FOCUS

Customer magazine from SKF Industrial Sales | Issue 114 | Autumn 2018

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SKF supports UWE Formula Student team



Avoid fake bearings

SKF can support with verifying authenticity

Falsely labelled machine components are a big issue for buyers of premium parts today, as counterfeiters have become very skilled at disguising cheap generic bearings to look like quality branded products such as SKF.

For you as a customer it is easy to get cheated, especially if you have sourced the products through non-authorized distributors. With the unreliable performance of your machinery as the result.

If you are uncertain about the authenticity of your bearings, the SKF Authenticate app enables you to take and send photos of suspect products directly to SKF for verification. Or e-mail details to: **genuine@skf.com**

The best way to safeguard authenticity is to buy from an SKF Authorized Distributor.

skf.co.uk/distributors

SKF
Authorized Distributor

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SKF®



Dear Business Partner,

Welcome to the autumn edition of FOCUS, SKF's magazine for customers and distributors across the UK and Ireland.
The big announcement for this issue is the release of the printed version of the latest SKF Rolling Bearings catalogue. These will be available from October, but the electronic version can already be downloaded from the SKF website. Extensively re-written and full of vital information, this 1,152 page publication will replace the current catalogue as the essential go-to literature on rolling element bearings.

In this edition, we're going to be looking at the underappreciated but vital bearing seal. These are vital to the long-term performance, reliability and longevity of both the bearing and the wider application, but often don't receive the attention they deserve.

Almost every industrial facility contains air handling systems, and they can often be major sources of noise, energy wastage, and unnecessary maintenance. We'll be thinking about ways in which you can make sure yours are running as smoothly and efficiently as possible.

We'll also be looking at some of the ways SKF products and services have helped solve a wide variety of problems for customers in the marine, dairy, and railway industries.

Enjoy this edition of Focus!

David Norris
Sales Director UK & Ireland
SKF Industrial Sales

skf.co.uk/focusreply

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→ SKF supports UWE Formula Student team

→ Siemens partnership to improve reliability

→ Linear and actuation technology business divested

New SKF Rolling Bearings Catalogue makes bearing selection easier

The latest edition of the popular 1152-page, SKF Rolling Bearings Catalogue is now available as a PDF. Printed copies of the new catalogue will be available from October.

The authors have aimed to make the new publication an essential engineering reference for users of rolling bearings, covering their appropriate selection, configurations and applications, and providing detailed guidance on correct installation procedures to ensure long and trouble-free service life.

The Engineering Section has been completely rewritten and now includes a step-by-step bearing selection guide - the 'Bearings Selection Process' - which makes it much easier for customers to select the right bearing arrangement for their particular machine or project.

This innovative new tool, which benefits from SKF's extensive experience of rolling bearing design, installation and in-service care, is also available as an online engineering resource for OEMs, SKF Authorized Distributors and other end-users.

The Engineering Section also includes a thermal analysis feature that can be used to highlight the influence of friction losses on clearance. A new 'Popular Items' feature has also been introduced; designed to speed and simplify the process of ordering bearings from SKF's commonly used product lines. This feature uses a special icon placed against products that are always available directly from stock due to their popularity.

The new catalogue is also available online via **www.skf.co.uk**. Online content is regularly updated to ensure that the very latest products are included along with the current SKF assortment, and that all obsolete items are removed from the Product Tables as soon as they are withdrawn from the catalogue.



Hexatronic signs fibre optic systems agreement



SKF and Proximion AB, a wholly-owned subsidiary of Hexatronic Group AB have entered into a development partnership for the industrialisation of fibre optic sensing systems.

The two parties will work together to combine SKF's fibre optic bearing sensing technology with Proximion's application integration experience and knowledge within development and production of advanced fibre optic sensors and data collection hardware units.

Victoria Van Camp, CTO and President, Innovation and Business Development, says: "Fibre optic sensing technology is an exciting opportunity, as it enables bearings to become process and quality control instruments. We have worked for some time to develop these sensors and by taking the next step together, we will be able to speed up the process of integrating these into customer applications."

Fibre optic technology allows for end-of-line integration into existing bearing production environments, whilst most existing sensor technologies place additional requirements on rebuilding manufacturing sites to cater for safe handling of electronics.
www.hexatronicgroup.com/en

SKF supports UWE Formula Student team

A sponsor since 2017, SKF has continued their support of the University of the West of England (UWE) Formula Student team, supplying bearings for the drivetrain and suspension for their most ambitious car to date.

The 61-strong UWE Formula Student team (UWEFS) have been hard at work bringing a major re-design to this year's car with the goal to break into the top 10 UK ranking universities. The changes include the custom designed 10" wheels, a full aerodynamics package, a wireless telemetry system to monitor every aspect of the car and the change to the Triumph 675cc engine. To celebrate the launch of their car, the team were invited to Aerospace Bristol to unveil the car under the nose of Concord; one of the finest works of British engineering.

A keen supporter and sponsor of the team, SKF supplied a range of bearings for the car and provided technical assistance on bearing selection and installation throughout the 2018 design process. The team's design goals included reducing the frictional losses in the drivetrain and suspension component, and achieving maximum reliability from the car during the competitions gruelling dynamic trials. There are 58 SKF bearings of various types used in the construction of UWEFS's 2018 car.



The suspension features 44 SKF bearings including 24 SKF GEH10 C maintenance-free spherical plain bearings pressed into the wishbones reducing the compliance of the suspension. 20 SKF left and right hand rod ends provided the ability to quickly adjust the ride height, anti-roll and setup of the car without the removal of suspension components. Meanwhile, the hubs, drivetrain and steering assembly are equipped with 61811-2RZ and 608-2RSL sealed deep groove ball bearings.

Members of the Formula Student team gain a deeper knowledge and further understanding of engineering throughout their degree, they often develop more practical skills as well as developing their use of complex engineering tools such as CAD, FEA and CFD. The product development department at SKF has taken advantage of this knowledge, with the last two of their 'Year in Industry' students being part of the UWE team.
www.uweformulastudent.co.uk

Siemens partnership to improve reliability

Siemens and SKF have signed a partnership agreement that will focus on improving train operators' asset management efficiencies. The partnership will see the implementation of SKF's Insight Rail condition-based maintenance solution in combination with Siemens' Railigent Application Suite that is linked with the Internet of Things operating system MindSphere.

This new cooperation between Siemens and SKF, which leverages the resources of SKF's Digitalisation initiative, will facilitate on-line monitoring of several important components such as wheelset bearings and wheels via Siemens' Railigent Application Suite for mass transit and infrastructure operators. The goal of this project is to help customers anticipate issues with individual components, and allow them to schedule maintenance only when it is required using one single monitoring system.

SKF Insight Rail is SKF's first fully wireless, condition-based monitoring system for railway rolling stock operators. Easy to install and operate, the solution provides local measurement, data analysis and display of actionable information via an intuitive app. Railigent is a Siemens cloud-based Application Suite that provides a single interface for data collected from many different infrastructure and vehicle system components. Dubbed the 'Internet of Trains', Railigent gives operators the tools required to increase train availability by leveraging the power of the Industrial Internet Of Things.
www.mobility.siemens.com



Exhibitions and conferences

Engineering Design Show 2018
Wednesday 17 to Thursday 18 October
SKF Motion Technologies
Stand A14 - Ricoh Arena, Coventry
The must-attend event for engineering, electronics and embedded design
www.engineering-design-show.co.uk

FAQs

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Q: Do SKF manufacturer bearings for high temperature applications?
A: Yes, for applications where speeds are limited to 100 rpm a range of special large clearance deep groove ball bearings are manufactured for temperatures up to 350 °C. High temperature Y-bearing units are also available.

Q: What seal types are available for a split plummer block bearing housing SNL522-619?
A: TSN522L or TSN522A or TSN522C or TSN522S or TSN522ND.

FOCUS 113 COMPETITION WINNERS

→ 1st PRIZE

Epson Expression 442 Printer goes to: Amanda Thompson - Sulzer Electro Mechanical Services (UK) Ltd

→ 2nd PRIZE

5 x leather travel wallets go to: Alan Pow - BRT Bearings Ltd, Simon Ross - BRT Bearings Ltd, Ruth Edwards - AG Edwards & Sons, Julia Founds - ERIKS UK Ltd, Graham Hart - Boxmore Plastics Ltd

→ 3rd PRIZE

10 x men's leather wallet go to: Nick Stacey - TDR Transmissions, Nina Burton - Brammer UK, Paul King - BRT Bearings Ltd, Kev Brown - Brush Traction Ltd, Nicola Clement - ERIKS UK Ltd, Chris Dipple - Buck and Hickman, Graham Small - Hayley Group Ltd, Amy Hurley - Sprint Engineering, Matt Boaden - Nottingham Electrical Transmissions, Peter Byers - ERIKS UK Ltd.

