured at different power levels.  
**Laser power at the focal point:** at a user-defined frequency, the



— 5-axis laser welding module assisted by smart vision software

## New Biography Pays Homage To Unsung Giant of Modern Industry.



The first comprehensive biography of one of America's greatest unsung inventors of the early 20<sup>th</sup> century. As one of the original founders of the modern bearing industry, Lewis Heim was a prolific inventor of many types of precision-made bearings and machinery that ushered in the mass-production technologies of the modern industrial age. As the inventor of the Centerless Cylindrical Grinder, a significant advancement in machine tool technology, and the Spherical Rod End Bearing, that was installed in nearly every American warplane by the end of WWII, this biography provides the true stories behind their creation. **Lewis R. Heim: Mechanical Genius of Modern Industry** (ISBN 9780997790726), is available now in paperback (\$27.50) from The Connecticut Press or your favorite bookstore.



Marcel Dubey,  
CEO of CPAutomation

to validate the process. For welding, image analysis of the weld using artificial intelligence algorithm enables the verification of the quality of the weld.

**Camera exposure time:** at a user-defined frequency, a white reference is automatically placed in front of the camera to perform a white balance. This operation makes it possible to detect any deviations of the camera-optical-illumination system.

**Out-of-roundness tools:** the tools are periodically measured by the equipment itself.

**Equipment component parameters:** the time of use of the various components of the laser modules is monitored to generate periodic maintenance actions, such as lens, mirror and periscope cleaning and replacement of wear parts .

### 20 years of experience serving the industrial sector

With 20 years of experience, CPAutomation SA supports its clients in digitising their factories and offers turnkey production equipment based on standardised platforms. For the most complex cases, the company also offers tailor-made solutions. CPAutomation's clients benefit from a wide range of expertise in micro-assembly/ micromanipulation, laser machining and automatic visual inspection. In addition, the company was recently named in the TOP 10 2019 robotic process automation solution providers by the American magazine CIO Applications for its European edition.

device measures the power of the laser in the machining area.

**Focal length of the laser optical system:** at a user-defined frequency, the equipment goes into calibration mode and automatically measures the focal length using suitable tools. Focal length monitoring detects the deviations of the complete laser optical system.

**Mire vision:** the alignment of the reference frames of the camera and the laser is checked periodically to anticipate any positioning deviation.

**Line Projector:** The Z position of the area to be machined is measured before each machining to ensure the repeatability of the positioning. This same line projector is periodically checked on a reference surface in order to verify any deviation of the measurement.

**Conformity of machined elements:** for engraving and marking, optical character recognition tools are used



— Smart Data Advisor software for the CP Series platform for monitoring laser processes



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**The power of  
predictability**





Digital technology enables a new approach to an old industrial problem: eliminating the unexpected. As explained by Bernie Van Leeuwen, Director Research & Technology Development at SKF.



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In industry, nobody likes surprises. Companies spend much of their time working to create conditions where people, assets and materials behave exactly as expected. The drive for stable, predictable outcomes is at the heart of much modern industrial practice, from statistical process control to lean manufacturing and Six Sigma.

At SKF, our focus is rotating equipment, and the bearings at their heart. Customers come to us because they want products and services that support their reliability, longevity and performance goals. The overwhelming majority of the time, that's exactly what they get. More than 90 percent of bearings last longer than the machines in which they are installed.

That still leaves room for improvement, however. Wear, fatigue and damage are inevitable facts of life, and machine owners accept that sometimes parts such as bearings will need to be replaced. What they want is the ability to manage this in an orderly manner. Replacing (or re-manufacturing) a bearing during a scheduled overhaul is fine, doing it in a rush after an unplanned stoppage is not.

### The predictability challenge

The bearings industry has spent decades researching the problem of predictability.

Some of the biggest challenges have been solved. Our understanding of sub-surface fatigue, for example, has enabled the development of robust models for predicting the time any bearing can run under within known operating conditions, before its reliability is compromised by accumulated fatigue.

There's a catch, however. Another thing that decades of experience has taught us is that, in the real world, sub-surface fatigue is the root-cause of failure in less than 1 percent of all bearings. That's around one in ten bearing failures in service. The other failures are caused by a host of different issues: problems with lubrication, contamination, corrosion or damage from stray electrical currents, for example.

These issues are much trickier to solve. They are the result of unexpected events that can't be incorporated into simple models or design-time calculations. That doesn't mean that asset owners need to accept surprise breakdowns as a fact of life, however. Timely, actionable information can turn a potentially expensive problem into a manageable issue. And providing that information is the aim of a major research and product development effort underway at SKF today.

### No surprises

Our Predictability work aims to answer three basic types of question for customers:

1. **Detection.** Is there an issue, or is there likely to be an issue, with my machine?
2. **Diagnosis.** What is the underlying root cause of the issue?
3. **Prognosis.** Can I continue to run my machine until its next scheduled maintenance interval? Should I take any action now to preserve its health?

Answering these questions is complicated, because they depend a lot on the specific application in question. Even basic definitions are hard to pin down. In a high-precision manufacturing application, damage to a bearing that leads to a small increase in friction, vibration or play might make a machine unusable. In a simple pump or fan, it might have little effect on overall performance, allowing operation to continue for weeks or months until replacement is convenient.

It isn't all bad news, however. Advances in technology and changes in industrial practice have given us new ways to tackle this complexity. Our understanding of materials science and tribology continues to evolve, for example, aided by advanced computer-aided modelling and simulation techniques. And most significantly, we



**Bernie van Leeuwen,**  
*Director Research & Technology Development at SKF*

view of how bearings perform in specific applications under specific operating conditions. That allows us to improve the design of our products, and the advice we give to customers on their selection, operation and maintenance.

Second, it is improving our ability to answer those difficult questions for customers: detecting issues earlier, diagnosing them more accurately and predicting their progression with more confidence. As significantly, we can increasingly use advanced computational techniques to automate tasks that have historically required manual analysis by skilled specialists. Over time, we believe that will transform the cost, accessibility and scalability of condition monitoring, predictive maintenance and related approaches.

#### **Where are we today?**

The challenge of predictability has not yet been solved, but we have made significant progress, especially in the areas of detection and diagnosis. We have new models and new analytical techniques that perform well in our R&D labs and in tests with customers. Work is now underway to make those approaches sufficiently robust and accessible for wider application. We plan to roll out a number of new tools, products and service offerings over the next two to three years.

And our rate of progress is accelerating all the time. One of the most exciting attributes of the new approach to predictability is the effect of scale. Every new data feed from each sensor-equipped bearing we install helps us to refine and improve our models. That takes us another step closer to our ultimate goal: to provide every customer reliable rotation. And our rate of progress is accelerating all the time. One of the most exciting attributes of the new approach to predictability is the effect of scale. Every new data feed from each sensor-equipped bearing we install helps us to refine and improve our models. That takes us another step closer to our ultimate goal: to provide every customer reliable rotation.

now have access to data on real world bearing performance that would have been unimaginable just a few years ago.

#### **The digital dividend**

That data comes from the rapid growth in the use of smart sensors and condition monitoring technologies. As part of our Rotating Equipment Performance service offering, SKF collects temperature, vibration and maintenance data from millions of bearings running in thousands of applications around the world. Increasingly, we have the opportunity to

supplement that basic information with additional data provided by customers' own automation and control systems.

We now have new ways of using data too. The development of advanced analytics and machine learning technologies is driving a revolution in our ability to extract new insights from billions of individual datapoints.

Combining rich real-world data with advanced theoretical models is helping us address the problem of predictability from two sides. First, it gives a better



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With You

# The Roller Bearing Solution – The Klingelnberg Done in One Measurement Solution

Roller bearings have to fulfil a variety of different tasks. They have to provide high stability for shafts while providing low power losses and a high durability. Therefore the requirements concerning material, geometric and form accuracy as well as surface roughness, are challenging for manufacturing. To ensure the quality in today's manufacturing environment a variety of different precision measuring devices is required. Typically dimensions are measured on a CMM, form and noise on a form tester, surface roughness on a surface tester and contours (e.g. edge radius) on a contour measuring station. This results in high investment and operating costs. Finally the operator has to setup the part on all different stations, which makes the measuring process quite long and keeps the operator unnecessarily occupied.

Klingelnberg follows the **“Done-In-One”** principle. A Klingelnberg P-machine is capable of fast measurement of dimension, form, contour and surface roughness in one setup and one automated cycle. This reduces the investment and helps to reduce the operating cost by an average 46 %, compared to current practices in bearing industry. On top, the measuring machines of the Klingelnberg P series keep the necessary accuracy even on the shop floor, saving the air conditioning costs and bringing the measuring machine really close to production. By removing the need to install multiple machines, customer benefits additionally from saving expensive factory space.

## The Machine

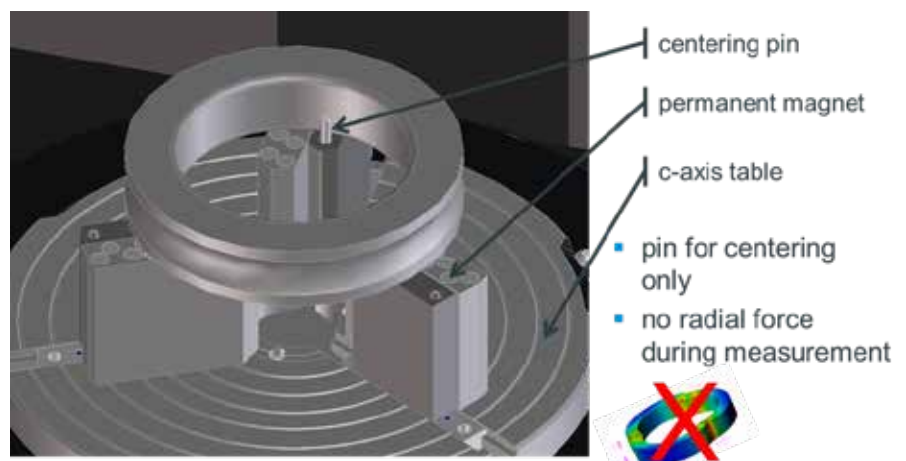
The measuring machines from the



— Figure 1: The Klingelnberg P-Series for Done-In-One measurement

Klingelnberg P-Series are manufactured from steel and cast iron. The temperature behavior throughout the whole machine is similar and predictable and is therefore compensated. In addition, the complete absence of granite, makes the machine totally insensitive to humidity. Therefore the accuracy can be achieved within a

temperature range of 15 to 35 °C with a maximum allowable variation rate of 2 °C per hour and 12 °C per day. To be prepared for the shop floor, the machine can even be equipped with an active vibration platform so that all influences of external factors can be fully isolated. Klingelnberg has a ten year record of



— Figure 2: High precision rotary table with smart clamping



more than 500 measuring machines performing high precision tasks on the shop floor throughout the world.

The rotary table, by itself has a radial run out of 0.2  $\mu\text{m}$  only. Together with the Klingelberg de-signed measuring head 3DNANOSCAN the capability to perform form tests is therefore fully guaranteed. An automatic three-jaw chuck offers controlled and low clamping forces. For very thin rings it can be equipped with magnets on the jaws to fix the part as shown in Figure 2. This allows high precision form testing with absolutely no influence of the clamping on the measuring results.

### Done-In-One Measurement of Roller Bearings

Generating the measuring program with the Klingelberg “Shaft Software” is an easy task. For roller bearings an automatic measuring cycle generation based on a parametric description of roller bearings is available. Thus the measuring program for one bearing type only needs to be generated once. By reading in the parameters from a data source the measuring cycle for different sizes of this bearing type are automatically generated without any user interaction. An example of different bearing sizes with the parametric measurement program generation is shown in Figure 3.

An example with results for different kinds of measuring tasks are shown in Figure 4. Standard tables with the actual values, the nominal dimensions and tolerances for GD&T measurements as well as graphs giving an idea of the form error shape are listed here. This way the machine operator receives all necessary information in order to analyze the manufacturing process and find measures for quality improvements. For surface roughness, there are options to choose the graphical view as well as the specific values according to the relevant standards. Special evaluations are also available including the Fast Fourier analysis FFT to analyze roundness errors as well as noise issues caused by a bearing. Since all these analyses are performed on the same machine with a



— Figure 3: Parametric measuring program generation

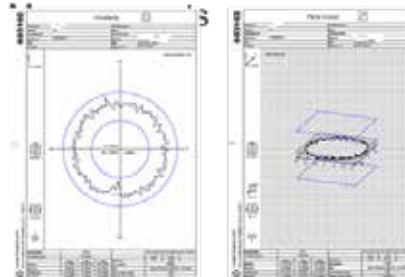
### GD&T Measurements



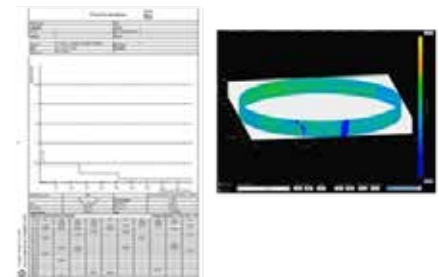
### Surface Finish Measurements



### Form & Position



### Special Reports and Evaluations



— Figure 4: Typical measuring reports for bearing rings

fast rotary table and a scanning probe, measuring time can be reduced up to 46 % compared to a standard setup.

All these measurements can be performed on the shop floor. The measuring machines of the Klingelberg P-series are all equipped with temperature compensation by design as well as a temperature model to ensure accuracy in a production environment. In addition roller bearings and linear guides are used to ensure the high robustness compared to standard CMMs with air bearings

and guides. Klingelberg combines its knowledge from precision metrology and machine tools to ensure its unique combination of precision and robustness.

### Authors:

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# 2020 CHINA INTERNATIONAL BEARING INDUSTRY EXHIBITION



**MAY 13-16 2020**

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## CHINA INTERNATIONAL BEARING INDUSTRY EXHIBITION 2020

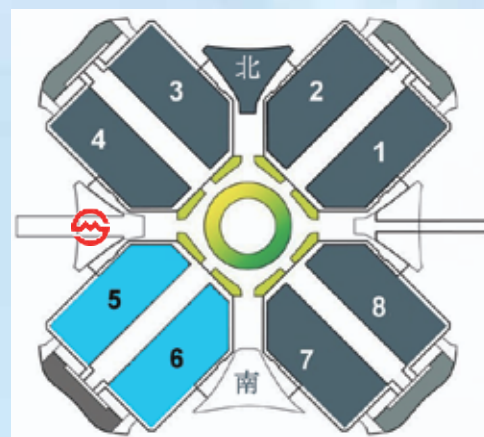
Covering an area of 53000 sqm with estimated 1000 exhibitors and 60000 visitors from all around the world will gather together during China International Bearing Fair between 13 - 16 May 2020.

Apart from previous year's the exhibition will be held this time in the new venue of National Exhibition and Convention Center in Shanghai. The exhibits include all types of bearings, and will cover special bearing industry equipment, precision measuring devices, transmission components, lubricant grease, solutions and accessories.

More opportunities for entering the Chinese bearing market, supplier development, and finding new business partners can be realized for International delegates during the B2B program sessions and at BearingEXPO International pavilion.

**There will be simultaneously 5 different exhibitions in parallel halls at the same date and venue:**

- ✓ The 20th China international Metallurgical Industry Expo
- ✓ The 18th China International Foundry Expo (METAL CHINA)
- ✓ The 18th China International Industrial Furnace Exhibition
- ✓ The 16th China International Refractory Material and Industrial Ceramic Exhibition
- ✓ The 14th China International Die Casting Industry Exhibition





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Today, Regal is still manufacturing some of the highest quality bearings attainable. Our components are made from the finest bearing grade steel available, manufactured in the most efficient manner in a modern facility by some of the highest skilled workers in the industry. Whether you are looking for a cylindrical mill support bearing or a bearing for use on your rolling mill, the Rollway bearings product range is able to offer an interchange product or a complete new design to keep the mill running.

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# NEW NSK

## *deep groove ball bearings for electric motors boost energy efficiency*

— The new NSK deep groove ball bearings contribute to the energy-efficient operation of electric motors

The low energy consumption of electric drives is an important target in many industrial applications, and rolling bearings can play a role in delivering this ambition. NSK demonstrates this effect with a new series of deep groove ball bearings that generates up to 80% less energy loss, a factor that has a positive effect on the energy efficiency of electric motors.

