

SKF develops and markets maintenance tools, lubricants and lubricators to optimize mounting, dismounting and lubrication of bearings. The product assortment includes mechanical tools, heaters, oil injection equipment, instruments, lubricants and lubricators.

Mechanical tools

Mechanical tools are used mainly for mounting and dismounting small and medium-sized bearings. The SKF range comprises tools for the installation and removal of bearings and locking devices. The range also contains bearing handling tools for safe and rapid lifting and positioning of bearings up to 500 kg.

Hook and impact spanners

SKF hook spanners have the exact radius to suit the appropriate lock nut. This enables safe and efficient tightening and minimizes the risk of damage to both the nut and shaft.

Impact spanners are made of spheroidal graphite cast iron and have a special impact face to transmit a maximum torque to the nut. Each spanner can be used with several nut sizes.

Lock nut spanners and axial lock nut sockets

To mount SKF self-aligning ball bearings on adapter sleeves in housings, a special bearing lock nut spanner set is available. Using these spanners, the correct tightening angle is easy to achieve and this enables consistently accurate bearing mounting.

Axial lock nut sockets are especially useful if there is insufficient space around the lock nut. They have drive connections suitable for use with power tools or torque wrenches.

Bearing fitting tools

SKF bearing fitting tools enable small bearings to be cold mounted on a shaft. They can also be used to mount bushings, seals and pulleys. The kits consist of impact rings and sleeves and a dead blow hammer.

Jaw pullers

SKF jaw pullers enable a wide range of bearings to be dismounted. One of the puller series, designated TMMA, which design is unique to SKF, incorporates a spring allowing easy opening and closing of the arms, while a special safety solution helps to prevent dangerous overload. A range of hydraulic spindles and rams are also available for increased puller forces. The SKF jaw puller range contains pullers with withdrawal forces up to 500 kN.

Strong back pullers

SKF strong back pullers are supplied as kits with all necessary accessories to cover the most difficult pulling operations. Strong back pullers consist of either a two or three-piece separable yoke, which when placed behind the bearing makes a "strong back". The pulling force can be applied using a mechanical spindle, a hydraulic spindle or a hydraulic ram.

Internal and blind pullers

To dismount a wide range of deep groove ball bearings from blind housing bores quickly and easily, SKF has developed blind housing puller kits. These pullers have hinged arms with specially machined ends so that they fit into the bearing raceway(s), allowing the bearing to be extracted from the housing.

Puller kits for removing bearings from housings, using an internal pull, consist of a number of adjustable collets that can be expanded to fit on the rear side of the bearing bore. A slide hammer arrangement allows large forces to be applied to the bearing in order to remove it.

For additional information on SKF maintenance products, please visit www.mapro.skf.com or order catalog 711-639.



Mechanical tools



Lock nut spanners



Bearing fitting tools



Jaw pullers



Strong back pullers



Internal and blind pullers

Maintenance products

Hydraulic tools

A variety of hydraulic tools is available to mount and dismount bearings in a safe and controlled manner. The SKF oil injection method enables easy working while the SKF Drive-up Method provides accurate results.

Hydraulic nuts

HMV .. E type hydraulic nuts enable mounting and dismounting of bearings with tapered bores of 50 mm and above. When compared with mechanical methods, they considerably reduce the time and effort needed to install or remove a bearing. SKF HMV .. E nuts are available with metric or imperial threads or with a plain bore.

SKF HMV .. E nuts, when used in conjunction with SKF pumps fitted with a digital pressure gauge and a dial indicator, allow the full advantages of the SKF Drive-up Method to be realized.

Hydraulic pumps and oil injectors

SKF hand-operated hydraulic pumps can develop pressures up to 21,750 psi (150 MPa). They can be supplied with a highly accurate pressure gauge, which allows the SKF Drive-up Method to be employed. All pumps are contained in a sturdy carrying case complete with a hose, quick connection coupling, nipple and mounting fluid.

Oil Injectors can supply oil pressures up to 58,000 psi (400 MPa). The SKF range comprises single injectors as well as a number of kits, which contain an injector and a selection of the most common accessories such as an adapter block, high-pressure pipes and nipples.

For large bearings and applications requiring a larger volume of oil, several air-driven portable pumps and injectors providing pressures up to 43,000 psi (300 MPa) are available.

Hydraulic accessories

To facilitate connections between hydraulic tools and most applications, SKF offers a wide range of accessories including pressure gauges, high pressure pipes, connection nipples and mounting and dismounting fluids.

For additional information on SKF maintenance products, please visit www.mapro.skf.com or order catalog 711-639.



Hydraulic nut



Hydraulic nut



Hydraulic pump



Hydraulic pumps



Hydraulic accessories



Oil injection kit

Instruments

To realize maximum bearing life, it is important to determine the operating condition of machinery and their bearings. With the SKF measuring instrument range, critical environmental conditions can be analyzed to achieve optimum bearing performance.

Tachometers

Optical measurement is a safe and reliable technique to determine rotational speed. Using non-contact instruments is often essential to meet industrial safety regulations. SKF provides a range of highly accurate optical tachometers. A range of accessories enables linear and direct contact rotational speeds to be measured.

Thermometers

The temperature of a bearing or bearing housing is a quick and easy indication of the running conditions of the bearing. SKF provides a range of contact and non-contact thermometers from

the indispensable ThermoPen up to a highly accurate, advanced dual channel, wide range thermometer. A comprehensive range of temperature probes for a variety of applications is also available.

Electronic stethoscope

The noise of a machine can help indicate troublesome parts such as damaged bearings, valve chatter, tappet noise, piston slap and gear and pump noise. The SKF electronic stethoscope is a hand-held instrument that picks up the noise or vibration from a machine via a probe and helps the user locate the source of the noise.

Oil check monitor

The SKF oil check monitor determines oil condition by analyzing the contamination levels and electro-chemical changes in both mineral and synthetic based oils. It was developed originally for engine oils but is suitable for gear and lubrication oils. It can also help to detect water, anti-freeze or metallic particles in an oil sample.

Alignment instruments and shims

SKF has developed laser alignment tools to make the machinery alignment process faster, easier and more reliable. Using the latest laser technology, the SKF shaft alignment tool measures both the parallel and angular alignment of shafts to be connected.

SKF's belt alignment tool aligns the grooves in a pulley rather than the pulley face, facilitating accurate and simultaneous adjustment of belt tension and pulley alignment.

A comprehensive range of pre-cut machinery shims in both metric and inch dimensions is available as well as stainless steel double slot shims for use with many housings.

For additional information on SKF maintenance products, please visit www.mapro.skf.com or order catalog 711-639.



Laser tachometer



Thermometer



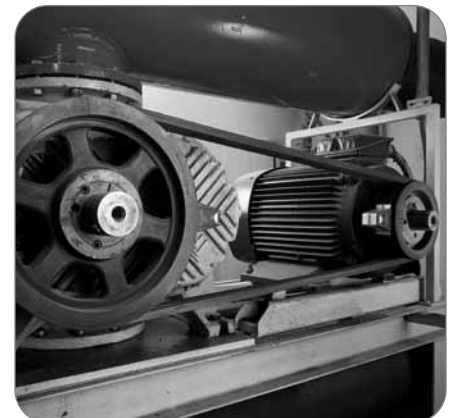
Electronic stethoscope



Oil check Monitor



Shaft alignment tool TMEA2



Belt alignment tool TMEB2

Maintenance products

Bearing heaters

A fast and very efficient way to heat a bearing for mounting is to use an induction heater. These heaters, which only heat metallic components, control bearing temperature safely and accurately, to minimize the risk of bearing damage caused by excessive heat.

Induction heaters

SKF pioneered the use of induction heaters for bearing applications. SKF TIH induction heaters cover a wide range of bearing types and sizes. The smaller heaters are recommended for bearings weighing up to 170 lb (80 kg) while the largest floor model can be used for bearings up to 1,500 lb (700 kg).

Large heaters are also suitable for heating smaller bearings, as a power reduction feature is incorporated. SKF induction heaters can be controlled by means of time or temperature. In addition, they feature a bearing heating mode to help prevent damage to bearings through over-heating. At the end of each heating cycle, the bearings are automatically demagnetized.