Linear and actuation business divested



SKF has signed an agreement to divest its linear and actuation technology business to Triton. The total consideration of the deal is SEK 2.75 billion, on a cash- and debt free basis and it is expected to close during the end of 2018.

The divestment is subject to regulatory approvals and involves consultation with employee representative bodies.

Christian Johansson, Senior Vice President and CFO, says: "Having successfully developed this as a standalone entity, it will now have an ownership structure that is able to invest in its continued development. The transaction also represents value for us and our shareholders by strengthening our balance sheet and focusing our product portfolio."

In 2017, SKF's linear and actuation technology business had approximately 1,200 employees and sales of SEK 2 billion.
www.triton-partners.com

Electric motor condition monitoring business sold off

SKF has signed an agreement to divest its electric motor condition monitoring business (Baker Instruments) located in Fort Collins, USA to the Megger Group - one of the world's leaders in the manufacture of electrical test instrumentation.

This divestment includes a transfer of the assets of the Fort Collins business, including the complete Fort Collins operation, to Megger Group and is part of SKF's efforts to focus on its core business and core value propositions around the rotating shaft.

Baker motor analyzer products are high-voltage instruments that detect weaknesses and faults in motor insulation and circuitry. These portable predictive maintenance tools perform a comprehensive spectrum of tests to provide a clear, reliable view of a motor's condition.

The Megger Group is committed to the continuing supply of products and developing the product range. **www.megger.com**

Cutting costs in air handling units

If you're looking for sources of unwanted frictional noise, energy wastage and maintenance costs in a plant room or similar environment, your HVAC system's air handling unit is a good place to start. More specifically, you should focus on problems generated within the bearings of the unit's fan assembly.

To address these issues, SKF has developed a range of low friction Y-bearings and complete Y-bearing units. Ideal for air handling systems like those in factories, offices, shops, restaurants, hospitals and hotels, their advantages can also be applied to applications including industrial fans, textile machinery and conveyors.

In tests, their frictional moment has been shown to be at least 50% lower when compared to similarly sized standard Y-bearings – and in some cases as much as 75%.

The most immediately obvious benefit of reduced friction is quiet performance, which improves conditions for people in the premises served. Reducing frictional losses also, of course, conserves energy and contributes to sustainability. In addition, low friction is a key to longer service life and less maintenance.

Lower friction, less heat, longer life

In developing its low friction Y-bearing units, SKF has drawn on over 100 years of expertise in tribology – the study of interacting surfaces in relative motion – and related sciences. The main technological improvements introduced here include a new and highly effective contact seal as well as a new low friction grease.

Lowered friction means the running temperature of the bearings is up to 30°C cooler than that of standard bearings, depending on the operating conditions. The industry's rule of thumb says that a 15°C temperature reduction doubles the service life of lubricant grease.

In this case, a specially formulated, low noise, low friction, water resistant, lithium-based grease, named SKF LEGE 2, has been used for extra efficiency and longevity. In combination with the new integral seals, it ensures that in normal circumstances there will be no need for relubrication during the bearings' long and reliable life. As well as minimising time, effort and cost, this avoids environmental concerns raised by relubricating.

A complete package – ready for anything

SKF low friction Y-bearings are available in a wide range of sizes and configurations to meet different needs. They can be supplied in fully assembled SKF low friction Y-bearing units with composite housings, optimised as necessary for specific applications. Lightweight, cost-effective and easy to mount, they should be especially welcomed by users with a requirement for reliability and minimal maintenance at high speeds with moderate loads.

The housings, made from polyamide material reinforced with glass fibre, are resistant to a variety of chemicals and dilute acids. For maximum mechanical strength, durability and thermal stability, a steel coil is moulded within the housing body while the mounting bolt holes are lined with zinc-coated steel. The unit's radial breaking load is, as a result, higher than the basic static load rating of the Y-bearing it contains.

Along with excellent corrosion and UV resistance, the material offers good tolerance of high and low temperatures, is paintable and can be recycled after use. Although up to 75% lighter, the housing is dimensionally interchangeable with that of cast iron units conforming to ISO 3228 – allowing easy upgrades.

Finishing touches

SKF low friction Y-bearing units are designed to be mounted with minimal effort or complication. An initial misalignment of up to 5° is accommodated by the bearing's spherical outer surface and the housing's matching bore. The bearing's inner ring can be extended on one or both sides, according to the desired locking method.

Optional SKF ECY end covers can be supplied with the units for compliance with health and safety regulations. These simply snap into the recesses in the housing bore. Made from polypropylene (PP), they provide strong resistance to most chemicals and are tolerant of temperatures as high as 100°C. Alternatively, users may request SKF ECW end covers, with the added option of a drain hole which can be easily opened when necessary.

"Whatever your situation, we can configure the right SKF low friction Y-bearing unit to reduce total cost of ownership," says David Oliver, Channel and Platform Development Manager Bearings and Units at SKF. "From faster, easier mounting, through reductions in energy and grease consumption, to lower maintenance costs and longer service life, these units will save time and money all the way. What's more, they will make buildings quieter and more comfortable, while minimising impact on the wider environment."





Correct lubrication for industrial applications

Lubrication is a fundamental maintenance activity, yet poor, inappropriate or non-existent lubrication is the root cause of up to three quarters of breakdowns of industrial equipment. Where rolling element bearings are concerned, a variety of factors will dictate what type of lubricant is most appropriate for a particular application.

Lubrication is a vital aspect of bearing care and will have a considerable impact on how well and how long a bearing will perform in service. Poor lubrication is estimated to be responsible for more than a third of all premature bearing failures; and as bearings are at the heart of most machines, this can lead to significant downtime. Quite apart from important considerations such as the frequency of lubrication and the quantities of lubricant used, it is vital to match the grade or type of lubricant to the operating conditions of the bearing. Get this right and you will optimise its service life, ultimately reducing incidences of unplanned machine downtime.

In the first instance, specifying a lubricant for a bearing comes down to the relatively simple choice between oil and grease. Grease offers a number of advantages over oil, as will be explained later in this article, and by far the largest majority of bearings (between 80 and 90%, in fact) are grease lubricated. Having said that, oil does have some important niche uses in bearing lubrication, particularly in high speed, high temperature applications that require maximised heat transfer from the bearing's contacting surfaces. Appropriate choices come down to selecting either mineral or synthetic oil, but by far the most important property is viscosity, as this will determine the consistency and thickness of the oil film created between the bearing's rolling and sliding elements.

In some applications, so called 'Solid Oil' delivers benefits that grease or oil alone cannot provide. This is a polymer matrix saturated with lubricating oil, which completely fills the free space in a bearing; Solid Oil is particularly useful in applications that are difficult to access for routine maintenance purposes. For extremely high temperature applications, where any grade of oil or grease would otherwise be burnt off, a solid, graphite-based lubricant would be the more appropriate choice. But returning to that most popular of lubricants for bearings – grease – let's first consider its characteristics and how it behaves in service.



Grease is composed of a thickener and a base oil. The thickener functions as a container for the base oil and behaves like a water-filled sponge. When a load is applied to grease, the thickener releases the base oil in a process known as oil bleeding or oil separation. When the load is released, the thickener normally reabsorbs the base oil.

The thickeners used in most common greases include lithium, calcium or sodium soaps. Lithium and sodium soaps have a wide operating temperature range, typically up to 120°C, while calcium soaps only have an operating temperature range of up to 80°C. However, calcium soaps offer superior protection against water, including saltwater. Meanwhile, a variety of favourable grease properties can be obtained by adding more complex soap formulations to the base oil.

Greases are divided into various consistency grades according to a scale developed by the US National Lubricating Grease Institute (NLGI). Greases with a high consistency (so-called 'stiff' greases) are assigned high NLGI grades, while those with a low consistency ('soft' greases) are given low NLGI grades. There are nine NLGI grades in total, but for rolling bearing applications the relevant grades are NLGI 1, 2 and 3. While every application must be considered in terms of speeds, temperatures, loads, etc when selecting an appropriate grade, grease based on a mineral oil and lithium thickener with an NLGI 2 grade is sufficient for most applications.