Before this development, NSK conducted an intensive investigation into the parameters influencing the energy loss of bearings, drawing a number of interesting conclusions. As a result, the new bearing series uses new grease that has been specially developed for friction reduction, while the grease filling level has also been optimised.

In comparison with a conventional deep groove ball bearing, the new NSK high-efficiency bearings demonstrate 60% less friction when using a steel cage. If a plastic cage is used, internal friction is reduced even further, by almost 80%. As a further benefit, service life with the new grease is increased by a factor of 2.7.

### **About NSK Europe**

*NSK Europe Ltd. is the European organisation of the Tokyo-based bearing manufacturer NSK, which was founded in Japan in 1916 and today employs around 31,000 people in its worldwide operations. The products and solutions provided by the industrial and automotive supplier can be found wherever things move. In addition to nearly all types of rolling bearings, the company's portfolio includes housed*

*bearings, linear technology, wheel bearing units, transmission and engine bearings and steering systems. The company is oriented to perfection in all of its business activities. Its aim is quality leadership in its industry, which it strives for through a continuous process of improvement, excellent product development, optimised production processes and customer-oriented service processes.*  
[www.nskeurope.com](http://www.nskeurope.com)

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NSK Deutschland GmbH  
Harkortstraße 15  
40880 Ratingen  
Germany*

# Joint Research and Simulation Software for an Optimized Rolling Bearing Friction Model

*by FVA, the Research Association for Drive Technology, and the FVA-Workbench*



— FVA-Workbench - The professional simulation platform for transmission systems

For individual companies, and especially SMEs, research is a cost-intensive undertaking that is often associated with high risks. For this reason, many gear manufacturers rely on joint research with other industrial enterprises. This allows companies across the industry to save costs, reduce personal risk, and collectively benefit from new discoveries. FVA (Forschungsvereinigung Antriebstechnik e.V.) has been conducting joint research in the field of drive technology for more than 50 years to promote cooperation between organizations. With a research

volume of more than 14.9 million euros as well as 224 projects and studies in 2018 alone [1], the FVA represents a true success story for its members.

## **The FVA-Workbench Bundles Hundreds of Research Findings in One Platform**

Numerous calculation methods for the design and calculation of gearboxes, which have been valued by the industry for many years, have been developed and tested by leading research institutes within the framework of joint

industrial research. It is impossible for a single engineer to possess this amount of research knowledge. Mastery of the contents of even a single research project can hardly be achieved in day-to-day business.

FVA GmbH develops the FVA-Workbench to provide unlimited access to these research findings. The software bundles the results and makes them available to the drive technology industry on a manufacturer-neutral and cross-sector basis, enabling companies to develop individual products at the highest

$$M_{total}=M_{hydr}+M_{irr}+M_{Plansch}+M_{Diff}+M_{Bord} \quad (1)$$

level. This simple, high-performance software gives users access to research results in their daily business.

### Increased Efficiency for Reduced CO<sub>2</sub> Emissions

Easy access to extensive research knowledge is important to be able to quickly respond to changing regulatory and market conditions. There is no time to study hundreds of research journals and findings. For example, current legislation requires the reduction of CO<sub>2</sub> emissions. Above all, power losses must be reduced to save energy.

Reliable information on expected losses is essential for system manufacturers and gearbox users. Losses occur in all contacts with relative motion, especially in bearings and gears within gear units.

### Extensive Documentation for Calculation of Power Losses

An unmanageable amount of literature, studies, and experiments exist for the calculation of power losses. A tool such as the FVA-Workbench that provides access to experimentally validated methods is essential, especially when a reliable statement about losses is a purchasing factor.

Power loss in gearboxes has been thoroughly investigated and documented. Loss considerations for the load-dependent and independent shares of power losses are listed, experimentally proven, and precisely calculated in the research reports from FVA Research Projects 69 I through VIII, dating from 1989 to the present. For gears, a very good correlation can be observed to date, with real measurements from gear units. In the past, manufacturers' documented catalog methods were used for rolling bearings. In some cases, however, significant deviations from measurements have been observed [2].

### Estimation of Power Losses According to Palmgren

Palmgren is the most common method for estimating power losses. This often forms the theoretical basis for estimation of losses in a technical environment. For estimation according to Palmgren, power losses are divided into load-dependent and independent components. The two amounts are largely determined using bearing-specific coefficients. All relevant effects must be included in these coefficients. This makes the Palmgren model comparatively simple. However, additional effects which are particularly important in rolling bearing technology cannot be taken into account. Influences from the type of lubrication or loads, for example from dominant tilting moments, cannot be represented. Therefore, an approach must be found in which the loss components are specifically listed for a design-dependent evaluation of bearing losses.

### More Precise Calculations Thanks to IMKT, FZG, and FVA

A new approach for the characterization of rolling bearing power losses based on seven FVA research projects and five dissertations was developed at the University of Hannover IMKT under Professor Poll. As part of the project, the newly developed approach was tested and validated on the test bench at the FZG of the TU Munich. The FVA-Workbench simulation software brings this theory into practice.

The foundation of the methodology is a precise resolution of the rolling contacts in the bearing, the tribological characterization, and the allocation of the loss components to the loss mechanisms. The total power loss is the sum of the individual losses in the bearing. The following individual friction components are considered: the hydrodynamic rolling friction  $M_{hydr}$ ,

hysteresis friction  $M_{irr}$ , splash losses  $M_{Plansch}$ , differential slip  $M_{Diff}$ , and the rib friction  $M_{Bord}$ . Friction from cage contact and seals is neglected. This results in the following general relationship:  $M_{total}=M_{hydr}+M_{irr}+M_{Plansch}+M_{Diff}+M_{Bord}(1)$

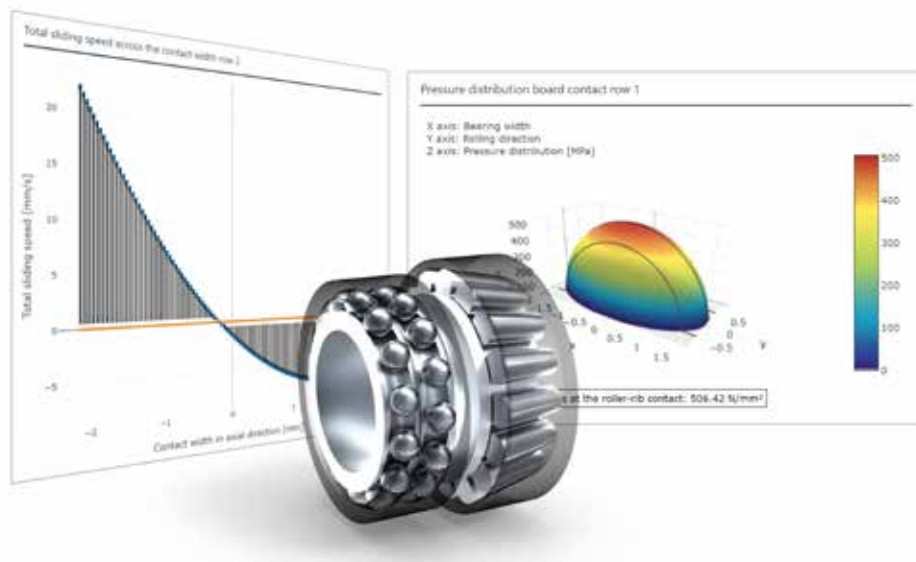
The geometries of the rolling bearings are needed to calculate the contacts. The Breuer calculation approaches from FVA 184 are used to determine the internal load distribution on the rolling elements and the pressure distribution on the rollers. Thus, all influences from the gear system are fully considered [4].

Different contacts and loss mechanisms occur in different rolling bearing designs. Formula (1) must be modified to take this into account. The ribs of deep groove ball bearings and angular contact ball bearings are ignored due to their design. For cylindrical roller bearings, on the other hand, the differential slip is ignored; however, if the bearing type has ribs, the rib friction is considered.

The calculation of the hydrodynamic rolling friction is based on the EHD theory. For this purpose, the bearing pressure across the contact length and contact width are resolved. The rolling element pressure can be derived from the stiffness calculation. All load components are considered in the stiffness calculation. The losses from irreversible deformation are determined by the material characteristics of the rolling bearings. The material damping influences the extent to which the irreversible deformation contributes to the total losses.

The splash losses in the rolling bearings are taken into account by many different influences. For a fast and powerful calculation, a CFD calculation is only of limited use. Therefore, the splash losses are determined based on the measurements from FVA 352. The losses can be derived from these measurements,





—FVA-Workbench - Optimized Rolling Bearing Friction Model

depending on the oil level in the bearing and the bearing geometry.

With grease lubrication, splash losses are neglected. This is based on the assumption that the grease was completely pushed out of the contact during the first revolutions of the bearing. The contact is supplied with the base oil viscosity by a lubricant. Thus, splashing cannot occur.

For bearings with point contact, the differential slip must also be considered. In addition to the more obvious deep groove ball bearings and angular ball bearings, this also occurs in tapered roller bearings with rib contact. The Heathcote effect and the bore movement that results if a rolling element runs on a raceway with an operating pressure angle other than  $0^\circ$  are considered in this calculation.

The validation projects of FVA 364 IV and FVA 701 show an excellent accordance with the theory. Thus, significantly higher accuracy can be achieved compared to the factor-based catalog methods. These high-quality results are achieved by completely considering the pressure distribution and the environmental boundary conditions, such as tilting and bearing clearances.

### The FVA-Workbench Brings Theory into Practice

In practice, precise statements regarding losses in the drive are required as

early as the project planning phase. Every bearing and every auxiliary drive counts. With the new statements from FVA 701 I and III, manufacturers can now provide these statements and prove them with investigations from joint research. The FVA-Workbench supports engineers with an easy-to-use calculation model, comprehensive input consistency checks, and easy-to-interpret results. With the results from FVA 701 II, gearbox manufacturers are now able to provide reliable statements regarding losses in the offer phase and better describe the loss mechanisms.

### FVA-Workbench – The Simulation Tool for Efficient Gear Design

The FVA-Workbench is a manufacturer-neutral software solution for the modeling, parameterization, and calculation of transmission systems. It bundles 50 years of research and development from the FVA expert network into a single platform and makes this accumulated knowledge directly available for industrial application. The software includes an impressive scope of calculations for all phenomena relevant to the design of drive systems. Gearbox systems can be developed in shorter cycles and in leading quality.

### Seminars on the Cutting Edge of Research

For detailed insight into damage

mechanisms and how loss calculation plays a decisive role, FVA Software and Service GmbH regularly offers seminars with well-known experts on the subjects of gearbox calculation and rolling bearing damage. In these seminars, you will learn about what makes a good design, how damage occurs, and how it can be avoided. At the same time, you can also make contact with FVA experts and other participants with similar interests.

### Upcoming Events

17 – 18.12.2019: Rolling Bearing Damage Analysis, Garching near Munich  
18 – 19.02.2020: Gear Damage and its Influencing Factors, Garching near Munich  
24.03 – 25.03.2020: Gearbox Design Using the FVA-Workbench, Garching near Munich

### More Information:

<https://www.fva-service.de>

[1] Forschungsvereinigung Antriebstechnik e.V. 2018 Annual Report

[2] FVA 364 IV - Service Life - Industrial Gear Units - Rolling Bearings (Lager2 extensions)

[3] FVA 382 - Influence of the Oil Level on the Friction Moment of Rolling Bearings with Line Contact

[4] <https://www.fva-service.de/en/fva-workbench/features/overall-system-calculations/>

***JANUARY - DECEMBER***

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# **2020**

***EVENTS  
EXHIBITIONS  
CONFERENCES***

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## 2020 AGENDA

## EVENTS, EXHIBITIONS &amp; CONFERENCES

## AGRICULTURE

**LAMMA**

07 Jan - 08 Jan 2020  
Birmingham / UK

Farm machinery, equipment  
and services show

[www.lammashow.com](http://www.lammashow.com)

## STEEL

**STEELEFAB**

13 Jan - 16 Jan 2020  
Sharjah / UAE

Steel production and metal  
manufacturing event

[www.steelfabme.com](http://www.steelfabme.com)

## AUTOMATION

**ALL AUTOMATION**

15 Jan - 16 Jan 2020  
Hamburg / Germany

Regional automation show

[www.automation-hamburg.com](http://www.automation-hamburg.com)

## TEXTILE MACHINERY

**GARMENTECH**

15 Jan - 18 Jan 2020  
Dhaka / Bangladesh

Show for textile machinery

[www.garmentechdhaka.com](http://www.garmentechdhaka.com)

## AGRICULTURE

**AGROMACH EXPO**

22 Jan - 25 Jan 2020  
Budapest / Hungary

International agriculture  
machinery exhibition

[www.agromasexpo.hu](http://www.agromasexpo.hu)

## MACHINE TOOLS

**IMTEX 2020**

23 Jan - 28 Jan 2020  
Bangalore / India

Flagship event for the Indian  
machine tool industry

[www.imtex.in](http://www.imtex.in)



## MATERIALS HANDLING

**UPAKOVKA**

28 Jan - 31 Jan 2020  
Moscow / Russia

Russian version of Interpack

[www.upakovka-tradefair.com](http://www.upakovka-tradefair.com)

## AGRICULTURE

**FIERAGRICOLA**

29 Jan - 01 Feb 2020  
Verona / Italy

International agricultural  
technologies show

[www.fieragricola.it](http://www.fieragricola.it)

## AGRICULTURE

**AGROTICA**

30 Jan - 02 Feb 2020  
Thessalonika / Greece

International Fair for Agricultural  
Machinery, Equipment and Supplies

[agrotica.helexpo.gr](http://agrotica.helexpo.gr)

## MACHINE TOOLS

**BIEMH CEVISAMA**

03 Feb - 07 Feb 2020  
Valencia / Spain

Metal cutting, metal forming and  
machine tools exhibition

[cevisama.feriavalencia.com](http://cevisama.feriavalencia.com)

## AUTOMATION

**AUTO EXPO - COMPONENTS**

06 Feb - 09 Feb 2020  
New Delhi / India

Auto components show

[www.autoexpo.in](http://www.autoexpo.in)

## MANUFACTURING

**SOUTHERN MANUFACTURING**

11 Feb - 13 Feb 2020  
Farnborough / UK

Regional manufacturing technology,  
electronics and subcontracting exhibition

[www.industrysouth.co.uk](http://www.industrysouth.co.uk)



Angular Contact Ball Bearing

The image shows two angular contact ball bearings in the foreground, one slightly behind the other, highlighting their internal structure with balls and a cage. In the background, there is a technical line drawing of a machine tool, possibly a lathe or mill, with a workpiece being machined, and a control panel with two windows.



Radial Bearing

The image displays three different types of radial ball bearings in the foreground, showing their outer rings, inner rings, and ball cages. In the background, there are technical line drawings of a motor and a pump or similar mechanical component.

Since 1966 **TPI** has been in bearing industry providing a massive range of custom design bearings for global industry. The key to success is our ability to develop bearing designs and automated production facilities, which empower us to constantly deliver excellent product and service to all of our customers.



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Multi-platform

**UAS4.0**  
Analysis Software

## APPLICATIONS



### MECHANICAL

Detect defects in any mechanical system.



### LEAKS

Find pressure and vacuum leaks in noisy conditions.



### LUBRICATION

Avoid over/under lubrication. Grease bearings right.



### ELECTRICAL

Inspect medium and high voltage systems for arcing, tracking and corona.



### VALVES

Assess valve tightness



### STEAM

Find faulty steam traps and leaking components



### HYDRAULICS

Troubleshoot any hydraulic system for passing and blockages.



