

Improving performance in downstream oil & gas industry

SKF solutions for the high production of your equipment



Increase reliability for your
downstream equipment





The oil & gas downstream industry has been facing an increasing number of challenges in recent years. These include the changing characteristics of the feedstock to be processed, aging of process facilities and equipment, rising cost of energy, lack of skilled plant operators who can run a refinery safely and efficiently, and the ever-changing requirements from both the market and the customer.

While each of these creates its own set of issues, they also have much in common. Chances are you are dealing with some or all of these challenges:

- Workforce competency and skills development
- Retention or acquisition of critical knowledge
- Reduced staff size in some markets and ramping up in others
- Increased environmental and safety regulations
- Management demands to be more cost effective while still improving performance
- More rapid decision making in an era of increasing risk management
- Increasing influence of equipment reliability on slim operating margins

Common goals

Regardless of type of process or plant architecture, most HPI facilities are focused on two primary goals regarding equipment health management:

- Improving the reliability and availability of rotating equipment
- Implementing or optimizing an overall plant reliability and maintenance programme

For many companies around the world, the search for a partner that understands their business, their challenges and their machinery has led them to SKF. Through our global engineering, reliability and service organization, SKF provides a range of tools, technologies and value-added services unmatched by any other company. SKF has a unique understanding of rotating equipment and how machine components and industrial processes are interrelated. This knowledge – coupled with our expertise in bearings, sealing solutions, lubrication systems, condition monitoring applications and reliability services – enables us to deliver effective, integrated solutions.

Working with both OEMs and plant maintenance professionals, SKF has provided assistance to improve designs of many types of equipment, ranging from pumps, fans and motors to gearboxes, compressors and turbines. Combining fundamental machine knowledge with our deep understanding of maintenance and reliability processes adds up to what's most important to our customers: the real-world experience SKF brings to the table.

Industrial pump

A large industrial pump is the central focus of the image. It features a prominent blue motor with a ribbed cooling fan on the right side. To the left, a white cylindrical tank is visible, partially filled with a white substance. The background shows a complex industrial setting with various pipes, valves, and machinery, all under a blue-tinted light.

Modern societies require reliable and efficient pumping systems. The challenge for today's pump operators is to find ways to reduce total cost of ownership, while also complying with increasingly tougher environmental and safety legislation.

Pump manufacturers are striving to increase meantime between failures, while optimizing energy consumption over the entire life cycle of the pump, as energy accounts for up to 45% of total pump ownership costs.

SKF works in close cooperation with leading pump manufacturers and end users. We offer everything from innovative engineering services in the design process to monitoring systems and service contracts that promote reliable and efficient operation.

SKF can provide engineering knowledge, products, services, tools and technologies for:

- Water and waste water pumps
- Hydrocarbon pumps
- Slurry pumps

Industrial shaft seals

For pump applications in water and waste water industries, the ability to withstand high volumes and abrasiveness is crucial. Our industrial shaft seals are designed to meet these demands, helping to ensure optimal bearing uptime and function. With material compounds and designs optimized for the water and waste water industries, the seals provide improved sealing performance and increased pump flow and head. Compatible with grease and oil lubricants and capable of operating in temperatures from -40 to +100 °C, SKF industrial shaft seals support long bearing service life, reliable operation and limited maintenance.



Sealed bearings

Field and lab-tested to keep grease in and contaminants out, SKF sealed bearings offer an excellent solution for water, food processing and other clean pump applications. SKF sealed bearings are ready-to-mount units, prelubricated under clean conditions with the appropriate amount and type of grease for the given application.



The single-unit design saves time and prevents errors during assembly and service, in turn minimizing operational problems in the field. Other benefits include:

- Improved uptime
- Extended service life
- Lower temperatures
- Reduced maintenance
- Less space needed

Single row angular contact ball bearings

SKF single row angular contact ball bearings can accommodate axial loads in one direction only. This type of bearing is typically adjusted against a second bearing. Their bearing rings have an upper and a lower shoulder and are non-separable.



Cylindrical roller bearings

Available in various designs (NU, N, NJ, NUP, etc.), with various types of cage materials (fiber glass reinforced polyamide, steel or brass) with one or more rows of rollers. The rollers feature a logarithmic profile for optimum load distribution, to better accommodate shaft misalignment, with optimized flange contact for low friction.

SKF super-precision cylindrical roller bearings are characterized by:

- High speed capability
- High radial load carrying capacity
- High rigidity
- Low friction
- Low cross-sectional height



Deep groove ball bearings

Deep groove ball bearings are the most widely used bearing type and are particularly versatile. They have low friction and are optimized for low noise and low vibration which enables high rotational speeds. They accommodate radial and axial loads in both directions, are easy to mount, and require less maintenance than other bearing types.

The SKF bearing catalogue lists a large range of designs, variants and sizes of deep groove ball bearings. Beyond our catalogue offering, the SKF Explorer deep groove ball bearings are customizable to offer advantages for applications with specific performance needs.