Portable induction heater

The portable SKF induction heater heats bearings and other components with a bore diameter up to 4 in. (100 mm) and a maximum weight of 11 lb (5 kg). It uses a patented method of heating based on high frequency induction for optimized efficiency. This truly portable unit weighs just 10 lb (4.5 kg) and is supplied with a heating clamp, temperature probe, power cable and a carrying case.

Hot plate

The SKF electric hot plate heats small bearings and other machinery components. It is suitable for bearings with an outside diameter up to approximately 170 mm or with a weight up to 4 kg. A lid for retaining the heat also prevents dirt from entering the bearing.

Heating devices to remove inner rings

A range of special heating devices for removing cylindrical roller bearing inner rings from shafts is available from SKF. Aluminum heating rings are designed for dismantling inner rings of small and medium-size cylindrical roller bearings.

Adjustable induction heaters are also available for frequent dismantling of various sizes of cylindrical roller bearing inner rings. Two sizes are available covering raceway diameters from 80 to 170 mm. Non-adjustable induction heaters are designed to suit a particular bearing and application. They are normally used to dismount inner rings of multi-row cylindrical roller bearings.

Gloves

SKF heat resistant gloves are specially designed for the handling of heated bearings and other machine components.

For additional information on SKF maintenance products, please visit www.mapro.skf.com or order catalog 711-639.



Induction heater TIH 100



Induction heater TIH 220



Portable induction heater



Hot plate



Adjustable induction heaters



Non-adjustable induction heater

Lubricants and lubricators

The value and importance of using the right lubricant is explained in the section “Lubrication”, starting on **page 23**. The formulation of all SKF bearing greases is based on extensive research, grease performance testing and field experience.

SKF developed many of the internationally accepted bearing-related grease testing parameters. For correct lubricant application, a range of lubrication equipment is available from SKF.

Greases

SKF offers a range of high quality lubricating greases to suit many bearing applications and conditions. The greases have been developed specifically to meet the needs of rolling bearings and their application conditions.

Grease guns and pumps

The SKF range also includes grease guns, manual and air-driven grease pumps and grease filler pumps. Grease filler pumps are used to fill grease guns and grease packers from standard SKF grease drums.

Grease meter

The SKF grease meter can accurately measure the volume of grease pumped into a bearing. A wide range of accessories is available.

SYSTEM 24 single point automatic lubricator

SKF SYSTEM 24 is a single point automatic lubricator, pre-filled with SKF grease or oil. Compared with traditional manual relubrication techniques, SKF SYSTEM 24 provides a more accurate control of the quantity of lubricant supplied. It can be set to continuously supply the correct amount of quality lubricant over a given time period, up to a maximum of one year.

SYSTEM MultiPoint automatic lubricator

SKF SYSTEM MultiPoint is a microprocessor controlled automatic lubricator. Grease can be supplied to up to eight points, using standard SKF grease cartridges. The cartridges assure the user that only clean fresh grease is used. SYSTEM MultiPoint lubricator has been tested and approved for use with all SKF bearing greases.

Oil leveller

The SKF oil levellers are designed for automatic adjustment of the optimal oil level in oil bath lubricated applications. They effectively solve the problem of adjusting the correct oil level during operation or due to leakage rather than just during standstill.

For additional information on SKF lubrication products, please order catalog 750-900.



Greases



Grease guns and pumps



Grease meter



System 24



System MultiPoint



Oil leveller

Lubrication products

Centralized lubrication systems

Components, assemblies and complete systems for the lubrication technology are also part of the SKF business. The competent SKF company for these products is the Willy Vogel AG, the world leader in the field of centralized lubrication systems for machines and industrial, commercial or rail bound vehicles. The product range of lubrication and circulating oil systems essentially includes the following products briefly described.

Detailed information can be found in the Vogel brochure "Overview of Products for Industry: Centralized lubrication and minimal quantity lubrication for machinery and systems". For additional information please visit www.skfusa.com and click on "Products" and look for "Engineered lubrication systems".

Generally there are two types of centralized lubrication systems: total-loss lubrication systems and circulating lubrication systems.

Total-loss centralized lubrication systems

Centralized lubrication systems feed a small and always fresh amount of lubricant to each lubrication point at requisite intervals, in line with a predetermined need. The residual lubricant that escapes from the lubrication point at some time is disposed of (in case of industrial applications) or is lost (in case of commercial or rail bound vehicles).

Depending on the operating conditions total-loss centralized lubrication systems can be designed as

- single-line systems
- dual-line systems
- multi-line systems

equipped with components individually needed. The applicable lubricants range from oils with a viscosity of 2 to 16 000 mm²/s and fluid greases with an NLGI consistency class of 0, 00 and 000 to consistent greases with an NLGI consistency class of 1, 2 and 3.

Circulating oil lubrication systems

In circulating oil lubrication systems the oil is supplied to the lubrication points with the aid of pumps. After passing the lubrication point the lubricant returns to a tank or sump where it is filtered before being returned to the lubrication points. Generally a larger quantity of oil is supplied to the lubrication points than actually needed.

For circulating oil lubrication systems a variety of components are available enabling tailor made solutions for all types of industrial applications. A continuous flow of oil produced by a pump and then divided up is required for machines or installations that use large amounts of oil for lubricating and cooling purposes.

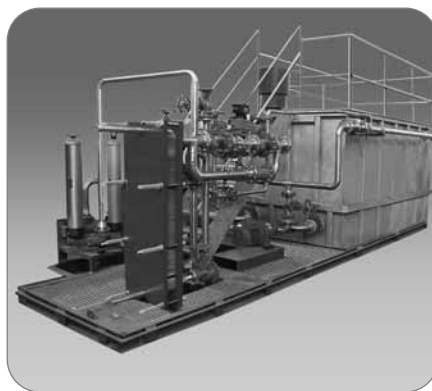
The lubricant for the lubrication points is apportioned by progressive feeders, flow limiters, flow controllers and/or flow meters.

Multi-circuit circulating oil systems

Vogel multi-circuit circulating oil supply systems are custom-designed and suitable for all types of hydrostatic shoe bearing arrangements that carry large rotating drums. They are modern systems, use state-of-the-art components and enable stable pressure at each individual bearing point.



Total-loss centralized systems



Circulating oil lubrication systems



Multi-circuit circulating oil systems



Chain lubrication systems



Oil and air lubrication system



Minimal quantity lubrication system

Chain lubrication systems

Vogel chain lubrication systems are customized, fully automatic systems for lubrication of drive or conveyor chains in all types of industrial applications. They enable environmental friendly systems that deliver precisely metered quantities of lubricant while the machine is in operation.

Oil+air lubrication systems

Modern oil+air lubrication systems are mainly used to supply extremely small amounts of oil to bearing arrangements, e.g. in spindles of machine tools or in linear guidance systems. They deliver a precise metered quantity of lubricant to each bearing to improve the operating reliability and reduce the consumption.

Splash and spray systems

These systems are manufactured on demand and custom-made to fulfill the needs of a specific application. They are typically used in customized handling equipment, for example, to spray lubricants onto conveyor belts or to spray billets and stampings with oil.

Minimal quantity lubrication systems

Minimal quantity lubrication is the clean alternative to wet machining and an optimal way to supplement dry machining. It can be used to optimize machining processes like milling, rolling, high speed cutting, drilling, boring or tapping. The oil or emulsion supplied to the working surface gets lost and no residue is left. These minimal quantity lubrication systems, which carry the trademark LubriLean®, provide considerable technology advantages. In addition, these systems can be used to reduce costs and increase productivity.

For additional information on SKF lubrication products, please order catalog 750-900.

Seals

Seals represent an important part of the SKF business. The SKF range consists of seals in contact with stationary or sliding surfaces and covers virtually all application requirements. Not just simple sealing arrangements, but a wide range of seals for demanding industrial applications. From design concepts to high volume production, from original equipment to after-market, SKF can provide sealing solutions to its customers.

Detailed information can be found in the catalogues "Industrial seals" and "Hydraulic seals". The standard range of dynamic SKF seals for rotating machine components is also listed in the "SKF Interactive Engineering Catalogue".