The most important considerations when choosing an appropriate grade of grease are its base oil viscosity, its rust-inhibiting capabilities, operating temperature range and load-bearing capacity. Viscosity is temperature and pressure dependent. The viscosity of the base oil, for example, decreases with rising temperature and increases with falling temperature. Conversely, the



> Poor lubrication accounts for more than 36% of premature bearing failures.

viscosity of the base oil increases with increasing pressure. It is also worth noting that for every 10 to 15°C increase in temperature, the viscosity of the mineral base oil drops by a factor of two!

The operating temperature of a bearing will affect grease selection and this is measured as close to the bearing outside diameter as possible. The choice of grease will also depend on the 'speed factor' of the bearing, which is a function of its rotational speed and mean diameter. Where load is concerned, the choice depends on the ratio between the dynamic load rating (C-value) of the bearing and the load to which it is subjected. Grease datasheets will list these variables and suggest corresponding grade choices.

As an aid to selection based on temperature alone, SKF has introduced a traffic light system in which the temperature range for greases is divided by four temperature limits - low temperature limit (LTL); low temperature performance limit (LTPL); high temperature performance limit (HTPL) and high temperature limit (HTL) - organised into five 'zones': red indicating LTL and lower, HTL and higher; amber indicating regions between LTL and LTPL, and HTPL and HTL; and green representing the ideal operating range between LTPL and HTPL.

To summarise, it is well to remember that grease does not last forever. Under the influence of time, temperature, mechanical working, ageing and the ingress of contaminants, grease in a bearing arrangement deteriorates and gradually loses its lubricating properties. Re-lubrication after a certain period of operation becomes necessary and, once more, it's vital to ensure that the correct type and quantity of grease is used.

SKF LubeSelect for SKF greases

The LubeSelect application accesses a knowledge base to help you in the selection of an appropriate lubricant for a particular application. You can select a lubricant based on:

- Application conditions
- Application profiles

By filling in the application conditions, an analysis is made and greases are suggested. This analysis is based on generalised selection rules that are carefully developed with SKF lubrication experts. The suggested greases are a weighed compromise to fulfil the described application conditions as well as possible.

By selecting the application profile that is most similar to your application, the profiles give best-practise suggestions based on (years of) experience of business segments, product centres and SKF lubrication experts.

The two approaches are complementary: the application profiles give suggestions 'from the field', while the suggestion based on a description of application conditions is based on extensive 'analysis.'

To download search: **SKF LubeSelect**







The secret life of seals

Hidden from view, and often underappreciated, the performance, reliability and longevity of many mechanical systems is determined by their seals.

Most machines operate in two contrasting environments. Inside, there is a demanding, but tightly-controlled world. Fluids travel around and through components, cooling and lubricating moving parts, protecting surfaces and providing the force to do useful work. Outside, things can be far less predictable. A machine's operating environment might be hot and dusty, or cold and wet. It might be full of corrosive chemicals or abrasive slurries. Or it might contain sensitive products that must be kept scrupulously clean.

Engineered seals are the front line between these two worlds. They must fulfil a variety of difficult tasks, allowing mechanical components to move freely while retaining fluids and lubricants inside the machine, and keeping harmful contaminants out. As the only engineering company that develops both bearings and seals, SKF knows just how much sealing technology matters, and how the choice of sealing system can make the difference between poor, adequate and exceptional performance.

Compared with the machines they protect, seals are often small, apparently simple, and relatively low-cost components. It can be tempting to underestimate their significance. Or, because seals may need to be replaced several times during the working life of an asset, some people think of them as commodity items.

In fact, high-performance seals require significant engineering input. Seals may incorporate several components made of different materials. They may have complex geometries, with multiple features that work together to provide the desired combination of low friction, protection and durability. Their design must consider many aspects of the eventual application, from the loads, temperatures and pressures involved, to the chemical composition of the materials, lubricants and fluids used in the machine and present in the wider environment.

No wonder then, that the SKF range includes a huge choice of seal designs. It includes seals for rotating shafts, used to protect bearings or retain lubricants within gearboxes, seals for reciprocating components, such as hydraulic or pneumatic cylinders, and seals for the fluid handling systems used in food and beverage production, chemical manufacturing and the oil and gas industries. The range covers the full spectrum of size and performance requirements, from extremely lightweight, low friction designs for racing cars to huge, heavy-duty units to protect mining equipment or the main bearings of giant wind turbines.

Materials

Creating the right seal design for any application requires the selection of a suitable material. Seal materials must meet a number of performance objectives. They must be flexible enough to accommodate surface irregularities, misalignment and the thermal expansion of machine components. But they must also be durable, able to resist chemical damage, creep, permanent distortion and wear in use.

SKF uses a range of different materials across its seal range, including nitrile rubber, thermoplastic elastomers and specialist engineering polymers such as PTFE and PEEK. In some applications, such as pharmaceuticals or food and beverage manufacturing, the chosen seal material must comply with strict rules governing colour, performance and chemical composition.

Unlike many seal producers, SKF develops its own proprietary sealing materials. Full control over the specification and composition of the high performance polyurethane materials, for example, allows SKF engineers to optimise characteristics of the material precisely to suit the needs of specific end-use applications.

Design

The design of a seal system requires optimisation of a range of mechanical and tribological characteristics. Most seals, for example, work by allowing a small quantity of lubricant into the gap between the shaft and the lip of the seal, creating a film that reduces friction and wear. The characteristics of that lubricant film depend on the geometry of the seal lip, the forces and pressures acting on the seal and the surface characteristics of seal and shaft.

SKF engineering teams use a combination of know-how and advanced analytical tools to create seal designs with the right combination of characteristics. Their know-how comes from more than 100 years of experience in the design and optimisation of mechanical systems. For analysis, they use a combination of proprietary seal simulation tools, computational fluid dynamics (CFD) and non-liner Finite Element Analysis (FEA) to identify the critical areas of a new design and to model and predict the behaviour of seals under specific operating conditions.

This work has allowed SKF to create features and complete seal designs that offer significant performance benefits to customers. Used across SKF's range of metal outside diameter radial shaft seals, for example, SKF's Wave lip design significantly reduces friction compared to conventional straight edge radial lip seals, with compromising durability.

Testing

Analysis in the virtual environment is backed up by extensive testing using highly sophisticated equipment. A network of dedicated facilities around the world conducts thousands of tests on new seal designs every year. SKF's state-of-the-art test rigs can simulate the harshest operating conditions, exposing seals to high static and dynamic loads while monitoring critical characteristics such as under-lip

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temperature, extrusion resistance, leakage and friction forces.

Results from those tests help engineering teams to validate and improve seal designs and determine acceptable operating conditions. They also contribute to SKF's empirical knowledge base, helping to benchmark future designs and determine the root cause of seal failures in real-world applications.

Manufacturing

Some seals are manufactured in their millions, to suit end customers with high-volume production requirements or as standard parts for a broad range of applications. Others are unique, made to meet the needs of a specific customer and a specific machine. To meet these diverse needs, and help customers through their new product development, test and launch processes, SKF has developed a highly flexible seal manufacturing approach.

For higher volume applications, seals are made using technologies that include compression, injection and resin transfer moulding. Full in-house control of tooling design, manufacture and moulding parameters ensures that material characteristics dimensions and surface quality are kept within tight tolerances.

For low volume or one-off applications, machining processes allow the production of seals without the time and cost overheads of dedicated tooling. The SKF machined seal concept allows the on-demand production of specialised products, prototypes and unique seal designs. For maximum speed and responsiveness, SKF application engineering teams can work with customers to identify suitable material combinations seal profile designs and dimensions. The seal is then machined from a stock of semi-finished tubes using computer numerically controlled (CNC) equipment at one of the six SKF Industrial Seal centres strategically located across the country.

A systems approach

It isn't good enough for seals to perform well in the laboratory. They also have to work in real-world conditions. That means seals and seal systems must be durable, straightforward to install and capable of handling exceptional operating conditions that many machines will encounter from time to time.

Based on experience working with customers in many sectors, SKF has developed a range of solutions that help machine builders and maintenance teams achieve high levels of sealing performance with less fuss. In fluid handling applications, for example, SKF locking T-seals have been designed to enable easier assembly with less risk of damage. These seals include ridges that snap into place when installed, mechanically locking the built-in anti-extrusion rings in the proper orientation.