### TIGHTNESS

Determine the tightness of any enclosed volume

## 2020 AGENDA

## EVENTS, EXHIBITIONS &amp; CONFERENCES

## MANUFACTURING

**EXPO MANUFACTURA**

11 Feb - 13 Feb 2020  
Monterrey / Mexico

Manufacturing and equipment expo

[www.expomanufactura.com.mx](http://www.expomanufactura.com.mx)

## AGRICULTURE

**WORLD AG EXPO**

11 Feb - 13 Feb 2020  
California / USA

International Agricultural Expo

[www.worldagexpo.com](http://www.worldagexpo.com)

## MEDICAL TECHNOLOGY

**MD&M WEST**

11 Feb - 13 Feb 2020  
Anaheim / USA

Cutting-edge medical technology

[mdmwest.mddionline.com](http://mdmwest.mddionline.com)

## PUMP &amp; VALVES

**PUMP & VALVES**

12 Feb - 13 Feb 2020  
Dortmund / Germany

Trade show for pumps, valves  
& industrial processes

[www.pumpsvalves-dortmund.de/en](http://www.pumpsvalves-dortmund.de/en)

## MAINTENANCE

**MAINTENANCE DORTMUND**

12 Feb - 13 Feb 2020  
Dortmund / Germany

Maintenance show of the Ruhr area

[www.maintenance-dortmund.de/en](http://www.maintenance-dortmund.de/en)

RECOMMENDED  
Bearing  
NEWS

## MANUFACTURING

**THAILAND INDUSTRY**

12 Feb - 15 Feb 2020  
Bangkok / Thailand

Leading manufacturing show of Thailand

[www.thailandindustrialfair.com](http://www.thailandindustrialfair.com)

## ENGINEERING

**FORNITORE OFFRESI**

20 Feb - 22 Feb 2020  
Erba / Italy

Mechanical Engineering exhibition for  
subcontractors from the engineering sector

[www.fornitoreoffresi.com](http://www.fornitoreoffresi.com)

## MANUFACTURING

**MANUFACTURING JAPAN**

26 Feb - 28 Feb 2020  
Chiba / Japan

Cutting edge mechanical components/  
manufacturing services

[www.japan-mfg.jp](http://www.japan-mfg.jp)

## AUTOMATION

**AUTOMATION WORLD**

04 Mar - 06 Mar 2020  
Seoul / South Korea

Smart manufacturing and automation fair

[www.automationworld.co.kr](http://www.automationworld.co.kr)

## AUTOMOTIVE

**AUTOMECHANIKA**

05 Mar - 07 Mar 2020  
Ho Chi Minh / Vietnam

International automotive parts exhibition

[www.automechanika-hcmc.com](http://www.automechanika-hcmc.com)

## MRO

**IMVAC / CBM CONNECT**

09 Mar - 12 Mar 2020  
Johannesburg / South Africa

Condition monitoring and reliability  
professionals conference & exhibition

[thebcmconference.com](http://thebcmconference.com)

RECOMMENDED  
Bearing  
NEWS





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Motor Sport

### Design Service

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The flexible manufacturing techniques used in the production of linkage components allow non-standard derivatives to be readily manufactured. We produce hundreds of customer specials with varying dimensions, thread forms and features. We welcome your enquiries - please contact us at [sales@dunlopctl.com](mailto:sales@dunlopctl.com)

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As a proud manufacturer we want to help Europe's industry flourish and to meet the world's evolving appetite for innovative designs and responsibly produced quality manufactured products.



Construction

**Agriculture  
Automotive  
Construction  
Industrial  
Motor Sport**



Male Rod Ends



Female Rod Ends



Spherical Bearings



Ball Joints



Clevis Joints



Linkages



Ball Studs



Rubber Dust Seals &amp; Spacers

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For enquiries please contact [sales@dunlopbtll.com](mailto:sales@dunlopbtll.com)



### European Distribution Centre:

MPT House, Brunswick Road, Cobbs Wood Ind Est, Ashford, Kent, TN23 1EL. *United Kingdom*

### UK Manufacturing Centre:

Unit 46, Werdoth Way, No. 1 Ind Est, Consett, County Durham, DH8 6SZ *United Kingdom*





# 2020 AGENDA

# EVENTS, EXHIBITIONS & CONFERENCES

## MATERIAL HANDLING

### LOGIMAT

10 Mar - 12 Mar 2020

Stuttgart / Germany

International trade fair for intralogistics solutions and process management

[www.logimat-messe.de/en](http://www.logimat-messe.de/en)

## FOOD & BEVERAGE

### CFIA

10 Mar - 12 Mar 2020

Rennes / France

Dedicated to production, maintenance, packaging and logistics for the manufacturers in the food-processing

[www.cfiaexpo.com](http://www.cfiaexpo.com)

## AGRICULTURE

### EXPOAGRO

10 Mar - 13 Mar 2020

Buenos Aires / Argentina

Agriculture machinery exhibition

[www.expoagro.com.ar](http://www.expoagro.com.ar)

## FLUID POWER

### IFPE 2020

10 Mar - 14 Mar 2020

Las Vegas / USA

Showcase the latest innovations and expertise in the fluid power, power transmission and motion control industries

[www.ifpe.com](http://www.ifpe.com)



## CONSTRUCTION

### CONEXPO

10 Mar - 14 Mar 2020

Las Vegas / USA

Construction trade show

[www.conexpoconagg.com](http://www.conexpoconagg.com)



## OIL & GAS

### AOG

11 Mar - 13 Mar 2020

Perth / Australia

Australia's oil & gas event

[www.aogexpo.com.au](http://www.aogexpo.com.au)

## TEXTILE MACHINERY

### TECHTEXTIL NORTH AMERICA

12 Mar - 14 Mar 2020

Atlanta / USA

Technical textile industry fair

[www.techtextil-northamerica.us.messefrankfurt.com](http://www.techtextil-northamerica.us.messefrankfurt.com)

## MANUFACTURING

### WIN EURASIA

12 Mar - 15 Mar 2020

Istanbul / Turkey

Manufacturing technology, automation, material handling exhibition

[www.win-eurasia.com/en](http://www.win-eurasia.com/en)



## MOTION & DRIVES

### IAMD EURASIA

12 Mar - 15 Mar 2020

Istanbul / Turkey

International trade fair for integrated automation, motion & drives

[www.win-eurasia.com/en](http://www.win-eurasia.com/en)



## METAL WORKING

### METAL WORKING EURASIA

12 Mar - 15 Mar 2020

Istanbul / Turkey

Metal industry fair

[www.win-eurasia.com/en](http://www.win-eurasia.com/en)



## MATERIALS HANDLING

### CEMAT EURASIA

12 Mar - 15 Mar 2020

Istanbul / Turkey

International trade fair for materials handling, automation technology, transport systems and logistics

[www.win-eurasia.com/en](http://www.win-eurasia.com/en)



## AGRICULTURE

### AGROTECH

13 Mar - 15 Mar 2020

Kielce / Poland

Agriculture machinery fair

[www.targikielce.pl/en/I41](http://www.targikielce.pl/en/I41)



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SPECIFICATION TABLE	
Material	ABEC 5
Surface Finish	Cronidur 30 per AMS-5898
Hardness	Rc 58 - 62
Inner Diameter	16 - 7/16" (.4375)
Outer Diameter	(2.7559)
Width	.0037-.0041
Angle	27.5° Ref.
Runout	.0012 Ref.
Flatness	3%
Roundness	.017 Max.



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AS9100  
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NADCAP  
CHEMICAL PROCESSING

## 2020 AGENDA

## EVENTS, EXHIBITIONS &amp; CONFERENCES

## MATERIALS HANDLING

**PROPAK VIETNAM**

24 Mar - 26 Mar 2020  
Ho Chi Minh / Vietnam

Processing, packaging,  
handling machinery

[www.propakvietnam.com](http://www.propakvietnam.com)

## MINING

**UZMINING EXPO**

24 Mar - 26 Mar 2020  
Tashkent / Uzbekistan

International Mining Industry Exhibition

[www.ieg.uz/en/uzminingexpo](http://www.ieg.uz/en/uzminingexpo)

## MAINTENANCE

**MAINTENANCE ANTWERP**

25 Mar - 26 Mar 2020  
Antwerp / Belgium

Maintenance trade show, a boost  
for the maintenance industry

[www.maintenance-expo.be/en](http://www.maintenance-expo.be/en)

## CEMENT

**CEMENTTECH**

25 Mar - 27 Mar 2020  
Anhui / China

China International Cement industry  
exhibition and conference

[www.cementtech.org](http://www.cementtech.org)

## MANUFACTURING

**MECSPE**

26 Mar - 28 Mar 2020  
Parma / Italy

Fair for the manufacturing industry

[www.mecspe.com](http://www.mecspe.com)

RECOMMENDED  
Bearing  
NEWS

## RENEWABLE ENERGY

**REE 2020**

26 Mar - 28 Mar 2020  
Jakarta / Indonesia

International renewable energy and  
environment technology exhibition

[www.ree-indonesia.net](http://www.ree-indonesia.net)

## MRO

**IMVAC / CBM CONNECT**

30 Mar - 02 Apr 2020  
Abu Dhabi / UEA

Condition monitoring and reliability  
professionals conference & exhibition

[thebcmconference.com](http://thebcmconference.com)

RECOMMENDED  
Bearing  
NEWS

## TUBE

**TUBE**

30 Mar - 03 Apr 2020  
Dusseldorf / Germany

International Tube and Pipe Trade Fair

[www.tube-tradefair.com](http://www.tube-tradefair.com)

## BEARING

**BEARING WORLD**

31 Mar - 01 Apr 2020  
Hannover / Germany

International academic  
bearing conference

[www.bearingworld.org](http://www.bearingworld.org)

RECOMMENDED  
Bearing  
EXPO &  
Conference

## MANUFACTURING

**GLOBAL INDUSTRIE / MIDEST**

31 Mar - 03 Apr 2020  
Paris / France

Global Industry fair

[www.global-industrie.com/en](http://www.global-industrie.com/en)

RECOMMENDED  
Bearing  
NEWS



## 2020 AGENDA

## EVENTS, EXHIBITIONS &amp; CONFERENCES

## MARINE

**NAVEXPO**

01 Apr - 03 Apr 2020  
Lorient / France

The maritime business meeting and expo

[www.navexpo.com](http://www.navexpo.com)

## AUTOMOTIVE

**AUTOMECHANIKA**

02 Apr - 05 Apr 2020  
Istanbul / Turkey

International automotive parts exhibition

[automechanika-istanbul.tr.messefrankfurt.com/istanbul/en.html](http://automechanika-istanbul.tr.messefrankfurt.com/istanbul/en.html)

## MACHINE TOOL

**CCMT 2020**

07 Apr - 11 Apr 2020  
Shanghai / China

China CNC Machine Tool Fair

[www.ccmtshow.com](http://www.ccmtshow.com)

## MINING

**MONGOLIA MINING**

08 Apr - 10 Apr 2020  
Ulaanbaatar / Mongolia

International Mining and Oil/Gas Expo

[www.mongolia-mining.org](http://www.mongolia-mining.org)

## MATERIALS HANDLING

**KOREA MAT**

14 Apr - 17 Apr 2020  
Kintex / Korea

Materials handling & logistics

[www.koreamat.org](http://www.koreamat.org)

## AUTOMOTIVE

**KIAE**

15 Apr - 17 Apr 2020  
Astana / Kazakhstan

Kazakhstan International  
Automotive Expo

[www.kiae.kz](http://www.kiae.kz)

## TRIBOLOGY

**K-TRIB 2020**

19 Apr - 22 Apr 2020  
Seoul / Korea

2nd Korea-Tribology  
International Symposium

[k-trib2020.org](http://k-trib2020.org)

## RAW MATERIAL

**COALTRANS CHINA**

20 Apr - 22 Apr 2020  
Shanghai / China

Coaltrans Conferences

[www.coaltrans.com](http://www.coaltrans.com)

## GENERAL INDUSTRY

**HANNOVER MESSE**

20 Apr - 24 Apr 2020  
Hannover / Germany

Industrial exhibition for motion drive  
automation & industrial supply

[www.hannovermesse.de](http://www.hannovermesse.de)



## MAINTENANCE

**MAINTENANCE**

21 Apr - 23 Apr 2020  
Gorinchem / Netherlands

Technologies for industrial  
maintenance and asset management

[www.maintenance-gorinchem.com/en](http://www.maintenance-gorinchem.com/en)

## AUTOMATION

**DRIVES AND CONTROLS 2020**

21 Apr - 23 Apr 2020  
Birmingham / England

The automation, power transmission  
and motion engineering event

[www.drives-expo.com](http://www.drives-expo.com)

## MINING

**MININGWORLD RUSSIA**

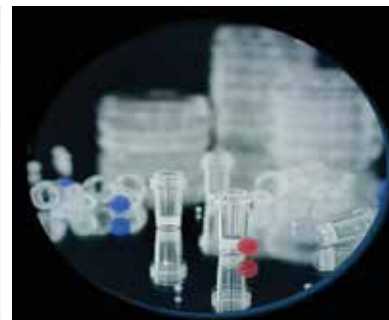
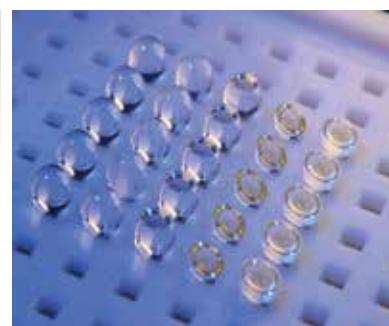
21 Apr - 23 Apr 2020  
Moscow / Russia

International exhibition of machines  
and equipment for mining, processing  
and transportation of minerals

[www.miningworld.ru](http://www.miningworld.ru)



## ***Global Production, Local Service***



**TSUBAKI NAKASHIMA CO.,LTD.**

Leading global supplier of precision balls, rollers, and components

[www.tsubaki-nakashima.com](http://www.tsubaki-nakashima.com)



# OPTIMIZE LUBRICATION & EXTEND BEARINGS LIFETIME

An Ultrasound instrument is the perfect tool for lubrication management

60-80% of premature bearing failures are lubrication related

Avoid downtime and premature bearing failures with Ultrasound Assisted Lubrication

## ULTRAPROBE 401 DIGITAL GREASE CADDY

Can be attached to a grease gun for ease of use

Know when to stop adding lubrication and record the amount used

Set up and store routes for easy condition based lubrication

Trend and report your lubrication data with UE Systems free DMS Software



The Path to  
**LUBRICATION EXCELLENCE**

**DOWNLOAD NOW FOR FREE AND START  
IMPROVING YOUR LUBRICATION PRACTICES**

[www.uesystems.eu/ebook-lubrication](http://www.uesystems.eu/ebook-lubrication)

**UE Systems Europe** - Windmolen 20, 7609 NN Almelo, The Netherlands  
**T:** +31 546 725 125 | **E:** [info@uesystems.eu](mailto:info@uesystems.eu) | **W:** [www.uesystems.eu](http://www.uesystems.eu)

**ue**  
**SYSTEMS INC**  
The *ultrasound* approach



# 2020 AGENDA

# EVENTS, EXHIBITIONS & CONFERENCES

APRIL

## AGRICULTURE

### AGRISHOW

27 Apr - 01 May 2020  
Sao Paulo / Brazil

Agriculture machinery exhibition

[www.agrishow.com.br](http://www.agrishow.com.br)

MAY

## MINING

### CIM

03 May - 06 May 2020  
Vancouver / Canada

Canada's mining market place

[convention.cim.org](http://convention.cim.org)

## STEEL

### AISTECH

04 May - 07 May 2020  
Cleveland / USA

Conference & Exhibition for  
Iron & Steel Technology

[www.aist.org/conference-expositions/aistech](http://www.aist.org/conference-expositions/aistech)

## OFFSHORE

### OTC

04 May - 07 May 2020  
Houston / USA

The Offshore Technology Conference

[2020.otcnet.org](http://2020.otcnet.org)

## RAW MATERIAL

### IFAT

04 May - 08 May 2020  
Munchen / Germany

Water, Sewage, Waste and Raw  
Materials management Fair

[www.ifat.de](http://www.ifat.de)

## ASSURANCE

### CONTROL 2020

05 May - 08 May 2020  
Stuttgart / Germany

International trade fair for  
quality assurance

[www.control-messe.de/en](http://www.control-messe.de/en)