Seals for rotating machine components

- Radial shaft seals
- Mechanical seals
- V-ring seals
- Axial clamp seals
- Wear sleeves for shaft repairs

Seals for reciprocating components

- Hydraulic piston seals
- Hydraulic rod seals
- Wiper seals
- Guide rings and guide strips

Seals for stationary surfaces

- O-rings
- Back-up rings

PTFE seals for different purposes

- Piston and rod seals
- Wiper seals
- Guide strips
- Radial shaft seals
- PTFE encapsulated O-rings

Separator filter dryer

Moisture, oil and dirt hurt compressed air systems

From concrete plants to food processing, countless applications relying on compressed air systems will eventually develop water vapor, oil, or particulates in the air lines. These contaminants damage delicate pneumatic controls, shorten machine life, and reduce productivity. Moisture alone is the main cause of most pneumatic equipment failures.

Oil, water, or particulates in compressed air contribute to increased maintenance, higher operating costs, and lower productivity. Many plants have found options to control compressed air contamination are often unreliable, cost-prohibitive, or maintenance-intensive.

SKF Separator Filter Dryer delivers clean, dry air supply

SKF developed the ultimate solution for clean compressed air: the Separator Filter Dryer (SFD), an innovative, three-in-one dryer system that keeps compressed air free of water, contaminants, and oil.

Compact and easy to install, the SFD dries compressed air right from a compressor's reservoir tank or at a point of use, eliminating the need for additional external filters.

The SFD dual-cartridge design channels air flow through one desiccant cartridge while the other regenerates, typically using less than 10% of air for regeneration.

SFD eases maintenance, protects profits

Accessible valves, spin-on desiccant cartridges and a patented filtration system contribute to easy, cost-effective preventive maintenance. Reliable SKF air dryer technology is proven in harsh environments across many industries, including ours – SFD units currently operate in SKF production facilities worldwide.

For additional information order publication #170-450A.



Separator filter dryer

Reliability and services

SKF has been a leader and innovator in bearing technology since 1907. The evolution of SKF expertise in machine reliability stems from the very nature of bearings and their applications. SKF's understanding of a bearing's performance in an application requires an equally extensive knowledge of the machines and the processes. The thorough understanding of machine components, systems and related processes, enables SKF to create and provide realistic solutions for optimum machine and process reliability and productivity.

Close working partnerships with customers worldwide has provided SKF with an extensive knowledge of applications in virtually every industry. As a result, SKF has learned to apply the most relevant of today's emerging technologies to industry-specific applications.

Through SKF Reliability Systems, SKF provides a single source for a complete productivity solution. The goal is to help customers reduce total machine related costs, enhance productivity and strengthen profitability. Whatever the requirements, SKF Reliability Systems offers the knowledge, services and products needed to achieve specific business goals.

An integrated platform

SKF's range of products and services provides the solutions that will ultimately lead to increased bottom line profitability. The focus on technology and seamless interface with plantwide systems supports four key areas.

Decision support

SKF can assist customers in retention, storage and utilization of crucial information with its @ptitude industrial decision support software (page 569).

Condition monitoring

As a leading supplier of condition monitoring products, SKF offers a complete range – from hand-held data collectors/analyzers to online surveillance and machine protection systems. These products provide interface with condition monitoring analysis software and other plantwide systems and are listed starting on page 570.

Tools and lubricants

SKF has developed a range of maintenance tools and lubricants to provide safe and damage-free machine maintenance. Brief information on these products is given in the section "Maintenance products" starting on page 561 and "Lubrication products", starting on page 565.

Component innovations

Component innovations are needed to achieve productivity goals that were never intended by original equipment manufacturers. SKF has developed bearing products designed to run faster, longer and cooler without maintenance in many difficult applications.

The assist efficiency optimization concept

The Asset Efficiency Optimization™ (AEO) concept from SKF picks up where most plan asset management programs typically stop. Using this concept enables a plant to produce the same amount for less cost, or to produce more for the same costs. It is a system for organizing and applying assets – from personnel to machinery – bringing together knowledge and technology to achieve the greatest return on investment.

By applying the power of SKF's technology and service solutions, you can benefit from a program that assists in achieving your organization's overall business objectives. These include reduced costs, greater productivity, better utilization of resources, and as a result, increased bottom line profitability (diagram 1).

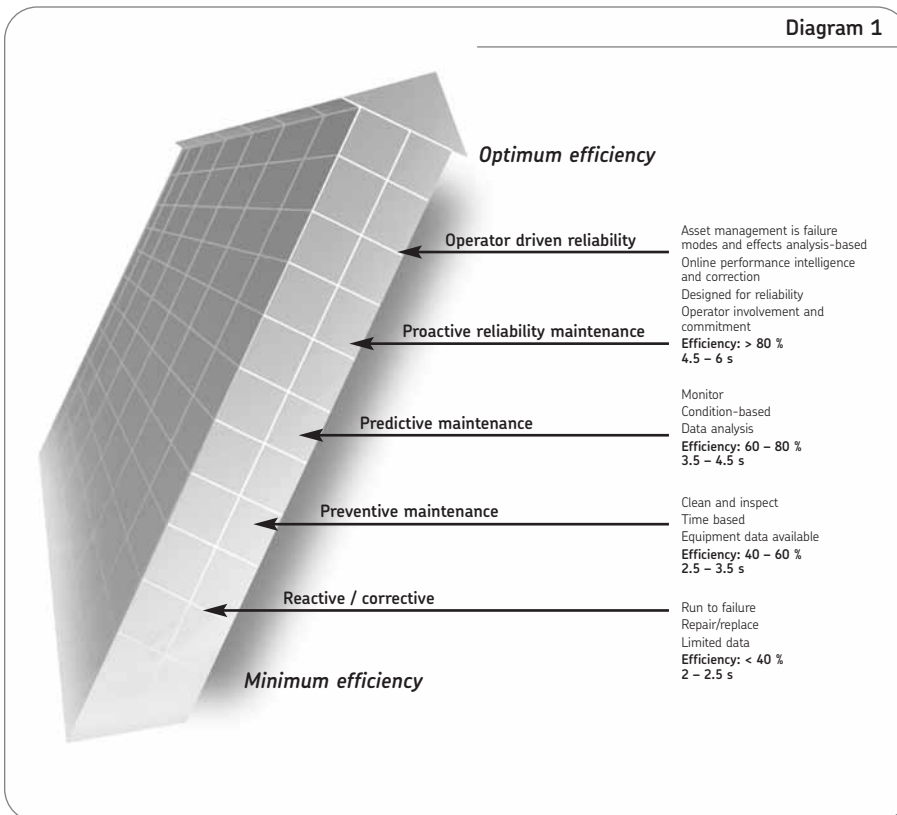
SKF technology and service solutions

The following summarizes the most important services and products that SKF Reliability Systems offers to provide solutions to the real-life application conditions. For detailed information on the SKF Reliability Systems program please refer to publication 5160 E "The Guide to Asset Efficiency Optimization™ for Improved Profitability" or visit www.skfreliability.com to see the latest information on strategies and services.

Assessment

An assessment can include one or all of the following areas.

- Determination of current situation
- Maintenance
- Supply and stores processes
- Predictive maintenance



Maintenance strategy

SKF can help to establish a comprehensive maintenance strategy, designed to make sure that productivity as well as safety and integrity issues receive the attention they require.

Diagram 1 on **page 568** illustrates the range and ranking of maintenance practices.

The latest and innovative approach to maintenance is called Operator Driven Reliability (ODR). This maintenance concept is simply a framework for organizing the activities of plant operations personnel in concert with a company's reliability maintenance practices. SKF has the knowledge and equipment to initiate and support this approach.

Maintenance engineering

Maintenance engineering is putting the strategy to work and includes for example the implementation of a "Computerized Maintenance Management System" (CMMS) with all the data and process information needed to achieve maintenance strategy goals.

Supply process

This service is an integral part of increasing profitability by reducing transaction costs, releasing capital tied up in spare inventory and making sure that the spares are available when needed.

Proactive reliability maintenance

Following the Proactive Reliability Maintenance process helps to provide best return on plant assets. It addresses failures and implements the processes necessary to prevent recurrence. The SKF Proactive Reliability process is based on four key steps:

- Predictive maintenance, a multi-faceted process that uses sophisticated technology systems to gather comprehensive intelligence on machine conditions and production processes.
- Diagnostics and Root Cause Analysis (RCA) to identify problems and necessary actions, such as machine alignment, balancing etc.
- Key performance indicators are performance improvement targets, established jointly between SKF and the customer.
- Periodic operational reviews between SKF and the plant management to analyze performance.