Over time, rotating shafts can wear at the shaft-seal interface, potentially compromising performance even when seals are replaced. SKF Speedi-sleeve is a thin walled shaft sleeve that can be pressed into place on the shaft to provide an excellent sealing surface. SKF Speedi-sleeve allows the life of worn shafts to be extended without costly and time-consuming disassembly and rework. Some customers even install SKF Speedi-sleeve on new shafts, where they can provide better sealing performance at lower cost compared to conventional machining.



Effective and efficient logistics

As a global company with a broad portfolio of products, and a large number of distributors and direct customers, SKF needs highly efficient, effective and flexible warehouse management and distribution facilities. This is provided by the SKF European Distribution Centre (EDC), which supports the entire supply chain of the SKF Group, as well as taking care of spare parts distribution for Europe, Middle East and Africa.

EDC was originally built to streamline and simplify SKF's logistics channels, replacing 18 local warehouses with a single, cutting-edge distribution facility. Based in Tongeren, Belgium, EDC acts as an international hub for SKF products, replenishing other regional and local warehouses around the globe. Located close to national and regional air and seaports, and built along a cross-road of European highways, EDC's 38,600m^2 warehouse handles 55,900 tons of products every year making up 4.37 million order lines. That's 220 tons and 17,000 order lines per day!

In addition to being a bonded warehouse, EDC also hosts SKF's Inventory Management Services team and the European Collecting Point. This handles customer returns for Europe, Middle East and Africa.

With its vast capacity and top-of-the-range systems, EDC is one of SKF's most powerful assets when it comes to ensuring that SKF Authorized Distributors and their customers are supplied with products as quickly and efficiently as possible.

EDC also forms the headquarters for the SKF Distributor Availability Programme and Vendor Managed Inventory system. These programs help distributors manage their inventories in the most efficient manner possible, ensuring availability while reducing their stock levels.

With the increasing levels of globalisation in every single industry, and with so many distributors and customers requiring such a broad range of products, it's vital that SKF is able to supply the correct products, to the correct place, at the correct time. The SKF European Distribution Centre makes this possible.

General information

Established	1994
No. of employees	320
Working hours	24/7
Warehouse space	38,600 m^2
Office space	1,000 m^2

Warehouse capacity

High bay (buffer area GSP)	60,000
Picking area (GSP)	35,800
Picking area (KLT)	17,400
Picking area (Euro)	4,600
Large size storing locations	1,540
Miniload picking locations	34,000

Volumes

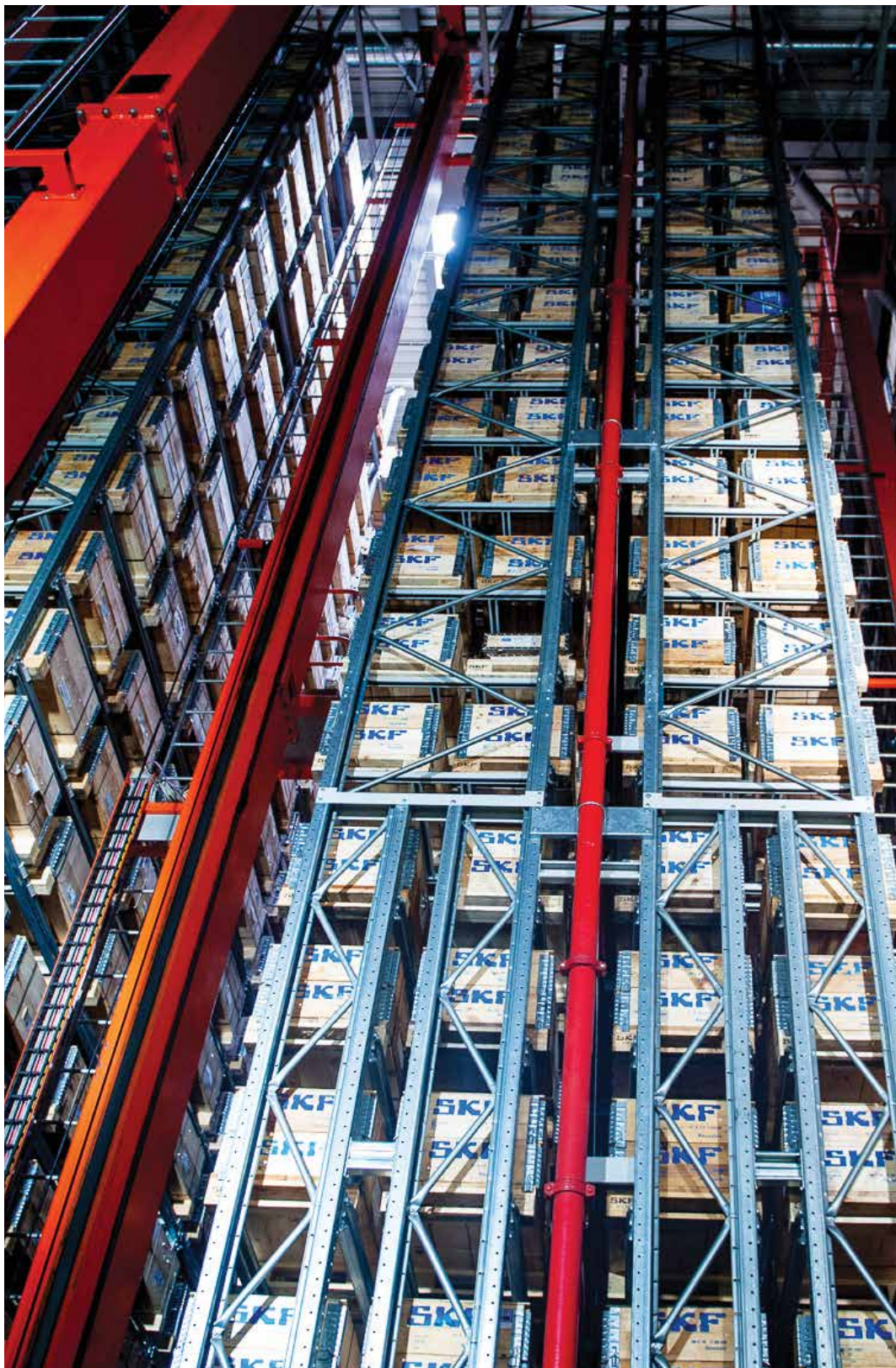
Tons/year	55,900
Tons/day	220
Order lines/year	4.37 million
Order lines/day	17,000

Certifications

ISO 9001 Quality
ISO 14001 Environment
OHSAS 18001 Health & Safety
AEO Certified
Known Consignor
Regulated Agent







> “EDC’s 38,600m² warehouse handles 55,900 tons of products every year making up 4.37 million order lines. That’s 220 tons and 17,000 order lines per day!”





Sirius Shipping invests in on-board online monitoring

To increase the control of on-board rotating machinery, Sirius Shipping has invested in online condition monitoring from SKF.

"We wanted to receive signals before anything happens so that we are better prepared to launch measures in plenty of time," says Stefan Johansson, Technical Superintendent at Sirius Shipping.

With ten vessels in its fleet, Sirius Shipping transports liquid media such as oil and chemicals to ports in Northern Europe. Delivering shipments on time, safely and, not least, in an environmentally sustainable manner, are important factors that customers demand.

"Maintenance work is a continuous process on board. We go into the shipyard for planned stoppages, roughly once every 30 months. There we review everything that we can't when the ship is in operation, such as inspecting the bottom, rudder, propeller, machine parts in the engine and gearbox," explains Stefan Johansson.

Increasing reliability

A recurring challenge facing the maintenance department is to increase the reliability of critical rotating equipment on board. Monitoring the reduction gearbox, which drives the propeller shaft, and the generator, which is also driven by the reduction gearbox, increases the safety of the system.

"Fortunately, we have done fairly well in avoiding major breakdowns. It is very costly if something happens, so we want to prevent the risks as much as we can," says Stefan.

Costly stoppages

If an unplanned stoppage were to occur, the length of the stoppage would depend on where the ship was located at that time, the accessibility of a shipyard, and whether it was necessary to move the boat from the harbour to the shipyard. It is not unusual for an ordinary shipyard stoppage to take around 6-7 days. But, with a major breakdown, the repairs can take several months, and that is something to be avoided as far as possible, according to Stefan Johansson.

"Usually the components need to be specially ordered. You can't get hold of large gear wheels or bearings straight away, so it is important that we have a longer planning horizon to be able to order parts and reduce the length of maintenance stoppages," says Stefan.