Industrial fans

A large, light-colored industrial fan is the central focus of the image. It is mounted on a metal frame and has a large, circular impeller visible on the right side. The fan is situated in a complex industrial environment with various pipes, metal structures, and other machinery in the background. The lighting is somewhat dim, highlighting the metallic surfaces of the fan and the surrounding infrastructure.

Bearings in industrial fans operate at high speeds and relatively light radial loads. They may also operate in extreme temperatures, both hot and cold, as well as in inaccessible locations. Quite often, airflow is used to transport material. Over time, materials build up on the impeller, creating unbalance and, eventually, reduced fan uptime and service life.

SKF can help

These operating challenges put heavy performance demands on fan bearing solutions. SKF can handle them. Based on extensive, first-hand experience, SKF has developed a range of solutions for industrial fans and HVAC systems. These solutions help improve cost-efficiency and provide trouble-free operation.

No two applications are the same

You can rely on SKF to design products and services that meet the unique demands of applications like:

- Industrial, high performance and hot gas fans
- High-performance fans with oil bath or circulating oil lubrication
- HVAC

Split pillow block housings

SNL pillow (plummer) block housings in the 30, 31 and 32 series are robust and suitable for tough operating conditions. They enable the incorporated bearings to achieve maximum service life with reduced maintenance requirements. Different housing variants and seal designs are available, making the use tailored housings virtually unnecessary and enabling cost-effective bearing arrangements to be made.



SKF Cooper split bearing units

SKF Cooper split bearing units are the ideal solution to reduce machinery maintenance and repair downtime.



The advantages of the SKF Cooper split bearing solution are especially valuable in inaccessible or trapped locations, for example, between head pulley and gearbox or motor, where the need to dismount associated equipment is eliminated.

Split bearing units can be disassembled into smaller components, easing the tasks of lifting and handling and making mounting or replacement simple even in the most cramped and inaccessible conditions. Clearances are pre-set, so there is no requirement for any on-site adjustments or specialized fitting tools.

Spherical roller bearings



Dealing with very heavy radial and axial loads in applications prone to misalignment or shaft deflections?

Meet the challenge with SKF spherical roller bearings, whose high load carrying capacity and ability to accommodate misalignment help you obtain low maintenance costs and long bearing service life.



NoWear coated bearings

NoWear is a wear-resistant carbon coating that can be applied to the rolling elements and inner ring raceway(s) of a bearing or only the rolling elements.

A physical vapour deposition process applies the wear-resistant carbon coating. Thickness of the coating ranges from 1 to 3 μm , depending on the size of the bearing.

The hardness of the coating is 1,200 HV10. NoWear coated bearing surfaces retain the toughness of the underlying material while adopting the hardness, improved friction properties and wear-resistance of the coating.

During the running-in period, minute amounts of the coating material are transferred to the counter-surfaces.

This coating reduces friction and improves resistance against wear and smearing, even in bearings where only the rolling elements are coated.

SKF insert bearings

SKF insert bearings offer nearly maintenance-free performance in air-handling units. In applications where re-greasing is not required, SKF insert bearings can be mounted in a rubber ring – an advantage in ventilation fan applications.

The rubber ring is located between the bearing outer ring and housing to dampen vibrations and noise. The rubber ring also enables slight displacement of the bearings in their housings to accommodate minor shaft elongation or misalignment.



CARB toroidal roller bearings

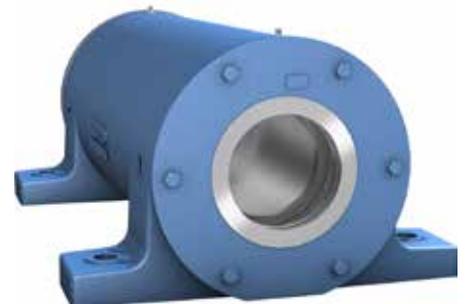
CARB toroidal roller bearings have one row of long, slightly barrel-shaped symmetrical rollers and torus-shaped raceway profiles.

They are non-locating bearings and accommodate exclusively radial loads. CARB bearings are often used to replace the non-locating spherical roller bearing in a locating/non-locating bearing arrangement.



Two-bearing housings – PD series

SKF two-bearing housings were originally developed for fan shafts with an overhung impeller, but are also suitable for other applications with similar shaft arrangements. Compared to the conventional shaft arrangement where two self-aligning bearings are mounted in separate pillow (plummer) block housings, two-bearing housings provide several advantages including improved running accuracy and quieter operation.



Compressors



Regardless of design or application, industrial compressors have always endured demanding operating conditions. Today, market and regulatory conditions are becoming equally difficult. Drive to reduce costs as well as stricter governmental regulations are spurring development of more energy efficient and environmentally friendly units. In addition, operators everywhere are demanding high reliability and long service life.

SKF works in close cooperation with leading compressor manufacturers and operators. We offer everything from innovative engineering solutions in the design process to monitoring systems and service contracts that promote reliable and efficient operation.