## MANUFACTURING

### FEIMEC

05 May - 09 May 2020  
Sao Paulo / Brazil

Machinery and Equipment exhibition

[www.feimec.com.br/en/about.html](http://www.feimec.com.br/en/about.html)

## AGRICULTURE

### AGRITECHNICA ASIA

07 May - 09 May 2020  
Bangkok / Thailand

The International exhibition for  
agriculture machinery and engineering

[www.agritechnica-asia.com](http://www.agritechnica-asia.com)



## MRO

### IMVAC / CBM CONNECT

11 May - 14 May 2020  
Amsterdam / Netherlands

Condition monitoring and reliability  
professionals conference & exhibition

[thebcmconference.com](http://thebcmconference.com)



## METAL

### FABTECHEXPO

12 May - 14 May 2020  
Mexico City / Mexico

The Leading Metal Forming, Fabricating,  
Welding and Finishing Event in Mexico

[mexico.fabtechexpo.com](http://mexico.fabtechexpo.com)

## 2020 AGENDA

## EVENTS, EXHIBITIONS &amp; CONFERENCES

## MOTION &amp; DRIVES

**IAMD BEIJING**

13 May - 15 May 2020  
Beijing / China

International Intelligent  
Manufacturing Exhibition

[www.iamdbeijing.com/En](http://www.iamdbeijing.com/En)

RECOMMENDED  
Bearing  
NEWS

## ROBOTICS

**CIROS**

13 May - 15 May 2020  
Shanghai / China

China international robotics show

[en.ciros.com.cn](http://en.ciros.com.cn)

RECOMMENDED  
Bearing  
NEWS

## BEARINGEXPO

**BEARING 2020**

13 May - 16 May 2020  
Shanghai / China

China International Bearing  
Industrial Exhibition

[www.bearing-expo.com/shanghai2020](http://www.bearing-expo.com/shanghai2020)

RECOMMENDED  
Bearing  
EXPO &  
Conference

## METALLURGY

**METAL & METALLURGY CHINA**

13 Mar - 16 May 2020  
Shanghai / China

Largest exhibition in the equipment  
manufacturing industry in Asia

[www.mm-china.com](http://www.mm-china.com)

RECOMMENDED  
Bearing  
NEWS

## ROBOTICS

**IARS**

16 May - 19 May 2020  
San Francisco / USA

Industrial Automation and Robotics Show

[waset.org/locations](http://waset.org/locations)

## MINING

**CON MINE**

18 May - 20 May 2020  
Jakarta / Indonesia

International construction,  
infrastructure and mining exhibition

[www.con-mine.net](http://www.con-mine.net)

## LUBRICATION

**LUBE INDONESIA**

18 May - 20 May 2020  
Jakarta / Indonesia

International lubricants, grease,  
maintenance and technology exhibition

[www.lube-indonesia.net](http://www.lube-indonesia.net)

## RAILWAY

**RAILWAYTECH INDONESIA**

18 May - 20 May 2020  
Jakarta / Indonesia

International railway technology,  
equipment systems and services  
exhibition and conference

[www.railwaytech-indonesia.com](http://www.railwaytech-indonesia.com)

## AUTOMOTIVE

**INAPA**

18 May - 20 May 2020  
Jakarta / Indonesia

International automotive parts,  
accessories and equipments exhibition

[inapa-exhibition.net](http://inapa-exhibition.net)

## METALWORKING

**METALLOBRABOTKA 2020**

25 May - 29 May 2020  
Moscow / Russia

Equipment, Instruments and Tools  
for Metalworking Industry fair

[www.metobr-expo.ru/en](http://www.metobr-expo.ru/en)

## ELECTRIC MOTOR

**CWIEME**

26 May - 28 May 2020  
Berlin / Germany

Coil winding, electric motor and  
transformer manufacturing exhibition

[www.coilwindingexpo.com/berlin](http://www.coilwindingexpo.com/berlin)

## AUTOMATION

**SPS IPC DRIVES**

26 May - 28 May 2020  
Parma / Italy

Electric automation - systems  
and components

[www.spsitalia.it](http://www.spsitalia.it)

## 2020 AGENDA

## EVENTS, EXHIBITIONS &amp; CONFERENCES

## MINING &amp; CONSTRUCTION

**CTT**

26 May - 29 May 2020  
Moscow / Russia

Part of BAUMA exhibition network

[bauma-ctt.ru/en](http://bauma-ctt.ru/en)

## ENGINEERING

**ENGINEERING EXPO**

29 May - 31 May 2020  
Pune / India

Regional engineering and  
manufacturing exhibition

[www.enggexpo.in](http://www.enggexpo.in)

## MANUFACTURING

**SMART MANUFACTURING  
EXPERIENCE**

02 Jun - 04 Jun 2020  
Pittsburgh / USA

Technology demonstrations  
and virtual reality event

[www.smartmanufacturingexperience.com](http://www.smartmanufacturingexperience.com)

## MACHINE TOOLS

**ITM POLSKA**

02 Jun - 05 Jun 2020  
Poznan / Poland

Machine tools and metal  
working exhibition

[www.itm-polska.pl](http://www.itm-polska.pl)

## MINING

**UGOL ROSSII & MINING**

02 Jun - 05 Jun 2020  
Novokuznetsk / Russia

Coal and metals mining,  
processing, handling expo

[www.ugol-rossii.com](http://www.ugol-rossii.com)

## MOTION &amp; DRIVES

**IAMD SHENZHEN**

02 Jun - 05 Jun 2020  
Shenzhen / China

The largest and most influential motion  
& driven show in South China

[www.ia-shenzhen.com](http://www.ia-shenzhen.com)

RECOMMENDED  
Bearing  
NEWS

## AUTOMOTIVE

**AUTOMECHANIKA DUBAI**

07 Jun - 09 Jun 2020  
Dubai / UAE

International automotive parts exhibition

[automechanika-dubai.ae.messefrankfurt.com/dubai/en.html](http://automechanika-dubai.ae.messefrankfurt.com/dubai/en.html)

## MOLDING

**ROSMOULD**

08 Jun - 10 Jun 2020  
Moscow / Russia

Mold making machinery and tooling

[www.rosmould.com](http://www.rosmould.com)

## PACKAGING MACHINERY

**ROSUPACK**

08 Jun - 11 Jun 2020  
Moscow / Russia

Exhibition for the packaging machinery

[www.rosupack.com](http://www.rosupack.com)

## MRO

**IMVAC / CBM CONNECT**

08 Jun - 11 Jun 2020  
Wuxi / China

Condition monitoring and reliability  
professionals conference & exhibition

[thebcmconference.com](http://thebcmconference.com)

RECOMMENDED  
Bearing  
NEWS

## LUBRICATION

**LUBMAT**

09 Jun - 10 Jun 2020  
Bilbao / Spain

Lubrication, tribology and  
condition monitoring technology  
conference and exhibition

[www.lubmat.org/en/home](http://www.lubmat.org/en/home)



## 2020 AGENDA

## EVENTS, EXHIBITIONS & CONFERENCES

JUNE

### MEDICAL TECHNOLOGY

#### MD&M EAST

09 Jun - 10 Jun 2020  
New York / USA

Cutting-edge medical technology

[advancedmanufacturingnewyork.com](http://advancedmanufacturingnewyork.com)

### MATERIALS HANDLING

#### SIL

09 Jun - 10 Jun 2020  
Barcelona / Spain

Exhibition for logistics and material handling

[www.silbcn.com](http://www.silbcn.com)

### AUTOMOTIVE

#### AUTOMOTIVE TESTING EXPO

16 Jun - 18 Jun 2020  
Stuttgart / Germany

Vehicle and component testing, validation technologies and services show

[www.testing-expo.com/europe/en](http://www.testing-expo.com/europe/en)

### AUTOMATION

#### AUTOMATICA

16 Jun - 19 Jun 2020  
Munich / Germany

Smart automation and robotics exhibition

[www.automatica-munich.com](http://www.automatica-munich.com)

### FOOD & BEVERAGE

#### FISTAL TECNOLOGIA

16 Jun - 19 Jun 2020  
Sao Paulo / Brazil

Food and beverage machinery & processing event

[www.fispaltecnologia.com.br](http://www.fispaltecnologia.com.br)

### MINING

#### DRC MINING WEEK

17 Jun - 19 Jun 2020  
Lubumashi / Congo

The largest mining and industrial platform in the Congo

[www.drcminingweek.com](http://www.drcminingweek.com)

### FOOD & BEVERAGE

#### FOOMA

23 Jun - 26 Jun 2020  
Osaka / Japan

Food & beverage machinery exhibition

[www.foomajapan.jp](http://www.foomajapan.jp)

### AUTOMOTIVE

#### DRITEV

24 Jun - 25 Jun 2020  
Bonn / Germany

Drivetrain system for vehicles and transmission developers conference

[www.vdi-wissensforum.de/en/dritev](http://www.vdi-wissensforum.de/en/dritev)

### INDUSTRY

#### MANUFACTURING EXPO

24 Jun - 27 Jun 2020  
Bangkok / Thailand

Manufacturing and equipment expo

[www.manufacturing-expo.com](http://www.manufacturing-expo.com)

JULY

### MRO

#### IMVAC / CBM CONNECT

Jul 2020  
Kuala Lumpur / Malaysia

Condition monitoring and reliability professionals conference & exhibition

[thebcmconference.com](http://thebcmconference.com)

RECOMMENDED  
Bearing  
NEWS

### MOTION ELECTRONICS

#### PCIM ASIA

01 Jul - 03 Jul 2020  
Shanghai / China

Power Conversion, Intelligent Motion event in China, for specialists in power electronics and its applications in drive technologies

[www.pcimasia-expo.com.cn](http://www.pcimasia-expo.com.cn)

### MACHINE TOOLS

#### AMTEX 2020

10 Jul - 13 Jul 2020  
New Delhi / India

North India's biggest exhibition on metal cutting and machine tools industry

[www.amtex-expo.com/en-gb.html](http://www.amtex-expo.com/en-gb.html)

# Supplying industry with quality parts and services since 1975



## **Stock Holding**

Reduce your stock and let Bowman hold it for you



## **Testing**

In-house facility is able to test bearings on behalf of our customers



## **Range**

The largest and most extensive ranges from one supplier



## **Special Sizes**

Rapid modification of standard parts and manufacture of non-standard sizes



## **Quality**

Our quality products and services are second to none

[www.bowman.co.uk](http://www.bowman.co.uk)



# BENTLY BEARINGS™

**GO OIL FREE!**  
**BENTLY BEARINGS™**  
**BY NEW WAY®**

**Offering magnetic bearing  
performance with the cost  
and simplicity of oil bearings.**



**EXTERNALLY PRESSURIZED POROUS (EPP)**

## GAS BEARINGS



### THE BEARING IS THE SEAL

Enable new machine designs by combining bearing and seal function. Bearings get closer to the work, reducing impeller clearances.

### HIGH LOAD CAPACITY

Load capacity is a function of input pressure. 900 PSI unit loading has been demonstrated with 1000 PSI input pressure.

### RUN ON PROCESS GAS

Bearings can run "Hot Immersed" on process gas. High temperature bearings are capable of 1000°C in continuous duty.

Don Bently, founder of Bently Nevada, started the Bently Pressurized Bearing Co. See what he had to say about the topic.  
[bentlybearings.com/chapter23](http://bentlybearings.com/chapter23)

### DIRECTLY RETROFITTABLE

Bently Bearings™ fit in the same space as oil bearings. Retrofit your problem oil bearing machine to gas bearings in place.

### HIGH STABILITY

Virtually zero friction means there is no destabilizing cross coupled stiffness. Whirl within the bearing is eliminated.

### EFFICIENCY AND RELIABILITY

Bently Bearings™ have two orders of magnitude less shear than oil. No contact wear at startup or shutdown means better reliability.

Dr. San Andres of the Turbolab at Texas A&M is a leading expert on gas bearings. View his paper on EPP Gas Bearings.  
[bentlybearings.com/sanandres](http://bentlybearings.com/sanandres)

[www.bentlybearings.com/BearingNews](http://www.bentlybearings.com/BearingNews)  
[inquiries@bentlybearings.com](mailto:inquiries@bentlybearings.com)



# 2020 AGENDA

# EVENTS, EXHIBITIONS & CONFERENCES

JULY

AUTOMOTIVE

## AUTOMECHANIKA

22 Jul - 24 Jul 2020

Mexico City / Mexico

International automotive parts exhibition

[www.paaceautomechanika.com](http://www.paaceautomechanika.com)

TEXTILE MACHINERY

## GFT EXPO

22 Jul - 25 Jul 2020

Bangkok / Thailand

Textile machinery exhibition

[www.gftexpo.com](http://www.gftexpo.com)

AUGUST

RELIABILITY

## MAXIMO WORLD

04 Aug - 06 Aug 2020

Orlando / USA

Conference and Trade Show for  
Asset Management Professionals

[reliabilityweb.com/maximoworld-call-for-papers](http://reliabilityweb.com/maximoworld-call-for-papers)

MARINE

## MARINTEC SOUTH AMERICA

11 Aug - 13 Aug 2020

Rio de Janeiro / Brazil

Maritime maintenance and shipbuilding

[www.marintecsa.com.br](http://www.marintecsa.com.br)

MOLDING MACHINERY

## EUROMOLD

13 Aug - 16 Aug 2020

Joinville / Brazil

Exhibition for mold- and patternmaking,  
tooling, design, additive manufacturing  
and product development.

[www.neventum.com/tradeshows/euromold-brasil](http://www.neventum.com/tradeshows/euromold-brasil)

TEXTILE MACHINERY

## GARTEX INDIA

21 Aug - 23 Aug 2020

New Delhi / India

Complete garment manufacturing  
solutions show

[www.gartexindia.com](http://www.gartexindia.com)

AUTOMOTIVE

## MIMS AUTOMECHANIKA

24 Aug - 27 Aug 2020

Moscow / Russia

Leading exhibition of automotive spare  
parts, automotive components, equipment  
and vehicle maintenance products

[automechanika.ru.messefrankfurt.com/moscow/en.html](http://automechanika.ru.messefrankfurt.com/moscow/en.html)

MARINE

## INAMARINE

26 Aug - 28 Aug 2020

Jakarta / Indonesia

Shipbuilding, offshore, marine  
equipment and machinery expo

[www.inamarine-exhibition.net](http://www.inamarine-exhibition.net)



SEPTEMBER

MRO

## IMVAC / CBM CONNECT

Sep 2020

Indianapolis / USA

Condition monitoring and reliability  
professionals conference & exhibition

[thebcmconference.com](http://thebcmconference.com)



FOOD & BEVERAGE

## WORLDFOOD ISTANBUL

02 Sep - 05 Sep 2020

Istanbul / Turkey

International Food Products &  
Processing Technologies Exhibition

[www.worldfood-istanbul.com](http://www.worldfood-istanbul.com)

MINING

## ELECTRA MINING AFRICA

07 Sep - 11 Sep 2020

Johannesburg / South Africa

International Mining, Industrial, Machine  
Tools and Electrical Trade Show

[www.electramining.co.za](http://www.electramining.co.za)

# 2020 AGENDA

# EVENTS, EXHIBITIONS & CONFERENCES

## MARINE

### SMM-HAMBURG

08 Sep - 11 Sep 2020  
Hamburg / Germany

International maritime trade fair

[www.smm-hamburg.com](http://www.smm-hamburg.com)



## AUTOMOTIVE

### AUTOMECHANIKA FRANKFURT

08 Sep - 12 Sep 2020  
Frankfurt / Germany

International automotive parts exhibition

[automechanika.messefrankfurt.com/frankfurt/en/planning-preparation/exhibitors/exhibitor-brochure.html](http://automechanika.messefrankfurt.com/frankfurt/en/planning-preparation/exhibitors/exhibitor-brochure.html)

## PAPER

### ICE SOUTH EAST ASIA

09 Sep - 11 Sep 2020  
Bangkok / Thailand

International paper converting fair

[www.neventum.com/tradeshows/ice-south-east-asia](http://www.neventum.com/tradeshows/ice-south-east-asia)

## AUTOMATION

### AUTOMATION EXPO

09 Sep - 12 Sep 2020  
Mumbai / India

India's leading automation and instrumentation exhibition

[www.automationindiaexpo.com](http://www.automationindiaexpo.com)