To increase the control of rotating equipment, the shipping company has chosen to install online status monitoring with measurement sensors for selected machine components. The Nimbus and Marinus vessels are the first to have this installed. Soon the SKF Multilog On-line System IMx-8 will also have been installed aboard the Neptunus and Scorpius vessels.

The SKF Multilog On-line System IMx-8 is the latest addition to the IMx range. This is a compact system that offers sophisticated functionality taken from its bigger brothers, the IMx-16 and IMx-32. The easy-to-assemble and compact system fits into Sirius Shipping's maintenance system. Sensors detect machine parts and transmit signals online to SKF's Remote Diagnostic Centre, where specialists identify machinery faults.

"They are aware of deviations and can see immediately if we have gone in to carry out any service measures on the machinery. I see it as a good step in the right direction to achieve greater predictability, which feels good", concluded Stefan.

www.siriusshipping.eu



SKF helps Houghton International to confirm and resolve motor issues



Investigation reveals problem in rail equipment.

Houghton International is a specialist in the repair, maintenance and life extension of rotating electrical machines. When engineers at the company carried out a HST alternator overhaul and rewind project for a rail industry customer, they applied their usual quality and verification procedures, which included a full range of tests using their SKF Baker AWA static motor analyzer.

Unusually, the winding failed the test. Based on the design of the windings in the machine, the waveforms generated during the surge test should be closely balanced. In this case, unbalance was extremely high, at more than 60 percent. That result surprised the Houghton International team. As one of the UK's leading rail industry service providers, the company's rail division has extensive experience in the repair, maintenance and life extension of AC & DC traction motors, motor alternator (MA) sets and HST alternators for customers in the UK and around the world.

Surge waveform imbalances can be caused by several issues, including short circuits or windings with an incorrect number of turns and misconnections. But when Houghton International inspected the new windings, and checked their work against the specification provided by the original manufacturer of the equipment, they could not find any reason for the test failure. On further investigations Houghton International engineers realised a reversed polarity winding connection in the circuit, and requested a third party confirmation before advising the customer and taking further actions.

Houghton International engineers then contacted SKF to discuss the results and also emailed the raw data to allow closer analysis for an independent review. SKF Engineer, Tony Ruane, then requested the winding data, and when he similarly drew out a winding diagram he also realised that the number of poles of the winding did not match the specification, and by reversing one connection within the circuit, the number of poles were then correct.

To confirm this, Houghton International then made the change of connection on the winding itself and subsequent testing showed that the surge waveforms were now closely balanced.

The finding was highly significant for Houghton International, but even more important for their customer, who learned the reason for some of the issues experienced with the equipment over the last thirty years. The customer contracted Houghton International to check and resolve the issue across its fleet.

"For us, this case underlined the value of the Baker test equipment in helping to identify and resolve difficult problems in electrical machines," says Michael Mitten, CEO at Houghton. "Thanks to the AWA Analyzer, and to the excellent support we received from SKF, we were able not just to fix this problem, but also help our customer address a longstanding fleet-wide issue."



Lubrication remote monitor ideal for difficult to access locations



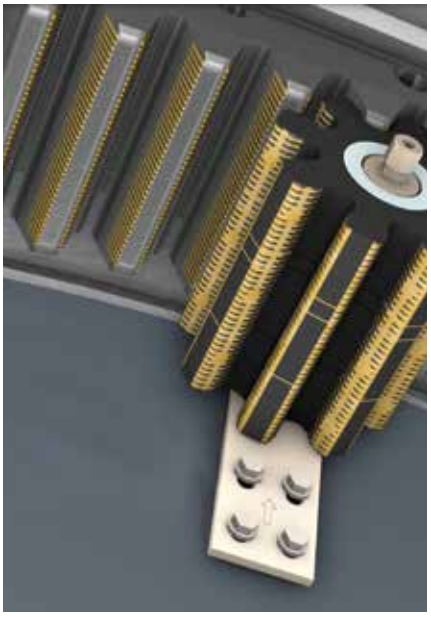
Compatible with oil or grease, the Lubrication Remote Monitor LRM2 is designed for use with lubrication systems that cannot be checked daily due to the nature or position of the application.

The LRM2 can be used on single-line, dual-line and progressive lubrication systems and can communicate with a pump or group of pumps on a system of the same type. The monitor utilises a SIM card similar to those found in cell phones to send and receive text messages via iOS or android mobile devices or via e-mail to a computer.

Featuring two digital inputs and outputs, the LRM2 sends both low-level and fault messages. The monitor can be used to start an additional lubrication cycle and can be reset simply by sending a message from a mobile device or computer. In addition, no special software is required as system information can be accessed using a web browser.

The LRM2 is suitable for wind energy, rail wayside, cable car and wastewater treatment applications, as well as other industries. The LRM2 module is also available without an enclosure for applications that require mounting in an existing control box.

Lubrication pinion ideal for gear wheels and gear tracks



Complementing SKF's existing lubrication pinion line, the reliable Lincoln Lubrication Pinion LP2 features a modular design and the capability to lubricate fast-rotating applications up to 80 r/min.

As the LP2 does not require pressurised air, there is no spray mist to contaminate the environment. Also, higher-viscosity lubricants, such as NLGI grade 2 grease, can be applied. When compared to manual lubrication, use of LP2 pinions provides better quality lubrication and reduces costs, labour and the risk of accidents.

The modular design enables customers to configure the lubrication pinion to meet specific application requirements. The LP2 is suitable for wind, mining, construction, marine and material handling applications, as well as slewing or pitch bearings.

Grease filling filter for automatic lubrication systems



Part of SKF's family of filtration products, the Lincoln small grease reservoir filling filter helps to minimise contaminants entering automatic lubrication systems during the filling process of smaller-sized reservoirs.

Installed as an inline component in the reservoir's fill line, the filling filter helps to ensure that clean grease enters the reservoir and the system. As grease enters through the inlet, it passes through the filter and then exits into a hose that is connected to the grease reservoir's fill port. As the filter element becomes clogged, the unit's clogged-indicator pin starts to retract, signalling that filter element cleaning is required. If the clogged filter element is not cleaned, grease will vent safely to a catch container but will not bypass to the reservoir.

The easy-to-install Lincoln small grease reservoir filling filter is available with either a 250- or 500-micron, crush-proof filter element, which is simple to clean. It has a fill rate of up to 8 litres/min (2 gal/min)* and operating pressure of 344 bar (5,000 psi). The filter's compact size makes remote mounting from the reservoir possible.

The Lincoln small grease reservoir filling filter is suitable for off-road construction, small mining equipment, general industry, wind energy and agricultural applications.

** Dependent on application, type of grease and ambient temperature*

Ultrasonic leak detector delivers superior results

The new SKF Ultrasonic Leak Detector TKSU 10 delivers superior leak protection results, enabling users to find leaks from a distance and in noisy industrial environments even more easily. This ultrasound measurement sensor is suitable for detecting, tracing and diagnosing the source of all kinds of leaks from compressed air, gas, steam and vacuum systems, and it can also be used to verify the correct operation of steam traps.

The TKSU 10 directly replaces the TMSU 1, which is being discontinued. Besides ergonomic and optical improvements, the lightweight, handheld TKSU 10 allows users to independently adjust headset volume and to also alter the sensor's sensitivity, via an LED screen.



The SKF Ultrasonic Leak Detector TKSU 10 works like a microphone but is sensitive only to high frequency ultrasound, due to a sensitive piezoelectric crystal used as the sensor element. Small sound waves excite the crystal, creating an electrical pulse that is amplified and then translated into an audible frequency that can be heard through passive noise reduction headphones. The screen also gives a numerical value for the air noise and by listening to the sound and observing the display value, users can quickly note if leakages are present and find their location.

The instrument also has a rubber nozzle that can be used to pinpoint leak location and protect the sensor from contact with grease. Supplied in a sturdy carrying case, complete with a neckband headset that works with protective headwear, the TKSU 10 can be powered via a 5V USB power supply or batteries as required.