Compressors perform a wide variety of tasks: compress refrigerant vapour, transport gases across process plants, supply high-pressure air to power air tools and much more. But regardless of the task, there are SKF bearings that allow you to customize your compressors to specific environments – and thereby improve performance, availability and reliability. SKF offer solutions for:

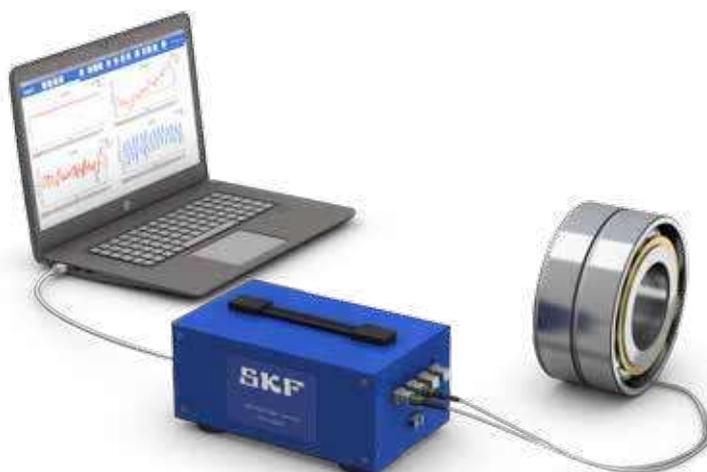
- Scroll compressors
- Reciprocating compressors
- Twin screw compressors
- Centrifugal compressors

SKF Load Sensing Bearings

What if you could draw reliable, accurate conclusions about the performance of your designs and prototypes, based on hard facts?

With SKF Load Sensing Bearings for pumps and compressors, you can use real-time bearing load feedback while testing your designs and prototypes. That way, you can improve and digitalize your design processes, generating significant savings in time and money.

SKF Load Sensing Bearings work by integrating a fiber optic sensorized bearing into your prototype equipment to extract reliable data using light alone.



Together with the SKF ‘interrogator’ unit and specialist PC-based software SKF Optomnia®, you can integrate and correlate load measurements with other test results to get a true, accurate picture of performance.

Plain Bushings

SKF manufactures bushings in various designs and from different materials. Therefore, SKF offers a wide assortment of bushings available from stock.



Bushings are suitable for rotating, oscillating and linear movements, whereas straight (cylindrical) bushings can accommodate radial loads only and flanged bushings can accommodate radial and axial loads in one direction.

Each combination of bushing design and material has characteristic properties and makes a bushing particularly suitable for certain applications.

Needle roller bearings



SKF needle roller bearings are bearings with cylindrical rollers that are small in diameter relative to their length. The modified roller/raceway profile prevents stress peaks to extend bearing service life.

SKF supplies needle roller bearings in many different designs, series and in a wide range of sizes, which makes them appropriate for a wide variety of operating conditions and applications.

ICOS oil sealed bearing units

A bearing requires lubrication to perform well, and seals to retain the lubricant and protect against contamination. Integrating seals and lubricant into a bearing makes it a complete, ready-to-mount unit. ICOS is our oil-sealed bearing unit.

It incorporates an oil seal, in this case, a spring-loaded radial shaft seal, on one side of the bearing.

Performance Benefits:

- ICOS is a ready-to-mount, oil-sealed bearing unit
- It incorporates a spring-loaded radial shaft seal on one side of the bearing

- This helps to retain lubricant and protect against contamination
- Initially used with deep groove ball bearings, but can be applied more widely



Four-point contact ball bearing and single row angular contact ball bearing sets

With just two bearings rather than three, QJ & SRACBB sets can handle high axial forces in the predominant axial direction as well as reverse axial forces from the opposite direction.



PEEK Cages

A number of SKF bearings are now available with cages made of the high-tech engineering PEEK polymer. PEEK stands for poly-etheretherketon and is a partially crystalline thermoplastic.



The most important benefits from using PEEK cages is the materials combination of strength and flexibility, high fatigue strength and high temperature limit of more than 160 °C at constant level and more than 200 °C as peak temperature. PEEK also offers high wear-resistance, low friction and good electrical and insulating properties. Bearings equipped with PEEK cages can be found in the angular contact ball bearing and cylindrical roller bearing assortments.

Tapered roller bearings

With a wide range of designs to choose from, SKF tapered roller bearings are also customizable to match your specific speed, load, contamination, temperature or vibration conditions.

SKF Tapered roller bearings feature a cup and cone assembly. The cup is comprised of the outer ring and the cone assembly consists of inner ring, rollers and cage.

This bearing construction accommodates combined loads and provides low friction during operation.

By adjusting one single row tapered roller bearing against a second tapered roller bearing and applying a preload, a rigid bearing application can be achieved.



Specialized bearings

Hybrid Bearings

Hybrid bearings have rings made of bearing steel and rolling elements made of bearing grade silicon nitride (Si₃N₄). Because silicon nitride is such an excellent electrical insulator, hybrid bearings can be used to effectively insulate the housing from the shaft in both AC and DC motors as well as in generators.

In addition to being an excellent insulator, hybrid bearings have higher speed capabilities and provide longer bearing service life than standard bearings under the same operating conditions. Hybrid bearings also perform extremely well under vibrating or oscillating conditions.



INSOCOAT Bearings for Motors

Electric current passing through a bearing causes arcing and micro-welding across the rolling element and raceway, leading to early and often catastrophic failure.