Machine maintenance

SKF Reliability Systems has developed its most comprehensive service program for rotating equipment to drive machine maintenance in the most cost effective ways. This program includes products and services such as

- Machine alignment
- Precision balancing
- Lubrication management
- Bearing analysis
- Technology advice and machine upgrades
- Bearing installation

Machine improvement

To remain competitive, plants must keep pace with new machine technologies. SKF can help to keep pace – without the need to invest in new machines. Recommendations can include one, or a combination of actions:

- Upgrade, rebuild and re-design
- Design engineering
- Refurbishment of bearings
- Repair and upgrade machine tool spindles
- Instrument/equipment calibrations

Training

SKF Reliability Services offers comprehensive machine reliability and asset management training – from the shop floor to the highest level of management.

Integrated Maintenance Solutions

An Integrated Maintenance Solution (IMS) agreement brings together all areas of expertise offered by SKF, establishing a continuous process of maintenance monitoring, analysis and improvement. It provides a planned skills transfer program for maintenance and operations personnel, and technology upgrades where required.

With an IMS agreement, SKF Reliability Systems will manage every key component of a machine asset management strategy, providing a total system for improving efficiency. Each agreement is customized to specific business needs. The user can choose which areas need to be included, based on internal resources and current supplier contracts. With an IMS contract, SKF shares some of the risk as well as the savings, while the user receives agreed-upon financial returns with little to no capital investment.

@ptitude industrial decision support system

The @ptitude Industrial Decision Support System from SKF is a knowledge management system that incorporates today's most advanced technologies to integrate data from multiple sources into an easy to use reliability maintenance application. It enhances the user team ability to make the right decision at the right time, providing a structured approach to capturing and applying knowledge. A key element of the @ptitude system is its online, web-enabled asset management knowledge bank: @ptitudeXchange subscribers have access to articles, technical handbooks, white papers, best practices and benchmarking information, interactive decision-support programs and an information network for expert advice and services.

For additional information, please visit www.apitudexchange.com.



Condition monitoring products

At the core of the SKF product range are the vibration detection, analysis and diagnostic products, which enable process monitoring as an added benefit. Some of those products are shown below. More information about SKF condition monitoring products can be found online at www.skf.com/cm.

Microlog family of data collectors

The SKF family of Microlog data collector/analyzers is designed so that users can easily establish a comprehensive periodic condition monitoring program. As a diagnostic tool, the Microlog is unequalled in its class. Embedded intelligence provides step-by-step instructions for performing critical analysis functions like basic and advanced balancing, cyclic analysis, run-up/coast-down, bump test, tracking filter or motor current analysis. The frequency analysis module enables overlay defect frequencies on collected spectra to detect bearing defects, gear mesh, misalignment, unbalance or looseness problems.

MARLIN family of data managers

The MARLIN data management system is designed to be the frontline tool for operators, building the communications/technology bridge between operations, maintenance, engineering and plant management. This rugged high performance data collector provides a simple, convenient and portable way to collect and store machine vibration, process, and inspection data for quick downloading and analysis.

Vibration Pen Plus

The Vibration Pen Plus offers users a way to begin a cost-effective condition monitoring program, or to expand the responsibility for machine reliability to operators throughout the plant. A multi-parameter vibration monitoring tool, the Vibration Pen ^{plus} operates with the press of a button, measuring vibration according to ISO standards and utilizing acceleration enveloping technology to identify a range of bearing, gear mesh and other machinery problems.

Inspector 400 ultrasonic probe

The inspector 400 ultrasonic probe senses high frequency sounds produced by leaks, electrical discharges and equipment as it operates. It electronically translates these signals using a heterodyning process, making them audible through a headset and "visible" as increments on a meter. This enables maintenance personnel to detect pressure and vacuum leaks, arcing, tracking and corona in electric apparatus or test bearings, pumps, motors, compressors etc.

Infrared temperature probe

This laser sighted non-contact thermometer senses the temperature of an object with an infrared detector, enabling maintenance personnel to take temperature readings in locations that might otherwise be difficult to access.



Microlog CMVA65



Microlog MX series



MARLIN 1-pro



Vibration Pen Plus



Ultrasonic probe



Infrared thermometer

Condition monitoring products

Machine condition transmitter, online monitoring units

SKF machine condition transmitters provide vital information about bearing performance and overall machine condition. This information can be used to make sure that essential production equipment is kept running. This cost effective system offers two adjustable warning levels (alert and alarm) via two independent set points with LED alarm indicators and output relay contacts.

Online monitoring units provide around-the-clock automated data collection and a powerful array of analysis tools to optimize condition monitoring efforts. If a machine starts to develop a problem, the system helps to detect, analyze and track the defect so that maintenance costs are minimized. A "live" mode feature enables detailed online analysis, while event logs provide a history of events that may have occurred while the system was unattended.

Vibration sensors, eddy probes

SKF's in-depth bearing, machinery, monitoring and signal processing knowledge was included in the development of the CMSS2100 and CMSS2200 vibration sensor series. These single units can be used instead of the wide range of accelerometers typically needed to meet a variety of conditions.

In addition to a full line of vibration sensors SKF also offers eddy probe systems for the measurement of relative motion in sleeve bearing machines.

SKF online monitoring system V/T

SKF wireless condition monitoring unit is a compact, four-channel, permanently mounted monitoring device that communicates using a wireless network. It collects acceleration, velocity, temperature and bearing condition data and automatically uploads it for viewing and analysis in SKF @ptitude Monitoring Suite. Choosing a wireless system can improve machine reliability, reduce installation costs and increase personnel safety.

SKF multilog online system IMx

The SKF Multilog On-line System IMx is the next generation of powerful, cost-effective solutions for a variety of condition monitoring applications. Together with SKF @ptitude Observer software, Multilog IMx-T provides a complete system for early fault detection and prevention, automatic advice for correcting existing or impending conditions and advanced condition-based maintenance to improve machine reliability, availability and performance. The Multilog IMx is available in wall-mounted or rack mounted configurations.

SKF @ptitude monitoring suite software

Consisting of three modules – Analyst, Inspector, and Observer – the SKF @ptitude Monitoring Suite forms the basis for a completely integrated approach to condition monitoring, permitting fast, efficient and reliable storage, manipulation and retrieval of large amounts of complex machine and plant information. Designed from the ground up with robust open databases and the familiar Windows® interface, this powerful software accepts data from the full range of SKF data collection devices and interfaces with SKF @ptitude Decision Support to facilitate consistent and reliable decision-making.

SKF @ptitude decision support

SKF @ptitude Decision Support is a dedicated decision support software that links with a range of data sources to facilitate accurate, timely, and consistent decision making and work order notification – within a single plant or across multiple facilities. By fusing knowledge from diverse sources, SKF @ptitude Decision Support provides the information essential to effective machine and process analysis, diagnosis, reporting and corrective action. Overall plant efficiency is improved by replacing labor-intensive data analysis with an automated process that identifies the probability of specific faults within an asset or process and then prescribes appropriate action.



Machine condition transmitter



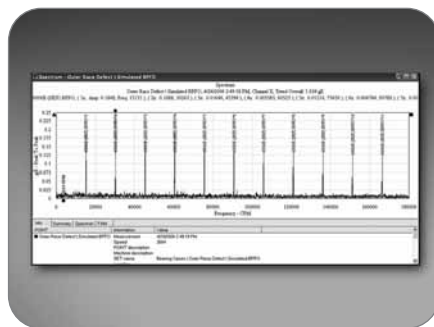
Vibration sensors



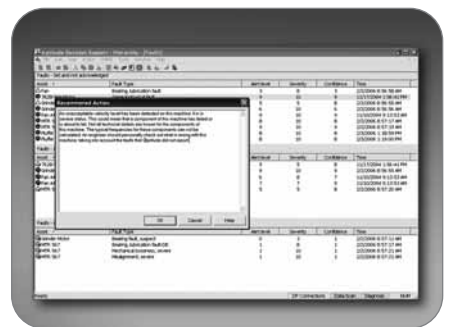
SKF online monitoring system V/T



SKF multilog online system IMx



SKF @ptitude monitoring suite software



SKF @ptitude decision support

Plain bearings

Spherical plain bearings and rod ends

Spherical plain bearings, which are designed for slow movement applications, can accommodate misalignment and oscillating movements. They have a very high load carrying capacity and are ready to mount. Spherical plain bearings are available with various sliding combinations: steel on steel, which requires lubrication, or the maintenance-free combinations steel on sinter bronze composite, PTFE fabric or PTFE composite. SKF offers a very comprehensive range:

- Radial spherical plain bearings in metric or inch dimensions, with seals and/or an extended inner ring.
- Angular contact spherical plain bearings for combined radial and axial loads.
- Spherical plain thrust bearings for thrust loads and in combination with a radial spherical plain bearing for heavy duty arrangements.
- Rod ends with integral spherical plain bearings with male or female threads or with cylindrical or rectangular section welding shank.