## MANUFACTURING

### IMTS

14 Sep - 19 Sep 2020  
Chicago / USA

International Manufacturing Technology Show

[www.imts.com](http://www.imts.com)



## MOTION & DRIVES

### IAMD USA

14 Sep - 19 Sep 2020  
Chicago / USA

America's Leading Trade Show for Integrated Automation, Industrial IT, Power Transmission and Control

[hannovermesseusa.com](http://hannovermesseusa.com)



## BEARINGEXPO

### BEARING CONFERENCE

14 Sep - 19 Sep 2020  
Chicago / USA

Bearing industry conference with commercial and technical topics

[www.bearing-expo.com/events](http://www.bearing-expo.com/events)



## MACHINERY

### TURBOMACHINERY & PUMP SYMPOSIA

15 Sep - 17 Sep 2020  
Houston / USA

Turbomachinery & pump symposia

[tps.tamu.edu](http://tps.tamu.edu)

## METAL

### AMB

15 Sep - 19 Sep 2020  
Stuttgart / Germany

International exhibition for metal working

[www.messe-stuttgart.de/amb/en](http://www.messe-stuttgart.de/amb/en)

## MACHINE TOOLS

### MWCS

15 Sep - 19 Sep 2020  
Shanghai / China

Metalworking and CNC Machine Tool Show

[www.metalworkingchina.com](http://www.metalworkingchina.com)

## AUTOMATION

### IAS

15 Sep - 19 Sep 2020  
Shanghai / China

Largest industrial automation show of China

[www.industrial-automation-show.com](http://www.industrial-automation-show.com)



## CONSTRUCTION

### KAZCOMAK

16 Sep - 18 Sep 2020  
Almaty / Kazakhstan

Kazakhstan road and heavy construction machinery exhibition

[www.kazcomak.kz](http://www.kazcomak.kz)



# 2020 AGENDA

# EVENTS, EXHIBITIONS & CONFERENCES

## MINING

### MINING WORLD CENTRAL ASIA

16 Sep - 18 Sep 2020  
Almaty / Kazakhstan

Central Asian mining exploration  
& mining equipment exhibition

[www.miningworld.kz](http://www.miningworld.kz)

RECOMMENDED  
Bearing  
NEWS

## MOTION & DRIVES

### EPTDA CONVENTION

16 Sep - 18 Sep 2020  
Warszawa / Poland

Annual event of the EMEA Power  
Transmission Distributors Association

[www.eptda.org](http://www.eptda.org)

RECOMMENDED  
Bearing  
EXPO &  
Conference

## MATERIALS HANDLING

### CEMAT RUSSIA

22 Sep - 24 Sep 2020  
Moscow / Russia

International Exhibition for  
materials handling, warehousing  
equipment and logistics

[www.cemat-russia.ru](http://www.cemat-russia.ru)

## WIND ENERGY

### WIND ENERGY

22 Sep - 25 Sep 2020  
Hamburg / Germany

Wind Energy expo

[www.windenergyhamburg.com/en](http://www.windenergyhamburg.com/en)

## RAILWAY

### INNOTRANS

22 Sep - 25 Sep 2020  
Berlin / Germany

International trade fair for  
transport technology

[www.innotrans.com](http://www.innotrans.com)

## MATERIALS HANDLING

### POWTECH

29 Sep - 01 Oct 2020  
Nuremberg / Germany

Trade fair for processing, analysis, and  
handling of powder and bulk solids.

[www.powtech.de](http://www.powtech.de)

## MANUFACTURING

### PPMA

29 Sep - 01 Oct 2020  
Birmingham / UK

Trade show for processing and  
packaging machinery showcases

[www.ppmashow.co.uk](http://www.ppmashow.co.uk)

## ENERGY

### EPOCH 2020

05 Oct - 06 Oct 2020  
London / UK

Exploration and offshore  
production congress hub

[www.oilepoch.com](http://www.oilepoch.com)

## AUTOMATION

### MOTEK

05 Oct - 08 Oct 2020  
Stuttgart / Germany

International trade fair for automation  
in production and assembly

[www.motek-messe.de](http://www.motek-messe.de)

## GENERAL INDUSTRY

### MSV

05 Oct - 09 Oct 2020  
Brno / Czech Republic

International engineering  
fair of Czech Republic

[www.bvv.cz/en/msv](http://www.bvv.cz/en/msv)



## 2020 AGENDA

## EVENTS, EXHIBITIONS &amp; CONFERENCES

## FOOD &amp; BEVERAGE

**AGROPRODMASH**

05 Oct - 09 Oct 2020  
Moscow / Russia

International automotive parts  
exhibition Machine & equipment  
for food and beverage industry

[www.agroprod-mash-expo.ru](http://www.agroprod-mash-expo.ru)

## MANUFACTURING

**METALEX**

08 Oct - 10 Oct 2020  
Ho Chi Minh / Vietnam

Metalworking, components  
and subcontracting

[www.metalexvietnam.com](http://www.metalexvietnam.com)

## MACHINERY

**LES DREVMASH**

19 Oct - 22 Oct 2020  
Moscow / Russia

17th International Exhibition Machinery,  
Equipment and Technology for Logging,  
Woodworking and Furniture Industries

[www.lesdrevmash-expo.ru](http://www.lesdrevmash-expo.ru)

## GENERAL INDUSTRY

**INDUSTRIAL TRANSFORMATION  
ASIA PACIFIC**

20 Oct - 22 Oct 2020  
Singapore / Singapore

Industrial transformation show

[www.industrial-transformation.com](http://www.industrial-transformation.com)



## MINING

**MINING MYANMAR**

21 Oct - 23 Oct 2020  
Yangon / Myanmar

Mineral mining machinery & equipment

[www.cpmmyanmar.com](http://www.cpmmyanmar.com)

## PACKAGING

**EURASIA PACKAGING**

21 Oct - 24 Oct 2020  
Istanbul / Turkey

International packaging machinery fair

[www.packagingfair.com](http://www.packagingfair.com)

## MOTION &amp; DRIVES

**PTDA INDUSTRY SUMMIT**

21 Oct - 24 Oct 2020  
Atlanta / USA

Annual event of the Power Transmission  
Distributors Association

[www.ptda.org](http://www.ptda.org)



## PUMPS

**PCV EXPO**

27 Oct - 29 Oct 2020  
Moscow / Russia

International exhibition for pumps,  
compressors, valves and actuators

[www.pcvexpo.ru](http://www.pcvexpo.ru)

## STEEL

**EUROBLECH**

27 Oct - 30 Oct 2020  
Hanover / Germany

International Sheet Metal Working  
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## Tuesday, 31 March 2020

### Conference Room 1

- 9:30    **Opening**  
 Prof. Gerhard Poll (Leibniz University Hannover, Institute of Machine Design and Tribology (IMKT), Hannover, DE)  
 Christian Kunze (Forschungsvereinigung Antriebstechnik e.V., Frankfurt, DE)

#### Keynotes

- 10:00    Does mechatronics need bearings or bearings mechatronic? Benefits from symbiosis!  
 Dr. Tomas Smetana (Schaeffler AG, Herzogenaurach, DE)
- 10:30    Keynote title and speaker to follow  
 (SKF Group)
- 11:00    Fives Flexible Grinding Manufacturing  
 Caitlin Barnhart (Fives Landis Corp., Hagerstown, US)

### Premature Rolling Element Bearing Failures

- 11:30    Influences on the Cathodic and Energetic WEC-Fatigue  
 Dr. Joerg Loos (Schaeffler Technologies AG & Co. KG, Herzogenaurach, DE)

#### 12:00    Lunch

### Premature Rolling Element Bearing Failures

- 13:00    White Etching Cracks in oil lubricated rolling/sliding contacts – Drivers and their effects  
 Dr. Ralf Dinter (Flender GmbH, Bocholt, DE)
- 13:30    The lubricant formulation: one driver for early damage associated to WECs in thrust and radial bearings  
 Dr. Arnaud Ruellan (SKF, Houten, NL)
- 14:00    The influence of mechanical stresses on the diffusion and accumulation of hydrogen in a cylindrical roller thrust bearing  
 Dr. Iyas Khader (Fraunhofer Institut for Mechanics of Materials (IWM), Freiburg, DE)

### Conference Room 2



*„Market trends for eMobility, autonomous driving, digitalization and robotics result into completely new requirements on system level and on component level. Bearing World offers ideal platform to challenge the current technical status quo and to discuss new development trends for bearings in team of experts from research and industry.“*

**Dr. Tomas Smetana (Schaeffler AG)**

### NVH (noise, vibration, harshness)

- Investigation of the damping characteristics in the dry lubricated rolling element – cage contact of deep groove ball bearings  
 M.Sc. Rahul Dahiwal (University of Kaiserslautern Institute of Machine Elements; Gears and Transmissions (MEGT), Kaiserslautern, DE)
- Reconstructing shaft orbit using angle measurement to detect bearing faults  
 PhD Guillaume Bruand (NTN-SNR Roulements, ANNECY, FR)
- Bearing raceway waviness induced noise in applications  
 Angelico Approsio (SKF Industrie S.p.A., Moncalieri (Turin), IT)

**Tuesday, 31 March 2020**

## Conference Room 1

### Premature Rolling Element Bearing Failures

- 14:30** Investigations of ZDDP tribofilm formation regarding temperature influences  
Dennis Mallach (University of Münster WWU, Institute of Physics, Münster, DE)
- 15:00** Calculation method to evaluate the Risk on WEC failure occurrence in Industrial Applications  
Dipl.-Ing. Dirk-Olaf Leimann (Edegem, BE)

**15:30** Coffee break

### Electric Drive Technology and Challenges to Bearings

- 16:00** Surface mutation of the bearing raceway during electrical current passage in mixed friction operation  
M.Eng. Simon Graf (University of Kaiserslautern, Institute of Machine Elements; Gears and Transmissions (MEGT), Kaiserslautern, DE)
- 16:30** Low Temperature Test Methods for Electric Car Bearing Greases  
Thomas Litters (FUCHS SCHMIERSTOFFE GmbH, Mannheim, DE)
- 17:00** Enhancement of the insulation properties of thermal sprayed ceramic bearing coatings  
M.Sc. Elisa Burbaum (RWTH Aachen University, Surface Engineering Institute (IOT), Aachen, DE)
- 17:30** Experimental High Frequency Analysis of the Electric Impedance of Rolling Bearings  
M.Sc. Tobias Schirra (Technische Universität Darmstadt, Institute for product development and machine elements (PMD), Darmstadt, DE)

**18:00** End of presentation day 1

**19:30** Evening Event:  
Restaurant XII Apostel, Pelikanplatz 2-4, 30177 Hannover

## Conference Room 2

### NVH (noise, vibration, harshness)

- Noise Calculation in BEARINX– dynamics in the kinematic regime  
Dr. Hannes Grillenberger (Schaeffler Technologies AG & Co. KG, Herzogenaurach, DE)
- Balls characteristics impact on bearing noise generation  
Dr. Stefano Pagliassotto (Tsubaki Nakashima Co., LTD, Pinerolo, IT)

Coffee break

### Condition Monitoring and Sensors

- An analytical approach for the Influence of the Real Film Thickness Distribution on the Capacitance of an EHL Contact  
Volker Schneider (Leibniz University Hannover, Institute of Machine Design and Tribology (IMKT), Hannover, DE)
- Monitoring load and lubrication in a wind turbine gearbox rolling bearing in the field  
Gary Nicholas (The University of Sheffield, The Leonardo Centre for Tribology, Department of Mechanical Engineering, Sheffield, GB)
- An intelligent hybrid plain bearing as a smart machine component  
Christian Kraft (Clausthal University of Technology, Institute of Tribology and Energy Conversion Machinery, Clausthal-Zellerfeld, DE)  
Robin Kurth (Fraunhofer Institute for Machine Tools and Forming Technology (IWU), Chemnitz, DE)
- Research on Improvement of Quantum Dot Temperature Sensor for Bearing Rotating Components Monitoring  
Master student Panting Liang (Xi'an Jiaotong University, Xi'an, Shaanxi Province, CN)

End of presentation day 1



## Wednesday, 1 April 2020

### Conference Room 1

#### Rolling Contact Fatigue and Materials I

- 8:30 Evaluation of the influence of non-metallic inclusions on the high and very high cycle fatigue life of inductive hardened bearing steel in multi-megawatt wind turbines  
Felix Stern (TU Dortmund University, Department of Materials Test Engineering (WPT), Dortmund, DE)
- 9:00 Fracture Mechanical Assessment of Inclusions in Bearing Steel  
Dipl.-Ing. Jörg Binderszewsky (Schaeffler Technologies AG & Co. KG, Herzogenaurach, DE)
- 9:30 Effect of material anisotropy on the fatigue life of bearing steel under dry and lubricated point contact condition: a numerical study  
Binbin Zhang (University of Twente, Engineering Fluid Dynamics, Enschede, NL)
- 10:00 Fatigue damage development in bearing steel: modelling and measurement  
Dr. Ir. Erik Vegter (SKF, Houten, NL)

10:30 Coffee break

#### Rolling Contact Fatigue and Materials II

- 11:00 Development of optimized nitrided bearing and transmission components for a better application performance: from process parameters to functional performance properties  
Dr. Christine Sidoroff-Coicaud (NTN-SNR Roulements, ANNECY, FR)
- 11:30 Finite Element Analysis of Two-step Deep Rolling of Bearing Steel for Expansion and Equalization of Compressive Residual Stress Profiles  
Prof. Jürgen Gegner (SKF GmbH, Schweinfurt, DE)

### Conference Room 2

#### Bearing Selection and Design

- Cost efficient Design of Wind Turbine Main Bearing Systems  
Dr. Bernd Lüneburg (thyssenkrupp rothe erde GmbH, Lippstadt, DE)
- Validation of a novel conical sliding bearing for the main shaft of wind turbines  
M.Sc. Tim Schröder (RWTH Aachen, Chair for Wind Power Drives, Aachen, DE)
- If form deviation than correct – The utilization of production-related defects for improving operating properties of journal bearings  
Lars Friedrich (Chemnitz University of Technology, Institute of Design Engineering and Drive Technology (IKAT), Chemnitz, DE)
- Bearing selection for high efficiency worm gear drives  
Jun. Prof. Dr.-Ing. Manuel Oehler (University of Kaiserslautern, Institute of Machine Elements; Gears and Transmissions (MEGT), Kaiserslautern, DE)

Coffee break

#### Tribology and Fluid Dynamics

- 3D CFD modelling of textured hydrodynamic journal bearings  
M.Sc. Patrick Wieckhorst (Otto-von-Guericke-University Magdeburg, Chair of Machine Elements and Tribology, Magdeburg, DE)
- Study on Oil-Air Two-Phase Flow Characteristics in Microscale Ball-Raceway Contact Zone  
Ph.D. Postgraduates Fei Chen (Xi'an Jiaotong University, Shaanxi, CN)

## Wednesday, 1 April 2020

### Conference Room 1

#### Rolling Contact Fatigue and Materials II

12:00 Progression of rolling contact fatigue damage from artificial indents in hybrid and steel-to-steel bearing contact  
Yuri Kadin (SKF GmbH, DE)

12:30 Microstructural Analysis of Bearing Steels by a Statistical Nanoindentation Technique  
PhD; Docent (Hab.) Esteban Broitman (SKF, Houten, NL)

13:00 Lunch

#### Bearing Durability and Dimensioning

14:00 Application-dependent bearing preload in planetary gear units – application, design and assembly  
Dr.-Ing. Norbert Schneider (SEW-Eurodrive GmbH & Co. KG, Bruchsal, DE)

14:30 Investigation of Wind Turbine Planetary Bearing Outer Ring Creep on a Component Test Bench  
M.Sc. Felix M. Schlüter (RWTH Aachen University, Center for Wind Power Drives, Aachen, DE)

15:00 Investigation of the load distribution on a planetary carrier bearing of a wind turbine gearbox to identify trigger for ring creep  
Jonas Gnauert (RWTH Aachen University, Chair for Wind Power Drives, Aachen, DE)

15:30 A Fatigue Life Model for Roller Bearings in Oscillatory Applications  
Georg Breslau (Technical University Dresden, Institute of Machine Elements and Machine (IMM), Dresden, DE)

16:00 End of conference

### Conference Room 2

#### Tribology and Fluid Dynamics

Extension of a Reynolds equation based solver to calculate axially-flown journal bearings of pumps  
M.Sc. Vincent Hoffmann (Otto-von-Guericke-University Magdeburg, Institute for Machine Construction, Magdeburg, DE)

Frictional properties of grease additivated by graphene platelets in angular contact ball bearings  
Dr. Florian Pape (Leibniz University Hannover, Institute of Machine Design and Tribology (IMKT), Hannover, DE)

Lunch

#### Bearing Mechanics

Investigations on the rolling bearing cage dynamics with regard to different operating conditions and cage properties

M.Sc. Sebastian Schwarz (Friedrich-Alexander-University Erlangen-Nürnberg, Department of Mechanical Engineering, Engineering Design (FAU), Erlangen, DE)

Measuring the kinematic behavior of spindle bearing rolling elements under radial loads

M.Sc. Hans-Martin Eckel (RWTH Aachen University, Laboratory for Machine Tools and Production Engineering (WZL), Aachen, DE)

Development of a methodology for tolerancing radial journal bearing systems

Marko Ebermann (Chemnitz University of Technology, Institute of Design Engineering and Drive Technology (IKAT), Chemnitz, DE)

A New Approach for Rapid Determination of Roller-Flange Contact in Roller Element Bearings

Marius Wolf (Robert Bosch GmbH, Renningen, DE)

End of conference

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## SCHAEFFLER GROUP

The Schaeffler Group is a leading global supplier to the automotive and industrial sectors. Its portfolio includes high-precision components and systems for engine, transmission, and chassis applications as well as rolling and plain bearing solutions for a large number of industrial applications.