Correcting the ground loop that is the root cause of this phenomenon is often a vexing problem to solve.

SKF has developed the Insocoat bearing to prevent passage of electric current through the bearing. It utilizes a plasma coating that physically transforms the bearing steel into an insulating layer. Applied to the outer or inner ring diameter, the basic bearing dimensions are the same as a standard bearing, thus permitting an easy field retrofit / upgrade.

MRC PumPac Angular Contact Bearings for Centrifugal Pumps

Process pumps throughout a downstream plant can subject their bearings to excessive or varying thrust loads beyond original design specifications. Often the original equipment bearings are not able to cope with these higher loads, resulting in reduced MTBF (Mean Time Between Failure), higher repair cost and even operational losses. SKF developed the PumPac Angular Contact Bearing range to deal with these challenges.



SKF ConCentra bearing units



SKF ConCentra ball and roller bearings can handle punishing outdoor conditions as well as heavy loads, shock loads and contaminants. They offer a proven, cost-effective alternative to conventional bearing and housing arrangements. SKF ConCentra bearing units perform well wherever maintenance requirements are tough and minimal. Greased and sealed, ready and easy to mount, the units help cut maintenance demands.

Sour gas bearings

The SKF sour gas solution is a robust rolling bearing arrangement consisting of high-nitrogen, stainless steel rings, ceramic rolling elements and polymeric PEEK cages. Currently installed in several highly demanding refinery, gas well boosting and recip boosting operations, the SKF sour gas solution is helping these operations increase run length from months to several years. The result? A sharp reduction in maintenance demands and operational costs, and an enabler for new low cost compressor setups.



Condition monitoring



Industry 4.0 Strategy – digitalization, reporting, linking and analyzing large amounts of data – is synonymous with the new industrial revolution, allowing factories to build a network of connected machines, and helps people gather and analyze data in real time.

By integrating digital technology, SKF complements its product portfolio so that customers can enhance their rotating equipment performance.

SKF Multilog On-line System IMx-16/IMx-16Plus

SKF Multilog devices provide a complete system for early fault detection. Improve the reliability, availability and performance of your rotating equipment with automatic advice for correcting existing or impending conditions.

These compact devices offer 16 analogue and 4 digital channels, with connectivity to mobile devices and networks for easy configuration and monitoring.

Machine intelligence from IMx data will help you avoid unplanned downtime and schedule maintenance proactively, prolonging machine availability and minimizing maintenance and repair costs.

The IMx-16Plus integrate easily with other IMx units and can connect with the SKF Cloud for storing and sharing data, enabling SKF Remote Diagnostic Services for expert reporting and recommendations.

They are DIN rail mounted or can be housed in an IP65 cabinet to provide additional protection in demanding industrial environments.



Features:

- 16 analogue and 4 digital inputs
- Simultaneous measurements on all channels and configurable for true synchronous measurements
- PoE (Power over Ethernet) and/or 24 – 48 V DC
- 4 GB internal memory for data and event captures
- Data buffering in non-volatile memory when communication is down
- Improved Modbus TCP/IP and Modbus RTU capabilities including multiple and simultaneous use
- Stand-alone mode or compatible with SKF @ptitude Observer
- Bluetooth configuration and data access in stand-alone mode via iOS and Android apps
- App support for SAT (Site acceptance test)
- Crash detection capability (machine tools)
- Event and run cycle based long time waveform captures
- LTE/GSM mobile data and Wi-Fi capabilities are built-in, as alternatives to hard wired Ethernet
- In addition to the standard capability for the analogue channels to accept a range of vibration transducers, channels 9 to 16 support directly connected PT1000, temperature sensors P

SKF Multilog On-line System IMx-M

Protect and enhance the reliability of critical machinery

The SKF Multilog On-line System IMx-M is a powerful, cost effective solution suitable for a variety of machinery monitoring applications. Together with SKF @ptitude Monitoring Suite software, the SKF Multilog IMx-M can provide a complete system for initiation of machinery shutdown, early fault detection and diagnosis.

In addition, the SKF Multilog IMx-M system can provide automated advice for correcting existing or impending conditions that can affect machine reliability, availability and performance.

Companion software

The SKF @ptitude Monitoring Suite forms the basis for a completely integrated approach to condition monitoring. It enables fast, efficient and reliable storage, manipulation and retrieval of large amounts of complex machine and plant information.

SKF @ptitude Observer's easy-to-use operator interface and intelligent diagnostics functions provide users of all levels the tools needed to set up and run effective on-line monitoring programs.

SKF Quick Collect

Fast, simple machine health monitoring

Do you need to start with digitalization of maintenance in your production plant? Basic diagnostics without larger investments?

Start today with the SKF QuickCollect sensor!

The SKF QuickCollect sensor makes machine data collection simpler and more cost-effective.

This easy-to-use, handheld, portable vibration and temperature sensor is combined with mobile apps that reduce the complexity of data collection and analysis so that you can detect machine issues before they cause failures and impact on your business.