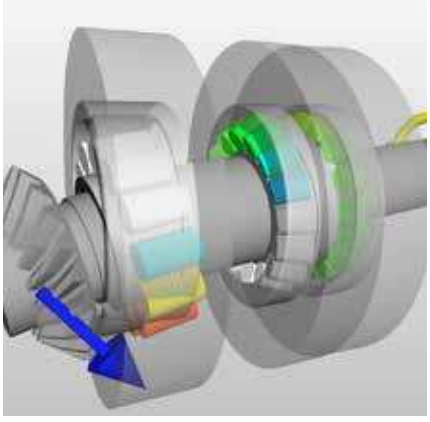
Advanced simulation software provides freedom of choice and flexibility

SKF SimPro Expert is an advanced simulation software tool developed in-house by SKF to maximise support for, and co-operation with, its customers. SKF SimPro Expert gives customers greater freedom of choice and flexibility when incorporating SKF bearings into their machine designs, but more particularly it gives them the power to evaluate the performance of SKF bearing arrangements in minute detail across a wide range of applications and service conditions, in the virtual world.

Effectively placing the breadth of SKF engineering knowledge into the hands of the customer, SKF SimPro Expert gives the user an extremely accurate means of evaluating bearing performance in any given machine model. Its enhanced application modelling capabilities and detailed bearing geometry, performance data and verified bearing theories, provides the user with a world-leading engineering tool.

As the software is practically the same as that used by SKF engineers, SKF SimPro Expert allows seamless interaction between the customer and the SKF Application Engineering team. Moreover, it encourages the customer to tackle more complex engineering challenges, confident in the knowledge that the support and guidance of SKF Application Engineering is available to hand.

SKF SimPro Expert covers many different aspects of rolling bearings in machine design and is able to simulate a broad range of bearing operating parameters and in-service conditions, including misalignment, load and moment, friction, raceway contact stresses, fatigue life and lubrication. The software creates models that take into account temperature, speed, lubrication type, contamination levels, material properties and so on; it also enables the customer to run 3D system animations of these models.



Rotation revolution



SKF has come up with a new way to keep equipment rotating with optimal efficiency at the lowest cost. SKF Rotation For Life is a performance-based contract based on a monthly fee which combines bearing technology, failure detectability and reliability services plus spares availability and optimisation into a single integrated package.

Catastrophic failure of rotating machinery can, quite literally, bring production to a grinding halt. This can result in millions of pounds in production losses, not to mention the significant unexpected extra costs to repair and replace broken equipment and restore process and equipment function.

Anything that can be done to mitigate these enormous costs is clearly to be welcomed. After all, who can dispute the fact that it's far more cost effective to invest in a proactive regime to identify the onset of problems, intervene as early as possible to avoid consequential damage, and fix the underlying causes for good, rather than waiting for a catastrophic failure to occur?

Having said that, to keep an asset rotating effectively, you need to balance the business risks and costs related to monitoring, maintaining, repairing, providing spare parts, and fixing the underlying causes of failure.

Bearings are at the heart of all rotating equipment and spares are often purchased based on price alone. This purely transactional approach may ignore other important aspects which can directly contribute to the rotating equipment performance and overall total cost of ownership or TCO of an asset, which takes account of not just the purchase price, but also the overall cost of operation and maintenance, and sometimes even disposal.

The TCO of an asset over a specific period of time includes not only the cost of the bearing, but also the cost of holding spare parts, the cost of maintaining machinery with related components and services and, finally, the cost of any downtime.

Responding to this challenge, SKF has created 'SKF Rotation for Life' – an integrated solutions programme designed to change the rulebook and transform the way you think about buying and using bearings.

Designed to improve the overall efficiency of rotating equipment, SKF Rotation For Life is a programme that can be implemented quickly to change the focus from a traditional bearing purchase model to one providing improved reliability and rotating equipment performance, combined with a reduced TCO. It also enables better cash flow and reduces the cost of capital to as low as possible for the user.

SKF Rotation For Life will result in a reduced TCO of rotating equipment over an agreed timescale and a significant increase in machinery reliability. In addition, the customer will reduce capital employed by optimising spare parts, minimising waste, optimising reusage and rework, having a fixed monthly cost and moving inventory costs from capital to operating expenditure thus freeing up more cash for investment.

To achieve the programme goals, we combine our knowledge of bearings, application engineering and rotating equipment reliability with enablers such as condition monitoring, root cause analysis and other core SKF capabilities.

Key performance indicators (KPIs) reflect the actual state of the customer's critical assets and are linked with agreed savings and rotating equipment performance improvements. SKF Rotation For Life provides the customer with bearings and all the related services and technical upgrades required to optimise rotating equipment performance to meet the agreed KPIs. The end result is a saving based on the reduction of the TCO.

Some of the savings result from increased machine and plant availability and others from the reduction of capital outlay by optimising your spare parts inventory and minimising waste. Because it involves a monthly fee instead of purchasing bearings on unit price, the programme enables its customers to evolve from a capital expenditure model to an operational expenditure model.

This integrated, single-source solution means you do not need to seek out other bearing sources or engineering services providers.

The result of all this, is that the customer saves money by moving from purchasing on unit price, to making purchasing decisions based on TCO for optimised machine reliability and efficiency. In short, the customer benefits from increased machine reliability at reduced capital cost.

Indeed, the performance-based model is a win-win scenario for both the customer and for SKF. For example, the scheme offers SKF valuable operational data on its products that it can feed back to its development teams to the future benefit of the customer.

Conveyors, for instance, are often a critical item in production processes. Under an SKF Rotation For Life contract, it would be in SKF's interest to supply and install sealed spherical roller bearings which cost less to maintain, need at least 60% less lubrication, and have three times longer mean time between failures than unsealed bearings.

In this example, SKF would also install an online condition monitoring system that collects and analyses data from the conveyor in real time and alerts it if it spots any potential problems. Such a system could also build up a history of the installation and identify any trends in behaviour.

SKF Rotation For Life explained

SKF Rotation For Life is tailored to particular customer requirements. First, SKF will define your optimum rotating equipment management strategy by conducting a detailed assessment and performance gap analysis. This will include a spare parts stocking strategy review, and a reliability engineering evaluation of the customer's critical rotating equipment.

Following the assessment, SKF will recommend an SKF Rotation For Life programme that can include all or part of the following:

- Bearing supply agreement
- Lubrication management – system and lubricants
- Sealing solutions
- Condition monitoring services and technologies
- Root cause failure analysis
- Procedures to guarantee quality
- Mechanical services such as inspections, bearing mounting/dismounting
- Bearing rework/remanufacturing including ring grinding, new roller manufacturing and radial and/or axial clearance adjustment

Customer benefits include:

- Lower overall costs for the operation of critical assets
- Total cost of ownership reduction
- Lower capital employed: bearings stock optimisation and reduction
- Monthly fee based on productivity targets

SKF Rotation For Life in practice

SKF has agreed a five-year 'Rotation For Life' contract with Zinkgruvan Mining AB which operates a zinc, lead, copper and silver mine located around 250 km southwest of Stockholm in south-central Sweden.

SKF will remotely monitor four horizontal grinding mills at a Zinkgruvan enrichment plant. The company then pays SKF a monthly fee in SEK/Tonne based on whether it meets its production targets.

This arrangement relies on well synchronised monitoring and digitalisation technologies. In one element of the contract, for example, online monitoring data from a conveyor belt is gathered automatically and the SKF specialist analyses all significant deviations as necessary.

Condition monitoring data can also be combined with process data such as machine speed and control parameters, enabling SKF to correlate a variety of data to further improve equipment performance.

Meanwhile, a distributed lubrication system keeps the line running at optimum efficiency.









Relubrication-free bearings enable savings at dairy operator

Ensuring the safe, contamination-free processing of food and beverages are critical to meeting compliance to industry regulations. To achieve this, companies perform a rigorous washdown process to sanitise machinery and the entire processing environment, as needed, to prevent bacterial and fungal growth.

Depending on the product being processed, washdowns may occur weekly or even daily when risks are higher for, or there is a history of, contamination. Past outbreaks of listeria associated with contaminated poultry, dairy and vegetables are a case in point.

However, while meant to improve food and beverage safety, the wet and humid conditions resulting from the washdown process not only pose reliability risks and require costly maintenance, but can result in potential food contamination and environmental hazards.

When standard bearing units are relubricated to purge water and contaminants, excess grease is often discharged past the bearing seals, being a potential safety hazard in case there is a risk of this ending up in the food stream. During the next washdown cycle, this grease is washed away, causing slippery floors before it ends up in the plant's wastewater. But, grease that remains stuck to the bearings also needs additional water and effort to clean.