From miniature bearings measuring just a few millimeters to large sizes with outside diameters of several meters – Schaeffler supplies around 60 different industrial sectors with rolling bearings and plain bearings, linear and direct drive technology, and a service portfolio including maintenance products, monitoring systems and other solutions. Smart components and digital services are becoming increasingly important. At the same time, Schaeffler is also working to increase the energy efficiency of bearing technology for industrial applications. The broad range of products and services includes

components and systems for automobile drive trains and products for high-speed trains through to rolling bearings for solar power plants and innovative solutions for aviation and aerospace applications. A worldwide network of sales engineers is available to provide advice to customers from all branches of industry directly on site – whether in agriculture or wind power, whether in the bicycle or steel industry.

The company generated sales of approximately 14.2 billion Euros in 2018. With around 89,000 employees, Schaeffler is one of the world's largest family companies and, with approximately 170 locations in over 50 countries, has a worldwide network of manufacturing locations, research and development facilities, and sales offices. As a global development partner and supplier, Schaeffler maintains stable long-term relationships with its customers and suppliers.



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**Head of Program Committee and Scientific Board,  
Editor of Bearing World Journal**  
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### Conference Organisation

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# BEARING EXPO INDIA 2019

## results in record number of participants

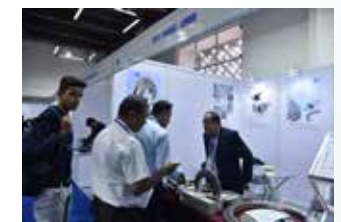
Over 720 delegates from 22 countries participated to the very first edition of the International BEARING EXPO INDIA event which took place on 15 – 16 October 2019 at the Nehru Centre in Mumbai.

The hundreds of participants and 60+ exhibitor companies had the chance to interact for 2 days at the exhibition halls, while the conference attendees could join both commercial and technical presentations and workshops, presented by 10 powerful speakers.

### Looking to 2021

The next BEARING EXPO INDIA event will take place in October 2021 at the Nehru Centre in Mumbai, while various BEARING EXPO conferences and pavilions will take place in Hannover, Chicago, Shanghai and Istanbul during 2020.

Feel free to contact [info@bearing-expo.com](mailto:info@bearing-expo.com) for more information about upcoming bearing events or visit [www.bearing-expo.com/events](http://www.bearing-expo.com/events)



## Safe bearing assembly thanks to smart technology

### New generation of Betex low frequency induction heaters

At this year's BEARING EXPO, Bega Special Tools will introduce a new generation of low frequency induction heaters. These are used for controlled heating of bearings, gears and other machine parts. Using smart processor technology, they provide better control over a stress-free, controlled heating process. A log function allows the heating process to be recorded.

Correct assembly of a bearing is one of the critical processes that affect the bearing's lifespan. The requirement of correct installation is becoming ever more important, especially for very expensive bearings or for bearings in hard-to-reach locations. With the introduction of its new series, Bega meets the industry's demand for greater control over the heating and assembly process. Two series have been developed:



the Basic Series and the Smart Series.

The Basic Series replaces part of the current Betex range. These heaters are controlled using a simple keyboard and have a single temperature sensor. Heating can take place in time or temperature mode. Smart electronics ensure ideal heating and efficient use of power.

The Smart Series is used where a greater degree of control over the heating process is needed. These heaters have a modern, easy-to-use touchscreen. The heating process is visualised in the form of a clear graph. Data can be

saved and externally documented via a USB connection. A double temperature (Delta T) measurement provides full control over the temperature progress. The operator can now exactly determine the rate at which a bearing is heated. The decisive factor here is not so much the speed at which the bearing reaches its target temperature as the prevention of stress that can result from rapid heating and can damage the bearing.

Induction heating is a sustainable form of heating. It replaces old methods, such as ovens, oil baths and open fires, which use much more energy as well

**HALL • A29**

Company Name:

**Bega Special Tools**

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**8171 ME Vaassen, The Netherlands**

E-Mail (General) :

**sales@bega.nl**

Website :

**www.begaspecialtools.com**



as causing pollution and safety risks. The robust Betex heaters are designed for intensive and industrial use. They are made from recyclable materials and use induction technology, which makes them very energy efficient.





## Manufacturer of High Quality Bearings for tomorrow's challenges

ZEN Bearings is a brand with a worldwide presence, with over 50 years of experience in the manufacturing of tailor-made and standard bearings for a wide spectrum of industries. More than 6.000 product lines guarantee the highest quality and the long life cycle of a premium product. All of them are manufactured according to DIN standards and are tested in our ZEN Inspection Center awarded with the ISO 9001:2008 Certification.

ZEN's logistics network with 6 warehouses around the world, more than 22 official distributors and 26 official sell points, are sure to provide you with ZEN bearings wherever you are. Our technical department can modify any non-standard bearings to your



requirements, even for small quantities. Also, we have at your disposition a great team of expert engineers who always will be happy to support your 3D max support, technical drawings, AutoCAD department. We look forward to your visit on our stand where we will be pleased to offer advice.

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Company Name:  
**ZEN Bearings**

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**Rudolfstraße 13 40549  
Düsseldorf Germany**

E-Mail (General) :  
**marketing@zen.biz**

Website :  
**www.zen.biz**



## Double load carrying capacity with single row of rollers for spherical roller bearings

BMI is an ISO 9001 manufacturer and exporter from INDIA working with customers in more than 27 countries. With more than 2000 sizes in stock BMI is able to make quick delivery to customers for standard sizes. Apart from roller bearings BMI also does non-standard / customized bearings as per customer drawing and sample as well. You can visit our website [www.bmibearings.com](http://www.bmibearings.com) for more information. BMI is also awarded with STAR Performer by EEPC ( Engineering

Export Promotion Council of India ) for exports in the bearings category.



**HALL • A2**

Company Name:  
**Bearing Manufacturing India**

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**A 206 Flying Colors, PDU Marg,  
Above Croma showroom, Mulund  
West Mumbai - 400080 India**

E-Mail (General) :  
**shrenik@bmibearings.com**

Website :  
**www.bmibearings.com**

## Automatic lubrication and assembly and disassembly of bearings.

simatec ag, from Wangen an der Aare in Switzerland, designs, manufactures and sells sets of practical and easy to use tools. simatool tools are used all over the world for mechanical assembly and disassembly of roller bearings and radial shaft seals. Currently, simatec ag has extended its range of simatool products and introduces a world innovation on the market with the FT-P fitting tool. The new simatool tool offers the ideal solution for mounting and snap-in installation of bearings or other circular shaped components. The FT-P fitting tool - coupled with a mechanical press - guarantees correct mounting of components having an inside diameter up to 60 mm.

With the simalube lubricator, simatec ag has launched a successful business and is one of the main suppliers on the world marketplace. The simalube automatic lubricator allows long-



lasting, clean, safe and maintenance-free lubrication of bearings. Thanks to this technology, complex processes can be simplified and significantly reduce the maintenance costs of thousands of machines worldwide. Investing in a simatherm induction heater pays off in a number of ways. Within seconds, a roller bearing is gently heated to the required mounting temperature. This results in a huge saving in time, energy and money compared with previous heating methods such as oil baths, heating plates or ovens. A

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Company Name:

**Simatec AG**

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E-Mail (General) :

**welcome@simatec.com**

Website :

**www.simatec.com**

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component is heated to the preselected temperature, where it is maintained using the keep-warm function, which means that it is never overheated and is ready for mounting at any time.

## High precision bearings for high precision applications at Bearing EXPO

COC introduces new mounted bearing units. The company is pleased to present spherical roller bearing units with innovative new designs and features to handle the world's power transmission needs. The COC new patent pending adapter locking system, CROSSLOC™ with SN dimension housing is a unitized replacement for standard SN split housing units. It's a great and unique off-the-shelf solution which can help end-users to save time and reduce the costs.



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Company Name:

**COC JAPAN**

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Website :

**www.crossocean.com**

## Discover the ultimate deal with KHS-LG Bearing Manufacturing at Bearing EXPO



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Company Name:

**KHS Innovation & Engineering LLP**

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**196, Raj Rajeshwari Compound,  
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Bhiwandi India**

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Website :

**www.khsbearings.com**



KHS INNOVATION & ENGINEERING is a manufacturer and exporter of bearings under “KHS-LG” Brand having the wide range of Tapered Roller Bearings (MM Series) And Spherical Roller Bearings, which are produced in India. Specially in Tapered and Spherical Roller bearings the prices / quality are very reasonable. KHS-LG Bearings are manufactured from bearing Steel

Grade SAE 52100 (as per international standard), with modern technologies and skilled workforce. The company has been focusing on quality & technical development since it has been established. KHS serves companies Globally, Quickly and Competently, with its progressive and innovative approach towards customers needs.





## To grease or not to grease? That is the question!



DASH Engineering was created to provide an impartial perspective based on facts, not sales. The founder, David Beattie worked for major manufacturers whose interest was not to improve reliability but to achieve sales. David then understood this need for impartiality and independence within the bearing industry and created DASH Engineering. DASH believes in the right of everyone to choose a solution that fully meets their real needs and not one presented with a limited perspective. The team at DASH is driven through the willingness to roll the sleeves up, get dirty, understand why things work and fail, and then move from replacement to prevention. Belief in this sustainability and attainable excellence, where stress becomes ease, challenges become solutions, and confusion becomes clarity, inspires our work at DASH Engineering. When people engage with us we want them to feel:

- Confidence in our technical excellence and tailored solutions;
- Trust in our impartiality;
- Secure in our understanding of the complexity of their requirements;
- Relieved that the solution is practical and cost effective; and
- A sense of security, confidence and reliability.

Dash demonstrates this through the services:

- Independent expert consultancy on all rolling element bearings;
- Failure analysis;
- Application review/design;
- Installation supervision;
- Bearing training; and
- Continuous Research and Development.

The 3 barrier solution as a sealing method is known worldwide. That is, grease filled housing, sealed bearings and a labyrinth seal.

**HALL • A30**

Company Name:

**Dash Engineering**

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WA Australia**

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**info@dashengineering.com.au**

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Over the past 4 years DASH research and development on conveyor pulley housings has identified that the 3 barrier solution is not a barrier, but a carrier. The grease within the housing results in contamination making its way through to the bearing, resulting in premature failure. Join David Beattie during BEARING EXPO for a passionate presentation explaining this phenomenon that has resulted in major mining companies reviewing their lubrication strategies site wide. The evidence presented will have you critically thinking about your current lubrication strategies and the opportunities that are available for improved reliability with minimal effort.

- Conveyor pulley housings
- Excessive grease fill within housings
- Sealed SRBS
- Grease migration
- Why labyrinths don't work

## The Expert for bearing testing and damage analysis joins BEARING EXPO

The Elgeti Engineering GmbH was founded on Nov. 3rd, 2009 by Hagen Elgeti as the only shareholder and managing director. In the same year, it also started the development of new bearing test rigs.

In September 2010, the first bearing test rigs were erected and the facilities had to be expanded. Since then, lifetime tests on bearings up to 310 mm outer diameter have been carried out.

The company has expertise in bearing damage analysis, building test rigs, supplier development, bearing assessment, material analysis, simulations, endoscopy of gearboxes and technical measurements.



**HALL • A38**

Company Name:

**Elgeti Engineering**

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**Liebigstrasse 15 52070  
Aachen Germany**

E-Mail (General) :

**he@elgeti-engineering.de**

Website :

**www.elgeti-engineering.de**



## GMM Group: Global Industrial Partner for high quality components and specialized predictive maintenance services

Born as a components distributor and then branching out into different business units, GMM Group today broadens its offer by providing high quality mechanical components, PREDICTIVE MAINTENANCE services and worker professional equipment. The ability to cope with specific needs by providing customized supply strategies and maintenance packs makes GMM Group the perfect Global Industrial Partner. Specialized predictive maintenance and condition monitoring services for the



most critical industrial applications. (where a perfect prevention can save from costly machinery breakages) Contact GMM for the highest quality and property importation mechanical components for all the industrial sectors.

**HALL • A9**

Company Name:

**GMM Group / Prüftechnik  
Aimil Condition Monitoring**

Address :

**Via del lavoro, 10 41042  
Fiorano (MO) Italy**

E-Mail (General) :

**azzaro@gmmsrl.it**

Website :

**www.gmm.srl**

## The Bearing Brand of Tomorrow



MTK+ is a leading Belgian manufacturer of rolling bearings and related products. Our experience lies on 35 years of history in the conception and engineering of high performance products. With over 100 employees based in Brussels, Belgium

including a technical competence centre, we offer excellent customer service to a global client base. With the ISO 9001:2015 certification, we confidently cover a sales network in all corners of the world from New Zealand to Canada.

**HALL • A27-28**

Company Name:  
**MTK+ Bearing Factory**

Address :  
**Joseph Chantraineplantsoen  
2 3070 Kortenberg Belgium**

E-Mail (General) :  
**info@mtk-bearings.com**

Website :  
**www.mtk-bearings.com**

Located a few kilometres away from Antwerp, the second largest port of Europe and next to the Brussels National Airport, we are proud to carry one of the largest and widest bearing and housing stock assortments of Europe.

## The Confident Choice for Bearing Steel



As India's leading alloy and special steel manufacturer, MSSSPL is the preferred supplier to many multinational and domestic customers as well as the government in the field of Automobile, Power Generation, Oil, Tool & Die, Railways, Bearing & Mining sector. MSSSPL is a subsidiary Company of Sanyo Special Steel Co., Ltd. -synonymous as the world's premier special steel

manufacturer founded in 1933. Mission -To supply high quality special steels and Rings to meet growing demand and to contribute to customers' competitiveness. Vision -To be the most successful, and socially responsible special steel manufacturer in India.

**HALL 22 • A46-47**

Company Name:  
**Mahindra Sanyo Special Steel Pvt. Ltd.**

Address :  
**Jagdish Nagar, Khopoli, Dist. Raigad  
410216 Maharastra India**

E-Mail (General) :  
**amit.varshney@mahindra.com**

Website :  
**www.mahindra.com**



## ROLLWAY Bearings - Assurance of Most Efficient & Trouble Free Performance

Primeroll International Pvt. Ltd., the Authorized Exclusive Distributor of Rollway brand bearings & accessories in the territory of Republic India and also Distributor for the brand McGill & SealMaster is a part of the largest bearing distribution group of companies in this country. The Directors of the group have more than 40 years of experience in the marketing and distribution of Industrial products throughout India. And what is more, the group is financial sound-it operates without any external financing.