- You will detect an emerging problem of your rotating equipment in real time
- It is ideal for walk around diagnostics, combining vibration, temperature and acceleration enveloping sensing
- All data can be viewed on the spot and in real time or uploaded to the cloud for future analysis

- The future data analysis can be facilitated by SKF application for free on your smart phone or tablet and connected to the sensor by Bluetooth
- You can rely on the expert support of specialists in the Remote Diagnostic Center

SKF QuickCollect app

Get started straight away with the QuickCollect app. It's easy to use - simply download the app and pair with your sensor to get on-the-spot indications of machine health.



SKF Enlight ProCollect app

Upgrade to ProCollect and enhance your maintenance program. Empower your operations team, create, schedule and execute manual inspection, lubrication routes, gain deeper insights into your machinery, save and share data to the cloud,

gain access to easy-to-understand dashboards, and connect to SKF expertise whenever you need it.



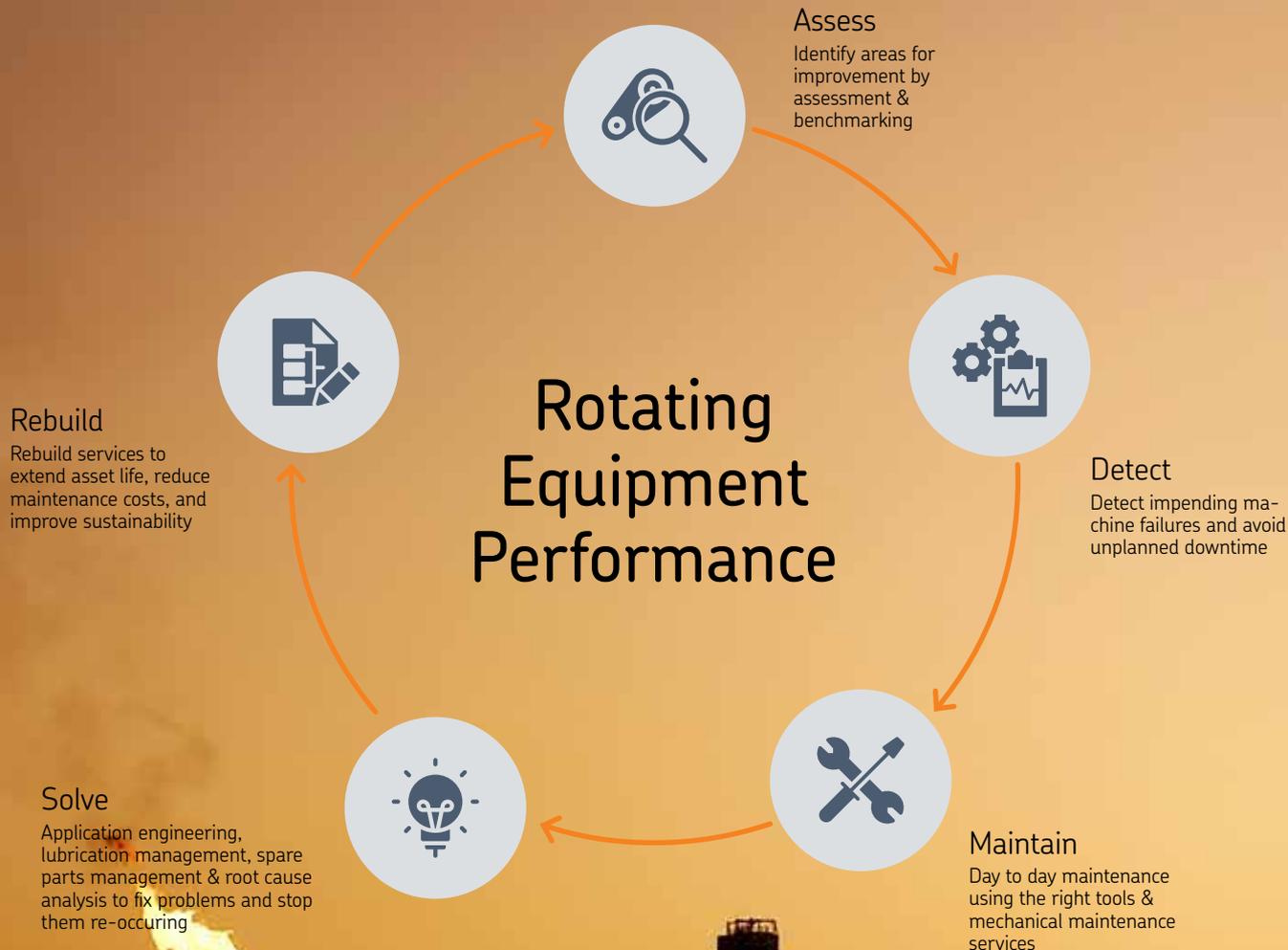
SKF Enlight Centre Cloud Based Software

SKF Enlight Centre is a first-of-its-kind, asset-based (as opposed to measurement focused) machine health monitoring system.

It features a radically simplified user interface, designed for use by operators, engineers and managers and enabling the scalability needed to support SKF Rotating Equipment Performance value proposition through a seamless integration to the customer work processes, analytics tools and a native integration to the SKF Digital Platform.