For detailed information, please refer to the SKF Interactive Engineering Catalog on www.skfusa.com



Radial spherical plain bearings

Bushings

SKF offers the world's widest assortment of stock bushings. The range is suitable for rotating, oscillating and linear movements. Cylindrical and flanged bushings, thrust washers and strips are available. Different materials serve different requirements.

- Solid bronze, the traditional robust material.
- Sintered bronze with oil impregnation for high sliding velocities.
- Wrapped bronze with lubrication pocket for contaminated environments.
- PTFE composite for long service life due to low friction.
- POM composite for low maintenance under tough conditions.
- Stainless backed composite, maintenance-free in corrosive environments.
- PTFE polyamide, cost effective and maintenance-free.
- Filament Wound for extreme conditions.

For detailed information, please refer to the SKF Interactive Engineering Catalog on www.skfusa.com



Angular contact spherical plain and spherical plain thrust bearings



Rod ends



Bushings

High efficiency screws

Ball screws

Ball screws convert rotary motion to linear motion in a very efficient way. The load is transmitted from the screw shaft to the nut through a series of recirculating ball circuits. There are a variety of recirculation systems depending on the application demands. The ball screws come in several precision classes to offer reliable positioning accuracy and backlash elimination.

Inch series ball screws

The inch series ball screws have a very robust recirculating system, allowing optimum reliability. These ball screws are precision ground, or commercial range and are available in pre-loaded or non-preloaded configurations.

Roller screws

The two basic types of roller screws are (planetary & recirculating), which will allow you to operate beyond the limits of most ball screws. The load transfers through the screw shaft to the nut through a number of threaded rollers. By virtue of their roller contacts there are a larger number of contact points which results in a much higher load carrying capacity, longer life, and finer leads, than a comparably sized ball screw.

Quick ship roller screws

There is a range of roller screws that are available in stock, and can be shipped within 2 weeks.

Ball screw repair service

SKF now offers a ball screw repair program. We can repair any brand of ball screw and return it to its original operating condition. A free evaluation can be supplied within 72 hrs. and emergency repairs are available on request. We have over 50 years of repair experience.



Ground ball screws



Ground ball screws



Ground ball screws



Ball and roller screws

Linear motion and precision technologies

Guiding & positioning systems

Metric linear ball bearings

The metric linear bearing comprises a plastic cage carrying hardened steel raceway segments that transmit the load through the recirculating balls into the supporting hardened steel shaft. Metric linear bearings are available with a self-aligning feature as well as integral seals. All linear bearings are available as pillow block units for easy mounting. The metric series of linear bearings offers complete interchangeability to market standard sizes.

Inch linear ball bearings

Inch linear ball bearings provide an economical solution to suit a wide variety of applications. SKF offers both steel sleeve and resin caged linear bearings. The SKF inch series bearings are available with a self-aligning feature as well as integral seals. All linear bearings are assembled as pillow block units for easy mounting. The inch series of linear bearings offers complete interchangeability to market standard sizes.

Linear bearing shaft and accessories

Both metric and inch shaft is available from SKF Easy Serve. SKF offers a prompt cut to length service as well as full machined to print capability. Shaft supports and end supports are available for both metric and inch shaft.

Profile rail guides

Profile rail guides provide high load capacity, superb stiffness, and precise smooth motion. The profile rail guide line is available in a four ball row circulation design to allow for equal loading from any direction. Each carriage features a lubrication reservoir that provides long service life. For smooth, low noise operation, the carriages are available with a ball separator to dampen vibration. The profile rail guides offer complete interchangeability to market standard sizes.

Precision rail guides

Precision rail guides are suitable for applications with limited strokes requiring high rigidity and position accuracy, and ultra smooth motion. The precision rail guides using optimized rollers are available with the patented ACS system that ensures that the cage remains in the center of the stroke at all times.

Positioning systems

Positioning Systems provide compact and economical solutions for guided and driven applications. They may be designed to meet special requirements.

Actuation systems

SKF Actuation Systems develops and markets systems that combine mechanics and electronics to provide integrated solutions for its customers. Today actuation systems are used within a wide range of products and applications. Primary areas of operation are in medical technology, healthcare, hospital and nursing home beds, rehabilitation, furniture, workplace ergonomics, industrial and manufacturing technology, automation and robot engineering.

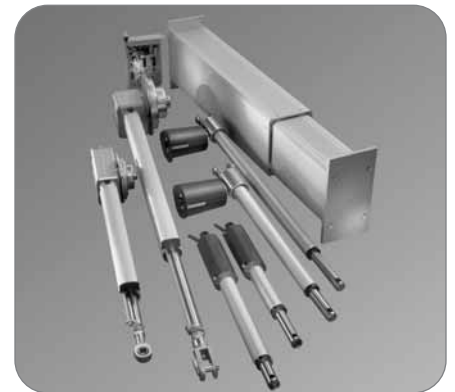
For additional information on Linear Motion and Precision Technologies, please visit www.linearmotion.skf.com.



Linear ball bearings



Profile rail guides



Actuators



SKF magnetic actuation range

Machine tool applications require superior performance from the bearings used to support spindles and precision ball screws. They must exhibit this in terms of speed capability, system temperature stability, rigidity, accuracy and noise level; such characteristics are rarely met by bearings for general purpose applications. Therefore SKF produces special high-precision bearings designed to satisfy the most demanding requirements in the machine tool environment.

Precision angular contact ball bearings – ABEC5, ABEC7 (P4A, PA9A)

SKF precision angular contact ball bearings are non-separable and are essentially single row angular contact ball bearings. In all such bearings the load is transmitted from one raceway to another at an angle to the bearing axis. These bearings can therefore carry axial loads acting in one direction in addition to radial loads. Axial forces produced in the bearing when subjected to a radial load must be counteracted by an opposing force applied externally. The bearings are therefore adjusted against a second bearing.

To meet the requirements of modern machine tool applications as fully as possible, SKF precision angular contact ball bearings are made in several series and designs. They can be supplied single or in matched bearing sets, and as full steel or hybrids. Bearing sets are used when the load carrying capacity of a single bearing is inadequate, or if axial loads acting in both directions have to be accommodated.

In addition to standard precision bearings, SKF also produces high-precision angular contact ball bearings, intended for even higher speeds and with extremely high running accuracy.

Precision cylindrical roller bearings, double and single row

High precision cylindrical roller bearings are bearings with a low cross section, high load carrying capacity and speed capability. They are therefore particularly suitable for machine tool applications, and enable spindle bearing arrangements to be designed for heavy radial loads, high stiffness and relatively high speed.

SKF high precision single row cylindrical roller bearings are used where increased speed capability and more compact spindle design are needed. The double row bearings are used when there is a need for high-load carrying capacity, and they are available with either cylindrical bore or tapered bore. In the machine tool field, cylindrical roller bearings are generally supplied with a tapered bore, as this design allows a certain radial internal clearance or preload to be achieved by adjustment, when mounting bearings on a tapered shaft.

Precision angular contact thrust ball bearings

Precision angular contact thrust ball bearings are especially suited to applications demanding accuracy and rigidity of machine tool work spindles. They have gained increasing popularity with machine tool builders over the years, and although not formally standardized, have become a standard bearing throughout the world. SKF offers two main families of angular contact thrust ball bearings: the double direction thrust ball bearings series 2344 (00) and the BTM series.

These bearings are able to locate a spindle axially in both directions and are designed for use with double row or single row cylindrical roller bearings of series NN 30 K and N 10 K, having the same bore and outside diameters. The outside diameter of the housing washer is however made to tolerances such that sufficient radial clearance to the housing bore seating is obtained. This is to ensure that the thrust bearing is only subjected to axial loads. An additional benefit is the simplified machining of the housing bore.