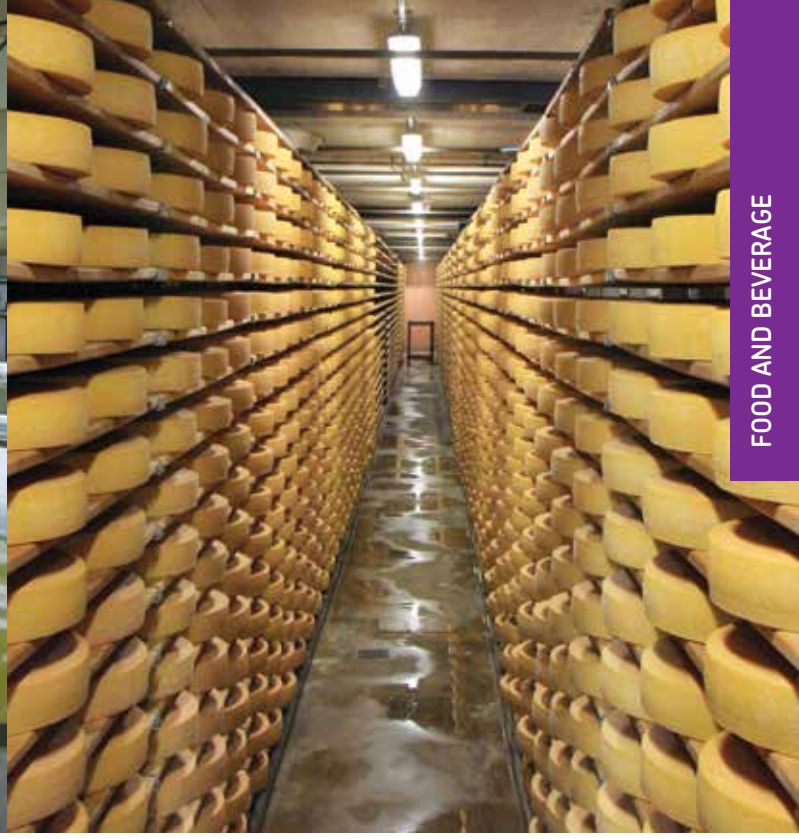
The constant exposure to repeated washdowns can cause the sealing system to lose its ability to perform reliably, allowing cleaning media to enter the bearing cavity, causing corrosion and reducing the bearing life. To offset this, maintenance teams are tasked to relubricate after each washdown – incurring high lubricant and labour costs.

But there are always risks associated to manual lubrication: standard bearings that are positioned underneath equipment may be difficult to locate and access, so they may be overlooked during regreasing; others that require the use of a ladder to reach can pose safety concerns to workers - especially in places where grease has leaked onto the factory floor. Unfortunately, missed lubrication points - whether through human error or ineffective lubrication systems (for example due to formation of grease clogs in lubrication pipes) - can cause breakdowns that lead to unplanned and costly downtime.

But what if food and beverages could be processed more safely and cost-effectively without the risks and expense associated with the use of standard bearings - even in the most challenging washdown environments?

SKF engineers understood that such an alternative could provide a tremendous advantage to this industry's processing





operations. With that goal in mind, they applied their expertise in sealing systems and knowledge of industry processing and regulations to develop an effective relubrication-free technology for its SKF Food Line Y-bearing units.

SKF Food Line Y-bearing units are industry compliant and designed to withstand high-pressure washing environments. Pre-lubricated with NSF H1 grease, they feature a relubrication-free, stainless steel bearing insert that is fitted with a very efficient multiple-lip seal (FDA approved) and a rotating flinger on both sides to keep the lubricant in, and harsh washdown solutions out.

The bearing is fitted into a high-strength, composite housing that is resistant to hot and cold water, disinfectants, washdown chemicals, citric acids and cooking fats - making it ideal for use in all food processing operations. In addition, the solid base design and smooth surface finish of SKF Food Line Y-bearing units facilitate easier visual inspection to improve bacteria elimination and ensure cleanliness.

So how does this translate into real-world benefits? Let's look at how a major provider of dairy products enhanced processing operations using this relubrication-free technology.

Before working with SKF, the dairy used standard bearings that required regreasing every week. This involved lubricating 350 mixed size bearings at a cost of £50,000 annually. The dairy also had to regularly perform extra cleaning to ensure that bearings were free from any dripping lubricant - requiring more than 380 cubic liters of hot water a year. Adding the related costs of heating the water and cleaning agents used, this additional cleaning process contributed noticeably to the cost of operations.

After replacing those components with SKF Food Line Y-bearing units, the dairy plant achieved significant benefits: weekly regreasing and extra cleaning of bearings became a thing of the past thanks to the relubrication-free technology, which prevented the original lubricant from being washed out. As a result, the maintenance team were able to recover the costs previously attributed to those tasks by reducing grease consumption and maintenance resource, as well as water usage. Through these improvements, the dairy realised its return on investment in six months.

> "SKF Food Line Y-bearing units are industry compliant and designed to withstand high-pressure washing environments. Pre-lubricated with NSF H1 grease"

Real-world results

- £3,200 saved annually from 113 kg of reduced grease consumption - which does not end up on the plant floor during washdowns and in the wastewater stream
- 380 cubic liters of hot water saved yearly from the elimination of extra cleaning requirements
- With a total of £50,000 saved annually, the return on investment was realised in only 6 months (based on labour, grease and purchased water costs)

"The implementation of SKF Food Line Y-bearings is evidence of our commitment to help food and beverage companies operate in a safe, cost-efficient and environmentally responsible environment," says David Oliver, Food and Beverage Segment Manager at SKF. "As this customer story shows, companies have an opportunity to solve ongoing issues by applying bearing technology that delivers significant cost savings and environmental improvements - without waiting years to achieve these results."

Correctly specified training improves productivity

Training is essential to the success of any business. In today's competitive world, keeping up with, and deploying best practices is a must. Achieving maximum machine reliability is critical, as machine reliability translates directly into machine uptime.

SKF offers a comprehensive range of training courses, which touch every stage of life cycle management, and are designed to help increase equipment reliability and reduce waste.

SKF is also accredited to offer BINDT (British Institute of Non-Destructive Testing) training in vibration analysis category 1 and category 2, and infrared thermography category 1.

Close working relationships between SKF and its customers have always been essential. Such relationships have resulted in a unique insight into the processes and challenges faced by every major industry today. Through this insight, SKF is also able to offer industry specific training courses.

On-site training

Besides our classroom-based courses in Aberdeen, Leeds and Luton, any existing course, or a customised version, can be delivered at your own premises.

Advantages include:

- Access to a full range of public programmes, as well as programmes specifically tailored to meet your own unique training needs
- We arrange timing and delivery of courses to suit your own requirements
- No travel time for delegates, thus providing time and cost savings
- Experienced instructors who are able to provide course participants with the full spectrum of maintenance and reliability-based training
- Cost effective method for training groups of employees from your own organisation
- Training all employees at the same time promotes a team environment and provides an immediate learning impact

On-site training is an ideal option for you if:

- You have eight or more participants from your own organisation
- You want to select a suitable date and location
- You want a trainer that understands your industry as well as a programme customised to meet your own unique training needs
- You want to save time and money while also receiving the best training

Maintenance and reliability

MS200 Introduction to modern maintenance philosophies, 1 day
16 October Leeds

MS230 Maintenance strategy review (MSR), 3 days
09-11 October Aberdeen

WI202 Vibration analysis - Category 1, 4 days
08-11 October Leeds
10-13 December Aberdeen

WI203 Vibration analysis - Category 2, 5 days
05-09 November Leeds
26-30 November Aberdeen

WI230 Introduction to infrared thermography, 1 day
30 November Leeds

WI241 Lubrication practitioner, 2 days
15-16 November Aberdeen

WI251 Machine lubricant analyst - Level 1, 4 days
15-18 October Aberdeen

WC230 Spares optimisation and inventory control, 3 days
09-11 October Leeds

WE202 Bearings in rotating machinery applications, 2 days
23-24 October Luton

WE203 Lubrication in rotating bearings, 1 day
25 October Leeds

WE204 Bearing damage analysis, 1 day
16 October Leeds

WE208 Renewables technician, automatic lubrication systems, 1 day
20 November Aberdeen

WE209 Automatic lubrication systems, (Level 1 and Level 2), 2 days, 1 day each
21-22 November Aberdeen

WE240 Precision shaft alignment, 1 day
23 October Leeds

WE250 Balancing theory and practice, 2 days
13-14 November Leeds

Railway industry

WE201-R2 Bearing theory - Level 2, 1/2 day
09 October Luton

WE201-R1 Bearing theory - Level 1, 1 day
10 October Luton

WE204-R Railway bearing damage, 1 day
11 October Luton

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Training courses 2018

Ref no: SR/T9 14778 EN

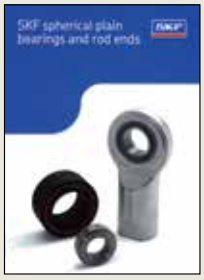
This 48-page catalogue profiles e-learning. classroom training, hands-on workshops, onsite mentoring, instrument and software-specific training, as well as a complete training needs analysis.