Rotating Equipment Performance (REP)



The industrial world is changing. And as new challenges emerge, plant managers, engineering managers, maintenance and service engineers are all looking for ways to maximise machine performance, while lowering operational and maintenance costs.

SKF offers you solutions to drive business success by getting the most from your machinery. With experience from almost every industrial sector and machine type, SKF can work closely with you throughout a machine's complete life cycle, using our knowledge, experience and insight to provide improved equipment design specifications, as well as the high quality products, services, and advice required to help you meet your business objectives.

What does Rotating Equipment Performance mean to you?



Gain new insights into your machinery

Gain visibility into the health of your equipment and turn data into performance-driving insights. Allowing your business to be more agile, deliver greater output, or optimise safety, reliability and sustainability. Drive forward digitalization of your operations using Internet of Things (IoT) solutions to connect to your machinery plant wide and planet wide. Store and share data in the



SKF Cloud and benefit from Big Data through SKF Enlight Centre dashboards, tailored to your workflows and giving easy to understand data interpretation. Connect directly to expert diagnostics and analysis, providing unrivaled application insights and advice to maximize rotating equipment performance.



Be more sustainable

SKF can work with you to reduce energy usage, waste output, spare parts consumption and more, helping you to deliver against your sustainability agenda, as well as saving on costs.



Improve output

By optimizing the performance of your rotating equipment you can increase availability, performance rate and quality – all driving greater Overall Equipment Effectiveness, and boosting output for your business.



Trim your Total Cost of Ownership

Poor performance and unplanned downtime don't just affect your productivity and cost of production, they can also directly affect the cost of energy, maintenance, spare parts, labor and more – all adding up to a higher Total Cost of Ownership (TCO).

SKF can help you achieve more reliable rotation, so you can reduce your TCO.



Reducing reliance on scarce talent

By working with SKF to connect our rotating equipment expertise to your business, you can reduce the time and cost of recruiting, training and retaining increasingly scarce and expensive maintenance and diagnostic skillsets.



Operate more safely

Whether you want to ensure maximum operational safety, reduce product safety risks or navigate the minefield of EHSS regulations, SKF can help you drive operational safety, and a reduced incident rate will feed into your productivity too.



Lubrication solutions

Single point automatic lubricators

Single point automatic lubricators are dispensing the proper amount of lubricant to the application based on a setting that takes into account the operating conditions and the bearing type and dimensions.

Especially when the lubrication points are difficult to access for safety reasons or their location in the plant is remote, automatic lubricators can offer the solution.

The wide range of single point automatic lubricators and accessories from SKF offers solutions for most lubrication points.

SKF SYSTEM 24 lubricators are suitable for a variety of applications, but often are used on pumps, electric motors, cranes and chains.



The single point lubricators can be adjusted to ensure that the correct quantity of lubricant is delivered to the lubrication point during a predetermined period of time.

This provides a more accurate control of the amount of lubricant supplied, when compared to traditional manual lubrication techniques.

Typical applications

- Applications in restrictive and hazardous locations
- Bearing housing lubrication
- Electric motors
- Pumps
- Cranes
- Chains (oil)

SKF SYSTEM 24 LAGD series

The units are supplied ready-to-use straight from the box and filled with a wide range of high performance SKF lubricants. Tool-free activation and time dispense setting by SKF DialSet free software allows easy and accurate adjustment of lubrication flow.

- Flexible dispense rate from 1 to 12 months
- Stoppable or adjustable if required (for a few days)
- Intrinsic safety rating: ATEX certified for zone 0 hazardous areas
- Transparent lubricant container allows visual inspection of dispense status
- Compact size, permits installation in restrictive areas
- Bearing greases and chain oils available



Manual lubrication tools

Various manual lubrication tools are available from SKF to complement any maintenance staff toolbox upon their needs.

Among them you can benefit of the SKF unique battery driven grease gun TLGB 20, which has an incorporated grease metering system to enable the technicians monitor the dispense grease into the application and thus to avoid an over-greasing or an under-greasing.

There are also various grease pumps to be chosen, such as manual or air-driven or filler pumps. An oil condition monitoring device (TMEH 1) from SKF or a portable grease test kit (TKGT 1) to check on-site if the grease in the application is alive, will complement your lubrication management practices.



LED light
Illuminates work area to help locate grease fittings in dimly lit environments

Filler nipple
Facilitates clean and simple filling from drums using filler pumps

Spring guards
Preserves flex hose life by preventing kinks

Vent valve
Removes trapped air inside grease gun for trouble-free priming

Multi-function LCD
Display shows grease output and battery charge and alerts the operator of blocked fittings and loss of prime

Ergonomic design
Lightweight with optimized balance for operator comfort

20V Lithium-ion battery
Dispenses up to 15 grease cartridges per charge and maintains stable energy output

4-Jaw coupler
Precision machined for durability



TMEH 1



TKGT 1

Consistency test
(Patent applied for)



Oil bleeding characteristics

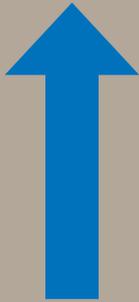


Contamination evaluation



Lubrication Management

What the right lubrication programme can do for you



Increase

- Productivity
- Reliability
- Availability and durability
- Machine uptime
- Service intervals
- Safety
- Health
- Sustainability

Reduce

- Energy consumption due to friction
- Heat generation due to friction
- Wear due to friction
- Noise due to friction
- Downtime
- Operating expenses
- Product contamination
- Maintenance and repair costs
- Lubricant consumption
- Corrosion



In order to achieve optimal lubrication, SKF has developed consulting services, geared to improve the performance of your rotating equipment.