Precision cylindrical roller bearings



Precision angular contact ball bearings



Precision angular contact thrust ball bearings



Ball screw support bearings

Bearings for machine tools

Ball screw support bearings

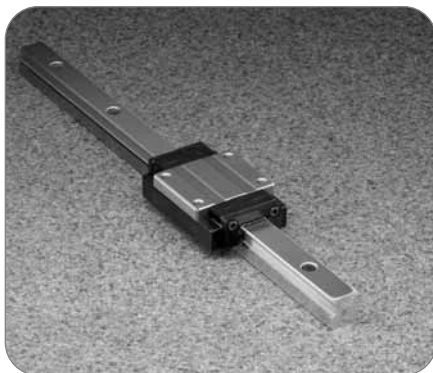
The precision ball and roller screws used to drive positioning tables on CNC machine tools have an important influence on work piece quality. In recent years the large increase in CNC machine tools with several controlled axes has emphasized the need for good and reliable positioning accuracy. In order to obtain this, precision screws must be supported with bearings of special design to provide the optimum axial run-out and rigidity characteristics.

Precision screws require bearings able to provide:

- High dynamic and static load rating
- Speed capability
- Superior axial rigidity
- Extreme running accuracy, especially in axial direction.

The SKF ball screw support bearings are single direction angular contact thrust ball bearings having a contact angle of 60°.

SKF has a wealth of experience with machine tool bearing applications, not only as a producer of high-precision bearings but also as a user of machine tools. This experience has been utilized in designing bearings specifically for the support of precision ball screws. As more than one bearing is often required to support a screw, matched sets of bearings are offered, requiring no subsequent adjustment. To further simplify mounting, complete ready-to-mount pre-greased cartridge units incorporating matched sets of single direction angular contact thrust ball bearings in a flanged housing are supplied on request.



Profile rail guides

Profile rail guides

Profile rail guides from SKF are modern machine components used in the production of linear guidance systems with unlimited travel. They consist of a profile rail with four precision-ground raceways and a slide unit with four ball circulation paths. This design offers numerous benefits:

- Square configuration of the raceways results in a guidance system with good rigidity, capable of withstanding moment loads in all directions.
- Load carrying capacity is equal in all four directions.
- Lubrication reservoir standard for all carriages provides long service life.
- Ball separator available for low noise, smooth operation requirements.
- Ready-to-mount units allow economy and simplicity of mounting.
- Provided as standard with grease nipple and all-round seals.
- Rail cover strip protects carriage from contamination that may settle on rail.
- High operational speeds with quiet running and low coefficient of friction.

Spindles

SKF is a worldwide supplier of a complete range of spindles, both belt driven and motorized. SKF's customers for spindles are mainly in the machine tool and woodworking industries, but applications are also found in printing, medical and factory automation.



Machine spindles



Spindle repair service

Machine tool and spindle repair service

Both manufacturers and rebuilders are acutely aware of the long lead times needed to customize small lots of bearings to fill a particular design requirement or replace a hard to get bearing arrangement. These long lead times frequently increase downtime for rebuilders and delay production schedules for OEMs. To correct this situation, SKF opened the Spindle Bearing Service Centers. The Service Centers can customize duplex, triplex and quad bearing sets, alter preloads and provide greased bearings—all within two weeks.

When the Service Center customizes an SKF bearing, the bearing carries a full manufacturer's warranty. With the SKF warranty, you get the extra quality assurances that only the manufacturer can provide. The bearings are measured, modified, noise tested and packed in a controlled environment—using the same exact standards as the factory.

The following is a list of services that the Spindle Bearing Service Center offers to all SKF customers:

- **Preload modification**—All ranges of preload can be accommodated in bearings up to 10" outside diameter. After they are face ground, the bearings are inspected, measured, and sound tested.
- **Matching**—Specific bearing arrangements can be supplied in dedicated pairs, triplex sets and quad sets. Matching 15° and 25° bearings for special loading conditions can also be accommodated.
- **Fitting ceramic balls into standard bearings**—Hybrid bearings combine steel bearing rings and ceramic balls where very high speed and high stiffness are important design considerations. To meet this growing need, the Spindle Bearing Service Center will refit SKF precision angular contact ball bearings with silicon nitride (ceramic) balls.
- **Grease packing**—SKF Bearings can be supplied with many types of grease and grease quantities. The Service Center can fulfill requests for any special lubrication requirements.
- **Spacers and kits**—The Service Center can provide bearing kits containing bearings and spacers matched as a set for proper preload and/or specific stack height dimension.
- **Special modifications**—Face slots for anti-rotation or slots for lubrication are special modifications that fall within the scope of the Service Center. Contact your SKF Representative to discuss other custom modifications.

For additional information, on Bearings for Machine Tools, please call 1-800-541-3624.

Bearings for extreme temperatures

Wherever very high or very low environmental temperatures are a limiting factor, a special bearing is normally needed. SKF offers a very comprehensive range of extreme temperature deep groove ball bearings that offer:

- Low life-cycle cost
- Extended service life
- High reliability
- Minimized maintenance
- Wide operating temperature range

SKF extreme temperature bearings are designed for the most common extreme temperature applications such as kiln trucks wheels, support rollers and general wheel arrangements.

In addition to the well-proven deep groove ball bearings, SKF range also includes Y-bearings units for extreme temperatures, available in three different housing styles with a choice of two different bearing designs.



High temperature bearings

INSOCOAT[®] electrically insulated rolling bearings

Rolling bearings in electric motors, generators or associated equipment are at risk from the passage of electric current, which can damage the surfaces of rolling elements and raceways in the bearing and degrade the grease rapidly. The risk of damage increases greatly if a frequency converter controls the motor, which is becoming increasingly common. In a frequency controlled induction motor, an additional risk for high frequency bearing currents occurs due to the inherent stray capacitances within the motor.

To solve this problem and to protect the bearings against electric current passage, SKF has developed INSOCOAT[®] bearings – electrically insulated rolling bearings. An INSOCOAT bearing is a very economical solution compared with other insulation methods that protect the bearing. By integrating the electrical insulation function into the bearing, SKF has been able to increase reliability and machine uptime by virtually eliminating this failure mode.

INSOCOAT[®] bearings offer many benefits:

- Key ability to protect the bearing against breakdown voltages up to 1000 V.
- Avoid damage caused by electric current leakage to achieve maximum bearing service life
- Higher operational reliability of electrical machinery and lower maintenance costs
- No additional design requirements, since the bearing dimensions conform to ISO standard and can be easily replace non-insulated bearings



INSOCOAT[™] bearings

NoWear[®] coated bearings

NoWear[®] bearings make sense whenever bearings are failing prematurely due to severe operating conditions. NoWear bearings can withstand longer periods of insufficient lubrication, sudden variations in load and rapid speed changes, vibrations and oscillations.

NoWear bearings open up new possibilities to existing applications operating under severe conditions, without introducing major design changes and allow freedom in new designs. They have already been proven in a wide range of extreme applications, including paper machines, marine and offshore applications, fans, compressors, hydraulic pumps and motors.

The combination of SKF know-how and the processes and materials employed makes NoWear a winning solution for your business. Now you can significantly increase the lifetime of bearings used in demanding operating environments, improve the performance of your machinery, and reduce your risk of unplanned downtime.

Switching to coated bearings often makes sense whenever the life or speed of a standard bearing is reduced due to lack of lubricant, sudden load variations, contamination or high operating temperatures. NoWear is proven in a wide range of applications including:

- Paper machines
- Compressors
- Hydraulic motors
- Material Handling
- Mining and Construction
- Marine & Offshore
- Racing



NoWear[™] coated bearings

Bearings for extreme operating environments

Hybrid bearings

Ceramic materials are hard and resistant to wear. In addition, they have electrical insulation properties and are chemically inert in hard conditions. SKF is increasingly incorporating ceramic material into its bearing products; currently SKF offers three different bearings that incorporate ceramics:

- **All-ceramic bearings**, where both rings and rolling elements are made of ceramic. These rotate easily and offer the benefits of very high-speed capabilities, low weight, good corrosion resistance, are non-magnetic and can withstand temperatures up to 1,800° F.
- **Hybrid bearings**, where the rings are made of steel while the rolling elements are made of ceramic. This results in a wear-resistant design that is also electrically insulating. Compared with traditional all-steel bearings, the life of the hybrid version could be increased by up to a factor of 10. Hybrid designs are also capable of running at very high speeds; shaft speeds can be doubled and grease life extended more than three times normal life expectancy when compared to all-steel bearings.