With its Corporate office and Central Warehouse located in Kolkata, PrimeRoll operates through its experienced Sales personnel-stationed in Mumbai, Coimbatore, Chennai, Gurgaon & Kolkata-and a Dealer Network strategically located

all over India. For the very First Time in India we are providing the High Precision American Technology at Affordable Prices.

Complete Shaft Solution is the motto of PrimeRoll for which the company has a team of trained engineers to effectively provide technical support to its customer. Also, PrimeRoll provide just on time delivery due to its huge inventory of the entire range of bearings.



## Precision is our Practice

We provide best quality bearings for rapidly growing automotive, industrial and marine industries. Our production capacity as reached 80,000 bearings per month and expanding. We are establishing our self in, national and international market. As part of our expansion now we are starting manufacturing precision non -standard bearing as per special requirement and drawings provided by customer. Our aim is to be the best manufacture of standard bearing & non- standard bearing in the world. Our constant production up-gradation with introduction of most advanced manufacturing techniques and state of the art machinery in production facility make sure that our products are far more versatile for automotive and industrial use. Satisfaction of our valued customer and to meet growing expectation for further expansion of product

range, in coming days company is going to expand manufacturing activities to produce big size tapered roller, cylindrical roller bearing.



**HALL • A18**

Company Name:  
**Primeroll International  
Private Limited**

Address :  
**"Diamond Heritage", 15th  
Floor, RoomNo. 1503, 16 Strand  
Road 700 001 Kolkata India**

E-Mail (General) :  
**marketing@primeroll.in**

Website :  
**www.primeroll.in**

**Prime Roll**

**HALL • A54**

Company Name:  
**B.K. Exports [IMB Bearings]**

Address :  
**1101, White lotus building,  
st. Francis street, Santa cruz  
(west) 400054 Mumbai India**

E-Mail (General) :  
**sales.imbbearing@gmail.com**

Website :  
**www.imbbearing.com**



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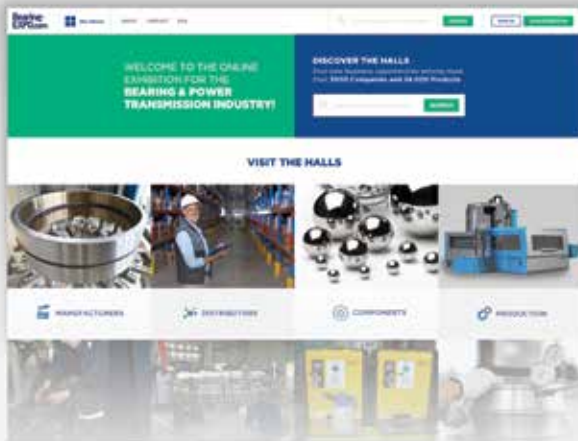


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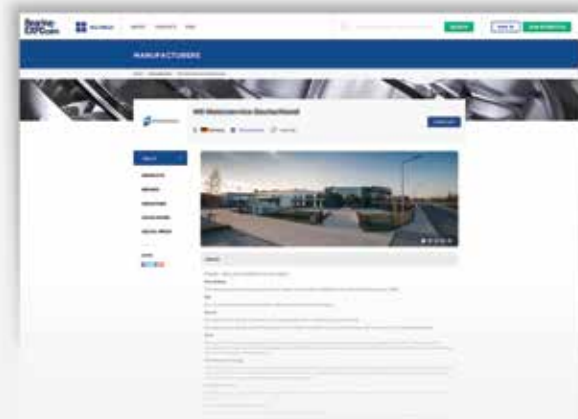


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## KG Bearing India displays their products at BEARING EXPO

**KG BEARING INDIA** is an 9001:2015 ISO Certified Company. We are a complete bearing solution provider with over **40 years** of experience in bearings industry. We export a variety of bearings in more than **35 countries**. We are known to deliver best quality bearings at an affordable price worldwide.

Our bearings are marketed in our Brand Name **KZ** which is manufactured by using Japanese and German technology machines. **KZ Bearings** are manufactured as per **ISO/DIN/ANSI** International standards under our quality control systems. The bearings are tested and exported complying with customer needs.

The main products of **KG BEARING INDIA** are:  
KZ DEEP GROOVE BALL BEARINGS  
KZ PILLOW BLOCK BEARINGS  
KZ TAPER ROLLER BEARING  
KZ SPHERICAL ROLLER BEARINGS  
KZ CYLINDRICAL ROLLER BEARINGS



## Your Frictionless Partner

Marc Bearings Pvt. Ltd. is an ISO 9001 bearing company from India manufacture and export wide range of tapered, spherical and cylindrical Roller Bearings made from Chrome steel SAE 52100/GCR15 as per International standard specification since 1995.

Marc Bearings have technical infrastructure equipped with ultra modern machinery to produce high quality bearings in a competitive rate and hence our bearings are being accepted in Europe, Middle East and African countries. Our Bearings range from 50 mm (O.D) to 500 mm (O.D.) Outer Diameter.

These bearings are effectively used in automobile, agriculture, industrial, power motors, construction, rolling mill, paper mill, stone crushing industry and a host of other applications.

Please visit our website : [www.marcbearings.com](http://www.marcbearings.com) to know more about our company and products.



**HALL • A40**

Company Name:  
**KG Bearing India**

Address :  
**M -17, 5200, 1st floor,  
Gawari Building, G.B. Road  
110006 Delhi India**

E-Mail (General) :  
**sales@kgbearing.com**

Website :  
**www.kgbearing.com**



**HALL • A13**

Company Name:  
**Marc Bearings Pvt. Ltd**

Address :  
**Shapar Survey No. 34, Plot No.  
17, National Highway-27, Dharti  
Agro Gate At. Shapar (Veraval)  
Dist. 360024 Rajkot,(Guj.) India**

E-Mail (General) :  
**export@marcbearings.com**

Website :  
**www.marcbearings.com**

## Klingelberg Done in One Measurement – THE ROLLER BEARING SOLUTION

**HALL • A35-36**



Company Name:

**Klingelberg India Pvt. Ltd.**

Address :

**Om Chambers, Office No. 501, T29/31,  
Telco Road, Near Toyota Showroom,  
MIDC Bhosari 411026 Pune India**

E-Mail (General) :

**shantanand.patil@klingelberg.com**

Website :

**www.klingelberg.com**

Roller bearings have to fulfil a variety of different tasks. They have to provide high stability for shafts while providing low power losses and a high durability. Therefore the requirements concerning material and accuracy are challenging for manufacturing. To ensure the quality in today's manufacturing environment a variety of different precision measuring devices is required. Typically dimensions are measured on a CMM, form and noise on a form tester, surface roughness on a surface tester and contours (e.g. edge radius) on a contour measuring station. This variety of devices results in high investment and high operating costs. Finally the operator has to setup the part on all different stations. This makes the measuring process quite long and keeps the operator busy. Klingelberg instead follows the Done-In-One principle. A Klingelberg P-machine is capable of fast dimension, form, contour and surface roughness measurement in one setup and one auto-mated cycle. This reduces the investment and helps to reduce the operating cost by an average by 46 %. On top the measuring machines of the Klingelberg P series keep the necessary accuracy even on the shop floor, saving the climatization

costs and bringing the measuring machine really close to production. Founded in 1863, the machine manufacturing firm Klingelberg is one of the leading companies in the gear industry. Thanks to numerous innovations in the areas of calculation, production, and measuring technology, Klingelberg considers itself a leader in this industry. With its acquisition of Höfler Maschinenbau GmbH's core business in 2012, Klingelberg has added machines for machining cylindrical gears to its range of products, reinforcing its position as a complete system provider. Headquartered in Zurich, the machine manufacturing firm currently develops and manufactures at its sites in Zurich (Switzerland), Hückeswagen and Ettlingen

(Germany), and Győr (Hungary). The company also has sales and service offices and numerous trade representatives worldwide. Klingelberg solutions are used in the automotive, commercial vehicle, and aviation industries, as well as in shipbuilding, the wind power industry, and the general transmission manufacturing industry. Applications range from vehicle drives, aircraft turbine engines, and cement mill gear units to drive systems for ships and oil rigs. With over 200 patent grants, the company continuously demonstrates its capacity for innovation. In addition, its ISO 14001 certification and participation in the VDMA's "Blue Competence" initiative underscore the company's sustainable, environmentally sound business practices.



## Manufacturer & Exporter of Bearings & Bearing Components

JEI Bearing is manufacturer and exporter of bearings, bearing races and components since 1999. The factory is IATF 16949:2016 certified by TUV SUD and vendor for MNC Bearing manufacturer. JEI Bearings is exporting bearing components to big bearing manufacturers in European countries since several years.

The company has also superior quality bearings for CAR, MUV & SUV like DAC, wheel bearing, Gen 2 & Gen 3 wheel hub units, clutch release bearings, taper roller bearings and specialized bearings.

JEI Bearing has been awarded for the best Exporter award by Engineering Export Promotion Council of India and have set up of full-fledged inspection facility for measurement & standard testing.

The company facilities ensure higher and consistent level of quality with commitment to meeting or exceeding customer's expectation.

**HALL • A33**

Company Name:

**JEI Bearings**

Address :

**Plot No. G-1933/2, Lodhika Gidc,  
Metoda-Rajkot 360021 Rajkot India**

E-Mail (General) :

**info@jeibearings.com**

Website :

**www.jeibearings.com**



## One stop solution for high precision balls for various applications of bearings

Precision applications are sensitive to high performance. NHB Ball & Roller has a culture that demands high commitment from all employees to deliver superior products on a daily basis. With a culture of continual improvement, the NHB Group is rapidly gaining presence on a global scale. With continuous investments in technology, systems, and training, NHB has transformed itself from a bicycle balls manufacture to over 1000's of high precision applications that affect everyone's daily life. Understanding the needs of the customer, NHB's 9 warehouses globally deliver Just in time service to cater to fluctuating

demands and ensure satisfaction.

NHB Balls are using Automotive Industry (CV Joint, Alternator Bearing, Water pump Bearing, Transmission Bearing, Hub Bearings), Ball Screw (Industry), Construction and Heavy Machinery, Electrical Motors, Alternators, Nasal Spray (Medical), Eye drops, Roll ON (Cosmetic).



**HALL • A52-53**

Company Name:

**NHB Ball and Roller Ltd.**

Address :

**103, Crystal Tower, 75,  
Gundavali Gaothan rd. No.3,  
400 069 Mumbai India**

E-Mail (General) :

**rikeshparmar@nhbball.in**

Website :

**www.nhbball.com**



## Plastic Bearings which are Non-Corrosive, Non-Magnetic, Light weight and self-Lubricating

TPI is perceived as a corporate entity that's innovative, unique and proactive. A pioneer in Plastic bearings and assemblies as well as moldings that offer multifarious advantages, It has distinct advantages, they are hygienic, flexible, entailing low friction & noise. TPI range covers 700 types of bearings designed to suit varied industrial applications.



## High-Quality Bearings & Solutions Providers

R.K International is a leading name in supply of high-quality bearings in the India market, with an experience spanning over 40 years. Our company specializes in providing a wide range of bearings in EXLR brand, including several types of multi-row, slewing bearings and other non-standard bearings (both, in inch and mm series), which are widely used in various applications of metallurgy industry, gearboxes, stone crushers/mining, paper & cement processing plants, etc. Customer satisfaction is taken at utmost priority, thus, we always stand dedicated to understand the technical

requirements/specifications of an application, and accordingly suggest the appropriate bearing size, steel material, and other related parameters. We hope to serve our esteemed clients to the best of our ability, and thrive to take the company forward for many more decades to follow.



**HALL • A47**

Company Name:

**TPI Bearings**

Address :

**Plot No. 230, Wagle Industrial Estate,  
21-Y Road 400604 Thane India**

E-Mail (General) :

**director@tpibearings.com**

Website :

**www.tpibearings.com**



**Design to Perform**

**HALL • A49**

Company Name:

**R. K. International**

Address :

**No. 1008, Vikram Tower,  
10th floor, 16 Rajendra Place  
110008 New Delhi India**

E-Mail (General) :

**rkinternationalindia@gmail.com**

Website :

**www.rkintlbearings.com**

## Leader in High Precision Balls & Rollers

Having provided tailored solutions for precision balls for more than 3 decades, N. Gandhi & Co. is considered as a trusted source for industries like the Automobile, Aeronautic Sector, Cosmetic, Chemical and Mechanical domains. NGC balls are used in a multitude of ways: ball bearings, safety valves, body jewelry, steering column, safety belt applications, and so on.

The company has broadened its product base over the years to include Grinding media and Rollers along with metallic and non-metallic balls including ceramic, glass & plastic. The long standing commitment to excellence and dedication to our customers has earned us advanced expertise and a thorough understanding of hundreds of very specific applications and processes in industries which has helped us in providing customized solutions in all materials, sizes and tolerances.

All the balls we provide are produced in accordance with the standards required



by the (DIN), (ABMA) and (ISO). Our quality assurance is also certified by the International Organization of Standardization, Standard 9001 : 2015 by Bureau Veritas.

The company's commitment to its customers and business integrity reflects in its widespread popularity - with a client base that's not only spread all across India but also in other parts of the world.

**HALL • A57**

Company Name:

**N Gandhi & Co**

Address :

**102, E-Square, Subhash Road, Near  
Garware, Vile Parle (East)  
Mumbai 400057 Mumbai India**

E-Mail (General) :

**sales@ngandhi.com**

Website :

**www.ngandhi.com**



HIGH PRECISION BALLS & ROLLERS

## The Specialist for Balls & Taper- Cylindrical Rollers

Tolia Group of companies is a family owned group established since the 1979. The group has been manufacturing steel balls, Taper roller bearing, taper Roller and cylindrical rollers for some of the leading industries in the 21st generation with cutting edge technology and with a will to serve the best quality products and services.

The Group consists of 3 manufacturing plants in today's date which are all based in Mumbai.

The group essentially consists of:

- Needumbra Industries Pvt Ltd (Established in 1979) – Ball Plant
- Forward Precision Engineers Pvt Ltd (Establish in 1987) – Ball Plant
- Tolia Industries (Established in 1992) – Taper & Cylindrical roller unit

All the 3 plants listed above are fully certifies with the ISO9001, TS 16949 & ISO 14001.



**HALL • A4**

Company Name:

**Tolia Group Of Industries**

Address :

**Plot No. D-4/1, Road No 16,  
Wagle Industrial Estate  
400604 Thane India**

E-Mail (General) :

**harshtolia@tolia.com**

Website :

**www.tolia.com**

## M/S FRANKE - GmbH: An Innovation for Light Bearing Applications

M/S Neelkamal Agency Pvt Ltd In India provides total solutions for customer bearing requirements. Wire race being a unique concept we support customer in design, assembly and integration for wire race bearing adoption with fully back up support for design and integration from Germany. We also do design manufacture and supply bearing assemblies to indian customer for different applications and adoption. M/S Franke - GmbH products are mainly antifriction wire race bearings, linear motion guides, direct drive bearings light weight bearing assemblies for various application like food, medicine, laboratory, vacuum, anti-corrosive, anti-magnetic applications.

M/S Franke - GmbH is a 70 year old company at Aalen Germany, a patented technology in design development of anti friction wire race bearing for any light bearing applications. They are pioneers in the field of medicine, automation, mechanical applications

where normally available bearings in the market some times not suitable to customer design applications and adoption.

Antifriction wire race bearings are suitable to adopt any complicated design aspect like higher diameters, load taking capacity in all direction, suitable to integrate with any base material and space saving technology.

These bearing consists of 4 wires and ball cages (wire diameter from 1.5mm to 16mm & ball diameter from 3mm to 20mm) these are available from 80mm to 2000mm in pre determined diameter for food, medical and many application like -40 degree C° to +80 degree C° climate condition and with anti corrosive, anti magnetic application like clean room, laboratory, vacuum application.

In total M/S Franke - GmbH products, are very special and very useful in many design aspects.