Super-precision bearings

Ref no: BU/P1 13383 EN

This 424-page catalogue contains the standard assortment of SKF super-precision bearings typically used in machine tool applications. Divided into 9 chapters including design and application recommendations, bearing types, lock nuts, gauges and a full index.



Spherical plain bearings and rod ends

Ref no: BU/P1 06116/1 EN

This 220-page catalogue profiles the range of bearings suitable for oscillating movements that can accomodate misalignment. Includes design and application recommendations, types, product tables and also selection charts.



Power transmission products

Ref no: PT/P1 11015 EN

This 308-page catalogue details the SKF range of pwer transmission products, inlcuding: belts, chains, couplings, bushings and hubs, sprockets, pulleys and smart tools.



Single-line lubrication systems

Ref no: LS/P1 17046 EN

This 196-page catalogue provides an overview of the combined offer of system components for SKF and Lincoln single-line systems, including pump units, metering devices, control and monitoring, etc. All products are shown with technical data, a short product description, application and order information.



Maintenance and lubrication products

Ref no: MP/P1 03000 EN

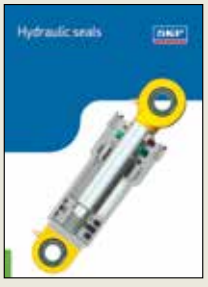
This 192-page catalogue profiles the range of bearing mounting and dismounting, instruments and lubrication products available from SKF. Also included is the SKF Bearing Life Cycle - helping your bearing achieve its maximum service life.



Industrial shaft seals

Ref no: SE/P1 10919/I EN

This 484-page catalogue includes a selection of our complete assortment of shaft seals and accessories. Product lines include radial shaft seals axial shaft seals and wear sleeves and incorporates material, design and application guidelines.



Hydraulic seals

Ref no: SE/P1 12393 EN

This 356-page catalogue contains the standard assortment of SKF hydraulic seals and guides typically used in hydraulic cylinders. This includes piston, rod and buffer, and wiper seals, guide rings and strips, O-rings and back-up rings.



Bearing housings

Ref no: BU/P1 13186 EN

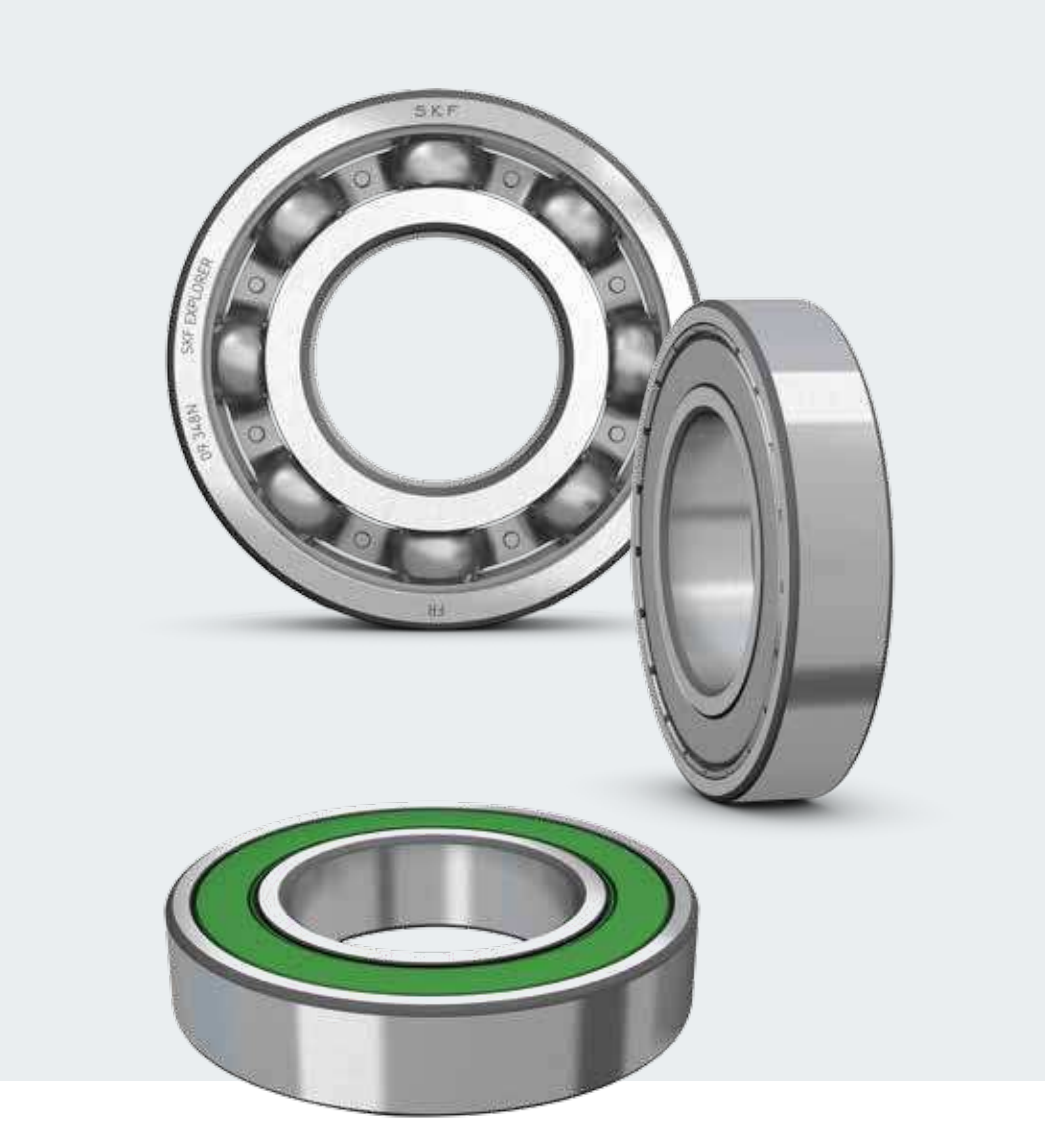
This 782-page catalogue features 18 chapters, beginning with an overview looking at selection and application, plus detailed advice on issues such as lubrication and mounting. With a comprehensive index engineers can find information quickly and easily.



Dual-line lubrication systems

Ref. no: LS/P1 16132 EN

This 72-page catalogue details dual-line systems typically used on large systems with dispersed lubrication points that require varying lubrication quantities. Applications include metalworking plants, pulp and paper, mining, mineral processing and cement factories..







Better performing, longer lasting, smoother running

SKF Explorer deep groove ball bearings provide the right choice for your high-performance solution

SKF Explorer deep groove ball bearings run more smoothly, more quietly, at cooler temperatures, and for longer than typical deep groove ball bearings.

SKF-specified steel has a higher resistance to fatigue. With the capacity to handle greater loads, SKF offers you a high performing solution that's available off-the-shelf, but is versatile enough to be used in many different applications.

Ball bearing seals are a key factor in durability. That's why SKF has extended its range of sizes available with its unique RSH seals, reducing maintenance costs and helping your machine run longer. RSH seals are designed to provide excellent sealing efficiency, as well as improve grease retention, and exclude water and contaminants.

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Competition

After reading the magazine visit: **www.skf.co.uk/focusreply** and select the three correct answers. Alternatively, tick the three correct boxes opposite and return to SKF by 31 October 2018 for your chance to win. **1st prize: Holy Stone Drone with HD Camera.** 2nd prize x 5 mini maglite torches. 3rd prize x 10 power bank chargers.





What quantity of products does the SKF EDC handle every year?

- 48,700 tons
- 52,400 tons
- 55,900 tons

In total, how many NLGI grades of lubricant consistency are there?

- 7
- 9
- 11

SKF low-friction Y-bearing units can accommodate an initial misalignment of up to:

- 3°
- 5°
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