When it comes to high-temperature tolerance, hybrid bearings equipped with special steel rings can work continuously at temperatures of 900° F. One of the clear advantages of this bearing is that it can be used as a direct replacement for all-steel bearings without any redesign of the applications.

- **Single-ball hybrid bearings**, where the design features a single ceramic ball in an otherwise all-steel bearing. The single hard ceramic ball keeps the steel raceway free from foreign particles in dusty and dirty environments. It smoothes the raceway, which increases service life under extremely contaminated conditions. This single-ball hybrid bearing can replace a conventional bearing without the need for remodeling.

Solid oil

Solid Oil is a polymer matrix, saturated with a lubricating oil, which completely fills the internal space in a bearing and encapsulates the cage and rolling elements. By releasing the oil, Solid Oil provides good lubrication for the rolling elements and raceways during operation.

Solid Oil has unique advantages:

- It keeps the oil in position
- It brings more oil to the bearing than grease
- It keeps contaminants out
- It's resistant to chemicals
- It can withstand large "g" forces
- No relubrication needed

SKF can supply most normal sizes of ball and roller bearings with Solid Oil. Some of the applications where Solid Oil is used are:

- Papermaking
- Equipment for snow and ice
- Pneumatically operated coupling
- Cranes and traverses
- Mixers



Hybrid bearings



Solid oil – spherical roller bearing

Slewing bearings

Slewing bearings are ball or cylindrical roller bearings that can accommodate axial, radial and moment loads acting either singly or in combination and in any direction. They are not mounted on a shaft or in a housing; the rings, which are simply bolted on the seating surface are available in one of three executions

- without gears
- with an internal gear
- with an external gear.

Slewing bearings can perform both oscillating (slewing) movements as well as rotating movements.

The outside diameter range of SKF slewing bearings with a one-piece ring is from 400 to 7 200 mm. Even larger bearings are produced with outside diameters up to 14 000 mm, but these have segmented rings. Some of the smaller sizes, up to approximately 2 000 mm outside diameter are standard production. Further information will be supplied on request.

- Single row slewing ball bearings
- Single row slewing roller bearings
- Double row slewing bearings
- Triple row slewing bearings
- Other slewing bearings

In addition to the standard designs outlined above, SKF also produces several other designs, for a multitude of applications, to order. These include:

- Slewing bearings as combined cylindrical roller/ball bearings
- Slewing bearings as double row angular contact ball bearings
- Dry sliding slewing bearings
- Slewing bearings with integral drive.



Slewing bearings

Hydrostatic shoe bearings

Developments in various industrial sectors have led to the use of increasingly large bearings to carry increasingly heavy loads. Examples of these applications include the drums used to grind ore and cement and the debarking drums used in pulp production. The drums have in some cases reached a size where conventional rolling bearings or bearing units cannot be used. SKF developed the hydrostatic shoe bearing for just this type of application. In addition to having very high load carrying capacity these bearings have the following advantages:

- No limit to bearing size,
- Friction is negligible,
- Virtually no wear,
- Bearing life is almost unlimited,
- The sliding surfaces are self-aligning
- Demands on accuracy of form of the trunnion or runner to be supported are moderate.

The SKF range comprises hydrostatic shoe bearings for horizontal as well as vertical bearing arrangements and also includes combined hydrostatic bearings with integral axial guidance.

Typical applications include:

- Ore grinding mills
- Cement mills
- Debarking drums
- Coal grinding mills
- Rotary kilns
- Air preheaters
- Dryers for grain
- Sugar diffusers
- Heavy machine tools
- Telescopes

A range of standard and special designs facilitate the choice of bearing for any individual application.

For more information please contact the SKF application engineering service



Hydrostatic shoe bearings

Traction motor bearings

SKF provided the very first bearing designed specifically for traction motors. Since then, SKF has improved on the traction motor bearing design with more than a dozen major refinements, all in direct response to needs of the railroad industry.

SKF Traction Motor Bearings are designed and built to survive in the heavy tonnage and severe demands of the North American freight railroads, which are among the most difficult in the world.

- Highly developed armature pinion and commutator end bearings for all traction and transit motors.
- Specialized spherical roller bearings for traction alternators and generators.
- Traction motor support bearings and tube-type housing assemblies.
- TBU (tapered bearing unit) journal bearings for freight care, rapid transit and locomotive applications.
- Specialized tools and maintenance products for mounting, dismounting and care of railway bearings.



Traction motor bearings

Fastening systems, rolling elements

Shaft couplings

SKF oil injection shaft couplings of type OKC and OKF join two shaft ends rigidly to each other. They are widely used in heavy torque applications where power has to be reliably transmitted. Applications range from joining the propeller shafts on a ship to connecting shafts in rolling mill drives.

SKF oil injection couplings are available as cylindrical or flanged couplings for diameters ranging from 100 to 1 000 mm. For more information, please ask for the publication "OK oil injection couplings from SKF" or visit www.couplings.skf.com.



OK shaft couplings

Supergrip bolts

SKF Supergrip bolts, based on the SKF oil injection principle, are compared with traditional bolt systems easier to install and remove and therefore offer important technical as well as economic benefits. They are typically used in applications where rotating flanged joints are subjected to heavy torque loads and downtime is particularly expensive, e.g. a ship's propeller shafts, steering equipment, steam turbines or rolling mills.

SKF Supergrip bolts are available for hole diameters starting from 40 mm.

For more information, please ask for publication "The SKF Supergrip Bolt for Rotating Flanges" or visit www.couplings.skf.com.

Bushings

Solid bushings for fully concentric locking of friction hub joints virtually eliminate the common problem with eccentricity in shaft joints. Robust mechanical locating devices for high torque transmission in slewing applications or belt and chain drives. The SHT design contains a slot for mounting in hubs. The SHR design is closed for welding.



OK shaft couplings

SKF ConCentra bushings

Extremely low section height bushings for fully concentric locking of friction hub joints virtually eliminate the common problem with eccentricity in shaft joints. The SHL design is a light-weight locating device for moderate torque transmission e.g. in fans or slewing appliances.

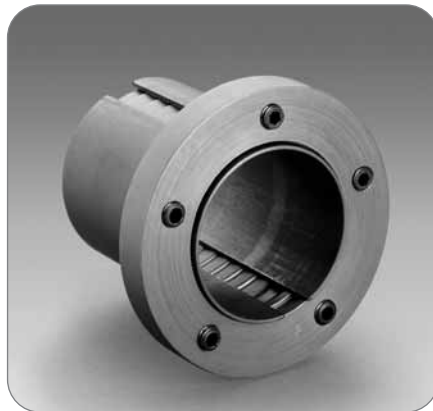
Rolling elements

SKF also supplies loose rolling elements that include balls, as well as cylindrical and needle rollers. Using loose rolling elements it is possible to produce economic full complement bearing arrangements for very heavy loads and low speeds or oscillatory movement, provided the other associated components can take the form of raceways having the same hardness and quality as bearing rings.

The rolling elements are made of carbon chromium bearing steel or silicone nitride. Additional information will be supplied on request.



Bushings



SKF ConCentra bushings



Rolling elements

MRC ball bearings

Single row deep groove ball bearing (Type S)

MRC S-type single-row ball bearings have no filling notches and can carry significant radial loads. Because of the uninterrupted raceway grooves and the high degree of conformity between balls and raceways, they can carry substantial thrust loads in either direction, even at very high speeds. Offered open or with single or double shields or seals, as well as with snap-rings in various combinations. Available in 1800, 1900, 100, 200, 300, 400 Series.

Single-row filling-notch ball bearing (Type M)

MRC's single-row maximum capacity "M-type" bearings offer two important advantages over other single-row types when used for heavily loaded positions: they offer maximum radial load-carrying capacity and have the ability to carry heavy combined radial and thrust loads where radial load predominates. MRC M-type bearings are also referred to as a "notch" type because they have a filling notch on one side of the inner and outer rings. Available in 100, 200, 300, 400 Series.



Single row filling notch ball bearing (Type M)



Single row deep groove ball bearing (Type S)

Single row angular contact ball bearing (R Series, XLS)

MRC R-type bearings feature one heavy race shoulder and one counterbored race shoulder on the outer ring. Because of this construction, it is possible to incorporate a greater number of balls than in the deep groove nonfilling notch bearing. MRC R-type bearings have ample radial and thrust capacity for the majority of applications involving heavy radial load, heavy single direction thrust load or both. Available in 1900, 100, 200, 300 Series. Supplied with 15° contact angles.