**HALL • A8**

Company Name:

**M/S. Franke - GmbH**

Address :

**No. 51 A Bikasipura main road (behind), JC Industrial Estate KNK Road 560 062 Bangalore – Karnataka India**

E-Mail (General) :

**frankebearingsindia@gmail.com**

Website :

**www.franke-bearings.com**



## COK BEARING Working Together Toward A Bright Future Meet Different Needs of Customers

Hebei Cok Bearing Co., Ltd. is located in the home of bearing in China, Linxi Bearing Industrial Park, Xingtai City. The floor space is 80,000 m2, among which 5000 m2 for office, measuring, physical and chemical laboratory. Now the Company is equipped with 248 sets of advanced production equipment, ACCRETECH and MITUTOYO roundness measuring instrument, contourgraph, coordinate measuring machine, surface roughness tester and other world leading measuring and detecting instrument, load and speed changing, simulated condition bearing service life performance tester, and Precision Bearing Technology Research and Development Center comprising of about 30 people is set up.

The Company mainly produces "COK"

precision ball bearing, cylindrical roller bearing, spherical roller bearing, insert bearing with housing and a series of mainshaft bearing products of precision machine tool with precision grade of P5, P4 and P2.

Cok Bearing products are widely used in general machine operation equipment market in industrial, agricultural field and middle and high end bearing market in automobile, elevator industry. COK BEARING provides full supporting service for equipment manufacturing industry, involving a variety of electric machine, precision machine tool manufacturing, elevator tractor, power drive, gear case, gear box, hub unit, metallurgy, mine, cement equipment, engineering machinery, truck bridge, oil exploitation equipment and so on.

**HALL • A56**

Company Name:

**Hebei Cok Bearing Co. Ltd.**

Address :

**Linxi Bearing Industrial Zone, Xingtai city Hebei China**

E-Mail (General) :

**export1@cok-bearing.com**

Website :

**www.cokbearing.com**





## FRICLEX Seals - Bearing's most favorite

Perfect Polymers believe in designing superior efficient sealing solutions for all kind of bearing needs. Began in 1982 in a small deli, it now specialises in patent seals and innovative technologies like FRICLEX. The company aims to supply versatile products of the same high quality. The seal FricLex comes very close to the vision of a low friction seal with efficient

sealing. Seals are designed specially according to the application such that it fulfills its sealing solution while attaining less friction than conventional seals. Benefits in torque reductions, fuel consumption and carbon build up. Some of the products already available with FricLex are: Bearing Seal, Oil Seal, O-rings, Anti Vibration Bush.



## Manufacturers of high precision bearings for high precision applications

YOGI HI-TECH (P) LTD. has been producing tapered roller bearings, cylindrical roller bearings and spherical roller bearings for the Indian domestic market, and has a good grip over overseas requirements and even fulfils OEM requirements since the year 1993.

YOGI HI-TECH are highly equipped with manufacturing technologies as well quality para metering instruments. As a result for best quality outputs, company believes in IN-HOUSE production for various processes. As a result to that company has installed various in-house processes

like forging, turning and grinding.

YOGI HI-TECH have been supplying bearings to Russia, Egypt, Afghanistan, Pakistan, Nepal, Bangladesh, Dubai and many other countries.



**HALL • A26**

Company Name:

**Perfect Polymers**

Address :

**G-1302, Road-H, Kishan gate  
main road, Metoda 360021  
Rajkot, Gujarat India**

E-Mail (General) :

**prashant.kaneria@teknixgroup.com**

Website :

**www.teknixgroup.com**



**HALL • A11**

Company Name:

**Yogi Hi-Tech Pvt Ltd.**

Address :

**SurveyNo. 197 p., PlotNo. 1, Veraval  
(Shapar) 360024 Rajkot India**

E-Mail (General) :

**rajan@zxlbearings.com**

Website :

**www.zxlbearings.com**



## Made in India – SRCT Bearings present Innovative Bearings for Industrial and Critical Applications at BEARING EXPO



SRCT Bearings are proud to showcase their Innovative Bearing Products with a Standard Lustrous Mirror Finish. Our products are made 100% in India, and we own 100% of the indigenously developed technology. We are proud to be the first Indigenous manufacturers of Large Diameter Roller Bearings in India.

We ensure quality by performing all the critical production processes in house. This includes Design, Simulation, Forging, Ring Rolling, Heat Treatment, Turning, Finishing, Assembly and Quality checks- all done under a single roof! All our products are made with the utmost care, using hard turning- a first in India. Not just this, Specially developed alloys, Mission Critical Heat Treatment Control and Stringent Ultrasonic Flaw Monitoring give us simply superior Bearing components, which materialise to sustained life improvement as finished Bearings. All of this translates to superior performance and surgical precision. We invite you to our stall at Booth A-41 for more information on our products and services!

**HALL • A41**

Company Name:

**SRCT Bearings**

Address :

**27, Tikawada Industrial Area, 305802  
Kishangarh, Rajasthan India**

E-Mail (General) :

**srct.jain9@gmail.com**

Website :

**www.srctglobex.com**



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## Roulements Inc. : Fidelity of Excellence



We at Roulements Inc have inherited hands on experience from our parent company that was established in the year 1949 by late Mr. Balwant Rai Mehta, who was one of the founder members of All India Ball Bearing Merchants Association & one of the first authorized distributors & innovators for many Reputed Bearing manufactures across the world..

Roulements Inc. is truly a master distributing company of High Temperature Bearings for SWC Wälzlagerfabrikation SWC GmbH based in the Schweinfurt Region of Germany, we specialize in rotational solutions for high temperature applications

predominantly in the bearing series of 6000, 6200 and 6300 which can handle temperatures from 150 C° to 350 C°.

Being a highly skilled, techno commercial & solution driven company, our core strength lies in-

- Locating hard to find obsolete bearings across Europe & USA.
- Supplying small and large size Ball & Roller Bearings with a range of 1mm bore to 600mm bore according to the customers need.
- Providing adequate remedies and repair solutions.
- Linked with the best inspection bearing team in Europe & USA that provide the correct inspection report for all type of bearings.
- Associated with a team of special application engineers who have a long held experience in this field.
- Roulements Inc. is a partnership firm having partners as Mr. Moniel Mehta & Yashel Mehta.

**HALL • A14**

Company Name:

**Roulements Inc.**

Address :

**1704, 17th floor leveta building, 64 nagdevi street 400003 Mumbai India**

E-Mail (General) :

**moniel.mehta@gmail.com**

Website :

**www.roulements.in**



## Indian High Quality Bearings with long Bearing Lifetime at BEARING EXPO

Flex Bearings, an ISO 9001 : 2015 company in India, is a leading manufacturer, supplier and exporter of various types of bearings including tapered roller bearing, spherical roller bearing and cylindrical roller bearing as per international standard specifications since 1995. We are engaged in mainly manufacturing and exporting of automotive & industrial bearings.



**HALL • A48**

Company Name:

**Flex Bearings India**

Address :

**Shed No. 21, Charotar Cement Compound, Jetpur Road 360311 Gondal India**

E-Mail (General) :

**swamishreejiturning@gmail.com**

Website :

**www.flexbearing.com**



## Precision bearing accessories: Adapter Sleeves & Locknuts for high precision applications at BEARING EXPO

**A.Nairsons Industries (India)** was founded in 1968 in Ludhiana. Over the years, the company has become a leading manufacturer of **KT (KING TIGER)** brand of engineering components that include **Adapter Sleeves, Withdrawal Sleeves, Hydraulic Sleeves, Hydraulic Locknuts, Lock Washers, Precession Locknuts** and a variety of other industrial fasteners providing custom made solutions to variety of customers.

With Dealer network of 400 plus dealers in India and also exporting to European countries such as Germany, United Kingdom, Denmark, Serbia, Lithuania, Dubai, Iran, Nepal and many more...



**HALL • A16**

Company Name:

**A Nairsons Industries India**

Address :

**B-III/4 G.T Road, Nandpur 141120  
Sahnewal - Ludhiana (Punjab) India**

E-Mail (General) :

**sales@ktkingtiger.com  
ktsleeves@gmail.com**

Website :

**www.ktkingtiger.com  
m.ktsleeves.in**

## The distinguished manufacturer of precision and durable range of bearings

Darshak Bearing Co. is established Under the guidance, supports and established setup of Mr. Champakbhai Ghetiya (Founder of Darshak Bearing Co.) in 1991 at Rajkot, Gujarat. The company is currently lead by Mr. Darshakbhai Ghetiya (son of Mr. Champakbhai Ghetiya) with wide range and precision quality for overseas as well as domestic markets. The producer is ISO 9001 : 2015 certified with experienced engineers and team members able to produce high precision bearings like Spherical Roller bearings, Cylindrical Roller bearings, Taper Roller Bearings, and customer specified bearings (SPM).



**HALL • A15**

Company Name:

**Darshak Bearing Co.**

Address :

**Plot No. P-116, Road-A, Gate  
No.1 360021 Rajkot India**

E-Mail (General) :

**darshak\_bearing@yahoo.com**

Website :

**www.darshakbearing.com**



## The Automotive and Industrial Bearing Specialist



VIMAL Engineering Company India established a bearing manufacturing facility in 1992. VEC is known as leading Indian manufacturer of precision taper roller bearings, spherical roller bearings, cylindrical roller bearings & wheel Hub Unit for automotive and industrial application. The modern facility at Shapar (Veraval) Industrial area has a capacity to manufacture 0.5 million bearings per annum. The facility is certified ISO 9001:2015 by TUV SUD.

VIMAL Engineering Co. is a manufacturer and exporter with expertise in automotive and Industrial roller bearings under "VEC" & "VPB" Brand

for Truck & Trailer & Buses i.e. VOLVO, SCANIA, MERCEDES, RENAULT, MAN, DAF, SAF, IVECO TRUCK, BPW TRAILER, PUGOT for automotive bearings (wheel bearings) i.e. IU (Insert Unit), RIU (Repair Insert Unit), HUB, THU (TRUCK HUB UNIT), TAM (Truck Axle Module), Ball Bearings, Cylindrical Roller Bearings, Taper Roller Bearings (MM Series & Inch Series), King Pin Bearings & Bushes in Bimetallic, Needle Roller Bearings, Spherical Roller Bearings, Water Pump Bearings & Bearings for Fork Lift in India.

VEC bearings are manufactured from bearing Steel Grade SAE 52100/GCR 15

**HALL • A03**

Company Name:

**Vimal Engineering Company  
(Vec Bearings)**

Address :

**Survey No. 30 Plot No. 4, N/H 27  
Ganga Gate Road 360024 Shapar  
(Veraval) – RAJKOT India**

E-Mail (General) :

**vimalbearing@gmail.com**

Website :

**www.vimalbearings.com**



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For further details, visit us at [www.vimalbearings.com](http://www.vimalbearings.com)



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Precision Components Inc. is an international group of associates working with affiliated manufacturers to provide customers the critical metal components they need to remain globally competitive. Since 1990, PCI has established a valuable reputation within the United States market by successfully developing and implementing multiple cost savings programs for US manufacturers. Over the past 30 years, PCI has expanded its operations to provide conglomerate services to customers all over the world. By identifying a manufacturer's core competency and matching it with

what's required in the North American market, PCI has helped prestigious manufacturers from lower-cost countries grow and succeed in their efforts to become recognized by the NA market. PCI delivers quality service and enjoyable working experience through sales, sourcing, product improvement, as well as consulting on both engineering solutions and international trade policies.



## Keep pace with the world bearing industry: High Life - High Load - High Precision

Shenyang Zhongye Guangyang Bearing Co., Ltd is located in North of China Shenyang known as "Chinese heavy industry base". It produces high quality medium-large size, large size and extra-large size bearings and bearing parts from 100mm inner diameter to 1500mm outer diameter. SYB has a senior technical team, strong technical force and production ability that can give customers perfect solutions and satisfaction.

SYB owns NC turning machines, grinding and super finishing machines for rings, grinding and super finishing machines for rollers, measuring equipments including profile instrument, roundness instrument,

length instrument, Brinell hardness tester, Vickers Microhardness instrument, Rockwell Hardness instrument, German Zeiss Universal microscope and detector, etc, all these equipments make a strong base for SYB manufacturing high precision bearings.

The best materials used by SYB are Northeast Special steel, OVAKO steel, SKF III, Jiangyin Xingcheng Special steel, etc, then these materials are done heat treatment by AICHILIN furnace. Stable and sustained quality, keep pace with the world bearing industry, Shenyang Zhongye Guangyang Bearing, the strongest note of the times, welcomes you to visit.

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Company Name:  
**Precision Components Inc.**

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**4455, Morris Park Drive, Suite M 28227 Charlotte USA**

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Website :  
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**PCOMPONENTS**

**HALL • A44-45**

Company Name:  
**Shenyang Zhongye Guangyang Bearing Co. Ltd.**

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**export1@syb-bearing.com**

Website :  
**www.syb-bearing.com**

**SYB®**



## The Bearing Steel Tube and Bars producer at BEARING EXPO



Sanji Group was established in January 2004 which began to produce in January 2005, it located in national level development zone in Ningbo Hangzhou Bay New Zone, which is near to Hangzhou Bay Cross - sea bridge, the world longest cross-sea bridge.

Sanji group now own 3 plants and 1 trading company with total

investment 1 billion RMB, total land area of 190000 m<sup>2</sup> and total employees more than 1200 which include 20% senior engineers, technicians and administrators. Sanji group is engaged in selling steel and coal, manufacturing bearing steel tube and shaped tube, processing wired rod and bar.

These years, Sanji people is always following the unremitting spirit of pursuing pragmatist and innovation, under the guidance of President Mr. Luo Jie, Sanji take the management tenet of "People Oriented, Credit from Hones" and quality policy of "Do Our Utmost to Meet Demand, Go On Surpassing Ourselves", then walk a road with Sanji special characteristics.

**HALL • A-59**

Company Name:  
**Zhejiang Sanji Steel Tube**

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**sale@zjsanji.com**

Website :  
**www.zjsanji.com**



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Company Name:  
**Solution Buggy**

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Layout 560102 Bangalore India**

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Website :  
**www.solutionbuggy.com**

## Benefits of Air Foil Bearings for High Speed Turbomachinery



Omega Dot is an engineering consultancy company based in England, United Kingdom. They specialize in advanced air bearings and high-speed turbomachinery. They design, manufacture and test air bearings for oil-free machines such as turbo compressors, turbo blowers, micro gas turbines and turbo motors. They serve a number of industries including the automotive, power generation and

oil & gas. Their air bearing technologies enables machines to be oil-free, maintenance free, extremely compact, simplified and highly efficient. They have validated air bearings sizes from 15 mm to 100 mm that can run up 180,000 rpm. Omega Dot prides in working closely with their clients to fast track their Research and Development activities and producing the high valued innovative products.

## Most Cost Effective Producer of China

Shandong UXG Bearing Manufacturing Co., Ltd focuses on designing and producing high speed, low noise spherical rollerbearings. The sales volume remains No.1 in china market since the year of 2014. The company starts from forging, controlled atmosphere spheroidizing annealing, turning process, controlled atmosphere salt-bath quenching, grinding process, as well as high precision roller production; It has its own material analyze and test laboratory, physical and chemical laboratory, precision measurement laboratory. It strictly follows management system of TUV ISO9001:2015 and TUV ISO14001:2015. The company adopted online inspection and SPC control system to monitor and track all the production process. It was one of national standard drafting units

for china bearing industry and Shandong provincial technical center, and Shandong single product champion enterprise. The company got China Mechanical Industry Science Progress Award in the year of 2018. Its products are appraised as "excellent products" in the regular national bearing industry inspection activity and also got high praise from customers in the application of blower machine, shaker screen, steel factory and mining industry. It is one of the listed companies recommended by China Metallurgy Association.



**HALL • A17**

Company Name:  
**Omega Dot Air Bearings**

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Blyth Road UB3 1HA Hayes UK**

E-Mail (General) :  
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Website :  
**www.omega-dot.com**



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Company Name:  
**Shandong UXG Bearing  
Manufacturing Co. Ltd.**

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252665 Liaocheng China**

E-Mail (General) :  
**sales@uxg.cc**

Website :  
**www.uxg.cc**

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