SKF Lubrication Management process



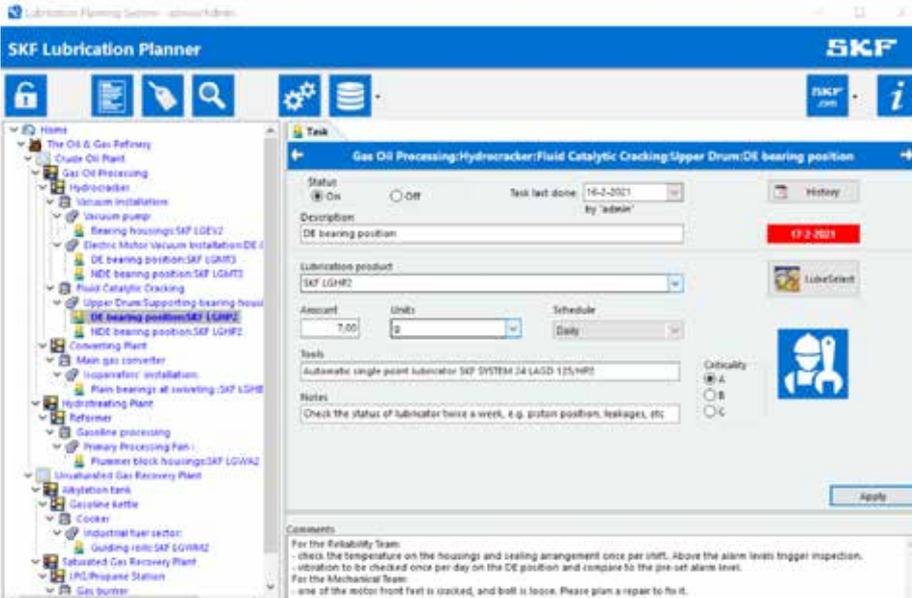
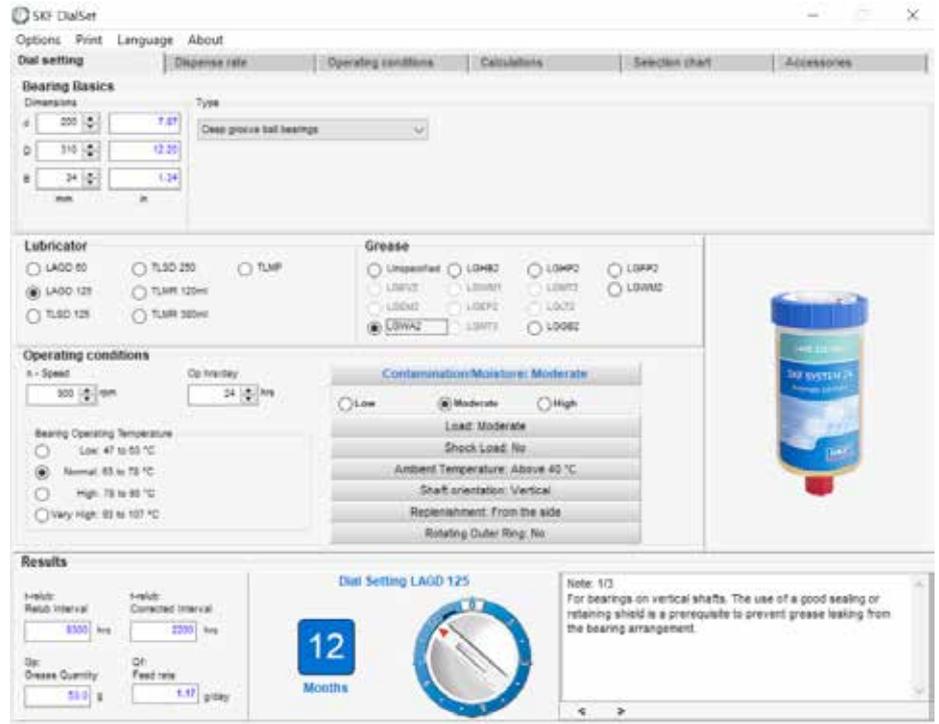
SKF DialSet

Software for quick calculation of the lubrication cycles

SKF DialSet has been designed to help you to set up your SKF automatic lubricators. After selecting the main operating criteria and the grease/oil appropriate for your application, the program provides you with the correct dispense settings for your SKF automatic lubricators. The software also provides pin-point values calculation for the relubrication intervals and quantity at the manual regreasing.