Single row angular contact ball bearings (7000 Series)

MRC angular contact ball bearings are used in applications where a thrust load is applied in one direction or where there are combined radial and thrust loads. These bearings can also be mounted in pairs for handling thrust loads in both directions. Available with 29° and 40° contact angles in 7200, 7300, 7400 Series.

Double row angular contact ball bearing (5000 Series)

MRC double-row ball bearings are available in two main types: C-type (Conrad construction) and M-type (maximum capacity with filling notches). All inner and outer rings have closure grooves. These bearings may be equipped with seals, shields, snap-rings or a combination of these. Included in the MRC assortment is an extra-wide double row bearing retrofit kit.

For additional information on MRC Bearings please visit www.skfusa.com/mrc or order catalog # M190-730.



Single row angular contact ball bearing (7000 Series)

Split ring angular contact ball bearings (97000 Series)

MRC also supplies a split inner ring 9000 Series angular contact bearing. These bearings are usually matched with a 7000 Series bearing of the same size and contact angle. This arrangement offers two bearing thrust capacity in one direction and one bearing thrust capacity in the opposite direction. Single 9000 Series bearings are also available.

Additional MRC bearings and related products:

- Cartridge width single row deep groove ball bearing
- Felt seal replacement ball bearing
- ABEC-7 machine tool spindle angular contact ball bearing
- ABEC-5 wood working single row deep groove ball bearing
- Dynamometer ball bearing
- Taper bore adapter sleeve ball bearing
- Self-aligning ball bearings
- Conveyor roll ball bearings



Split ring angular contact ball bearing (97000 Series)



Double row angular contact ball bearing (5000 Series)

MRC

Marathon® series corrosion-resistant mounted products and bearing units

Few industries challenge bearings with a harsher operating environment than the food and beverage industries. Perhaps no industry works as hard to meet regulations governing contamination. When MRC introduced the Marathon Series Composite Mounted Bearing Units, it was possibly the best solution to the problems associated with bearing failures.

Now the composite units are joined by our HD_i—heavy-duty cast iron—and XD₅—extreme-duty cast stainless steel—to more thoroughly meet the needs of the industry.

The entire maintenance-free Marathon® Series is built to resist corrosion and is designed for extended service life. At the heart of the units are high-quality, corrosion-resistant insert bearings, available with ZMaRC® coating or with stainless steel construction. The units' multifunction rubber seals are bonded to AISI 304 stainless steel for superior corrosion resistance, and sealed-for-life lubricants are USDA approved.

Marathon series composite housing

The Marathon Series composite housing resists citric acids, cooking fats and most chemicals used in food and beverage processing. It is constructed of a thermoplastic composite material that can be up to 61% lighter than cast iron housings. Its spherical bore accommodates the insert bearing's spherical outer surface, enabling the unit to fully compensate for initial bearing seating misalignment.

Marathon Series units are available in the following housing designs to meet the needs of most food and beverage processing applications:

- Pillow blocks
- Two- or four-bolt flange
- Tapped base
- Three-bolt bracket flange
- Narrow and wide slot take-up
- Made-to-Order Items:
 - Low backing height pillow block
 - Low profile two- and three-bolt flange
 - Four-bolt piloted flange
 - Hanger

Marathon HD_i – ZMaRC coated cast iron units with ZMaRC coated insert bearings

The Marathon HD_i is a corrosion-resistant, heavy-duty cast iron series of bearing units. The cast iron housings, protected with MRC's proven ZMaRC coating, eliminate the flaking problems associated with nickel-plated products. The housings are matched with our ZMaRC-plated, lubed-for-life, quality insert bearings.

The HD_i series provides a number of cost-savings and performance benefits. As with all Marathon products, MRC's patented two-part stainless steel seals allow the units to operate in heavy washdown environments without regreasing. And since there is no need for relubrication, continuous grease purge is never a problem.

The HD_i housing styles available include:

- Pillow blocks
- Two- or four-bolt flange
- Tapped base

Marathon XD₅ – extreme duty cast stainless steel mounted units

Composite housing units are suitable for many food and beverage industry applications. However, there are extremely challenging applications that require an even more durable unit—the XD₅ line of Marathon units. These housings are AISI 300 series cast stainless steel with MRC's proven stainless steel insert bearings.

The Marathon XD₅ stainless housings are the strongest housings offered in the Marathon family. For any application where loads are very heavy or where shock loads are possible, the extra strength and toughness of the stainless steel housings are a benefit. Also, in applications where failure of the housing could result in injury, such as in cases where workers pass below a portion of a machine, the safety factor inherent in the cast steel housing is desirable. Exposure to extremely aggressive washdown chemicals is another reason to choose these stainless units.

The XD₅ housing styles available include:

- Pillow block
- Two- and four-bolt flange
- Tapped base
- Made-to-Order Items:
 - Three-bolt bracket flange
 - Wide and narrow slot take-up units
 - Compact two- and three-bolt flange
 - Piloted flange units

For additional information on MRC Bearings please visit www.skfusa.com/mrc or order catalog # M190-730.



Marathon series composite housings



Marathon HD_i series



Marathon XD₅ series

MTO – the source for custom bearing solutions

Made-To-Order products can provide bearing solutions to compensate for demanding operating conditions or unknown maintenance practices. By modifying a stock bearing or designing and manufacturing a new bearing specifically for the application, MTO Products are able to supply practical solution to special requirements. And what sets MRC® MTO Products apart from local machine shops and rework facilities is that the bearings carry the MRC manufacturer's warranty.

MTO Products offer a broad size range of single- and double-row ball bearings in the following styles:

- Inch size R-type
- Thin section 1800 and 1900 type
- Single-row deep groove S-type
- Single-row maximum capacity M-type
- Single-row 15° angular contact R-type
- Single-row angular contact 7000, 7000P, 7000PJ series
- Single-row angular contact split ring 9000, 9000P series
- Double-row angular contact 5000 series
- Self-aligning ball bearings
- PumPac 8000 series
- Precision grade ABEC 5 and higher
- Specialty bearings

For additional information on MTO products, please order catalog # M200-111.



Made-to-order products

MRC PumPac bearings

PumPac is an MRC bearing system designed as a unique solution to the common problem of premature thrust bearing failures in high speed centrifugal pumps, as well as other applications where duplexed angular contact ball bearings are used.

PumPac is a matched set of bearings, consisting of a 40° angular contact ball bearing mounted back-to-back with a 15° contact-angle bearing. The 40° contact-angle bearing supports the primary thrust load during operation, while the 15° contact-angle bearing handles reverse thrust during start-up and shut down, and supports radial loads during normal operation.

PumPac bearings are manufactured to ABEC 3 tolerances, with special machined bronze cages, and are high-temperature stabilized. By using PumPac system, ball sliding and shuttling are virtually eliminated, resulting in lower operating temperatures, stable oil viscosity, consistent oil film thickness and longer service life.

The PumPac is also available in the 8000BB PumPac Diamond series, which consists of a matched set of 15° (B) bearings in a back-to-back arrangement. This series is desirable in high speed, lightly loaded applications in which axial loads are balanced, resulting in reduced operating temperatures and increased life.

For additional information on MRC PumPac bearings, please order catalog # M200-100.



MRC PumPac bearings

For additional information on MRC Bearings please visit www.skfusa.com/mrc or order catalog # M190-730.

Magnetic bearings

Magnetic bearings

Magnetic bearings are used in a variety of applications e.g. turbomolecular pumps, compressors, turbo generators, semiconductor equipment and high speed machine tools. They levitate the shaft by inducing a controlled magnetic field. This means that the shaft is rotating without contact. The system senses the shaft position and adjusts the force in real time keeping the shaft at the required position.

Some of the benefits of magnetic bearings are:

- No contamination from wear
- Lubrication-free
- Operate in severe environments e.g. extreme high and low temperatures, ultra-high vacuum or submerged applications
- Minimal vibration transferred to housing
- Precision control and elimination of shaft runout caused by unbalance
- Built-in condition monitoring of rotor dynamics of vibration and forces

SKF offers a full range of magnetic bearing products:

- Magnetic bearings
- Digital controllers
- DC brushless motors
- Hyperspin spindles
- Engineered shaft solutions

For more information, please visit www.revolve.com.



Magnetic bearings



Magnetic bearings