Free download at: mapro.skf.com/dialset

The app is available for iPhone and Android



The screenshot shows the SKF LubeSelect software interface displaying a table of property scores for various lubricants. The table has columns for User, Application, Lubricant, Viscosity, Total Sulfur, Total Acid, Water, and Sulfur. The data is as follows:

User	Application	Lubricant	Viscosity	Total Sulfur	Total Acid	Water	Sulfur
10001	10001	10001	10001	10001	10001	10001	10001
10002	10002	10002	10002	10002	10002	10002	10002
10003	10003	10003	10003	10003	10003	10003	10003
10004	10004	10004	10004	10004	10004	10004	10004
10005	10005	10005	10005	10005	10005	10005	10005
10006	10006	10006	10006	10006	10006	10006	10006
10007	10007	10007	10007	10007	10007	10007	10007
10008	10008	10008	10008	10008	10008	10008	10008
10009	10009	10009	10009	10009	10009	10009	10009
10010	10010	10010	10010	10010	10010	10010	10010
10011	10011	10011	10011	10011	10011	10011	10011
10012	10012	10012	10012	10012	10012	10012	10012
10013	10013	10013	10013	10013	10013	10013	10013
10014	10014	10014	10014	10014	10014	10014	10014
10015	10015	10015	10015	10015	10015	10015	10015
10016	10016	10016	10016	10016	10016	10016	10016
10017	10017	10017	10017	10017	10017	10017	10017
10018	10018	10018	10018	10018	10018	10018	10018
10019	10019	10019	10019	10019	10019	10019	10019
10020	10020	10020	10020	10020	10020	10020	10020



SKF Lubrication Planner

Software for easy management of lubrication tasks – with some minimal IT settings is compatible with CMMS (SAP, Maximo, etc.) skf.com/lubrication

LubeSelect for SKF lubricants

Software for generalized selection of lubricants and calculation of lubrication cycles skf.com/lubrication

Maintenance solutions from SKF

Machinery shaft alignment

Shaft misalignment is a major contributor to rotating machinery breakdowns. Accurately aligning connected shafts can prevent a large number of machinery breakdowns and reduce unplanned downtime that results in a loss of production. In today's challenging environment of reducing costs and optimizing assets, the necessity of accurate shaft alignment is now greater than ever.

Generally, misalignment of coupled machinery is caused by inadequate measurement techniques, an improper foundation, degradation of the foundation, problems with the feet of the connected machinery e.g. soft feet, defects of manufacturing, degradation of the supporting feet (cracks corrosion), deterioration of the couplings, etc .

From SKF you can have various precision alignment systems to adapt your applications needs.

SKF Shaft alignment tool TKSA 71

Designed for professional alignment in harsh industrial environments, the TKSA 71 is a very versatile tool with ultra-compact measuring units for use in extremely narrow spaces. Its dedicated software applications enable different types of alignments, including horizontal and vertical shafts, spacer shafts and machine trains.

- Easy-to-use - Intuitive software applications, guided alignment processes and explanatory videos
- Wide range of applications - Comprehensive accessories and dedicated software applications
- Superior alignment performance - Up to 10 m measurement distance, disturbance compensation, measurement flexibility, only 40° total rotation, automatic measurement and customised alignments with target values
- Protection against harsh environments - Completely sealed measuring units (IP67) to withstand dust and water

- Ultra-compact measuring units - Use in extremely narrow spaces
- Robust carrying case - Excellent protection, convenient transport and wireless in-case charging



SKF Shaft alignment tool TKSA 41

The ergonomic display unit with intuitive touch screen navigation makes your alignments fast and easy, whilst innovative features, like the "free measurement", increase the alignment performance. With the focus on improving alignment practices, the SKF Shaft Alignment Tool, TKSA 41, is one of the industry's best value alignment solutions.



TKSA 11

TKSA 31

TKSA 41

TKSA 51

TKSA 71

- Wireless communication
- Automatic measurement enables handsfree measurements by detecting the head position and taking a measurement when the heads are rotated into the right position.
- Automatic reports are generated after each alignment.
- Live view supports intuitive measurements and facilitates horizontal and vertical alignments.
- QR codes can be used to further simplify machine identification and improve the alignment workflow.



SKF Machinery shims TMAS series

For accurate vertical machinery alignment

- Made of high quality stainless steel, allowing re-use
- Easy to fit and to remove
- Close tolerances for accurate alignment
- Thickness clearly marked on each shim
- Fully de-burred
- Pre-cut shims are supplied in packs of 10 and complete kits are also available



SKF Vibracon

The universal adjustable re-use-able chocks.

SKF Vibracon is a machinery mounting chock that is easily and accurately adjusted. The chock accommodates the angular difference, up to 4°, between machine and the mounting base without expensive machining of the base or the extra work of installing epoxy resin chocks. The self-levelling capability, combined with the height adjustment feature, eliminates the possibility of a soft foot in the production line throughout the life cycle of the machinery.

The SKF Vibracon is available in different materials to meet the need of your application, even those in the harshest environments.

This adjustable chock is available in standard carbon steel (CS series) and in surface-treated carbon steel (CSTR series) for improved corrosion protection.

Developed to withstand the most challenging conditions, a stainless steel version (SS series) is offered with the highest corrosion protection available.



Stainless steel chocks (-SS)

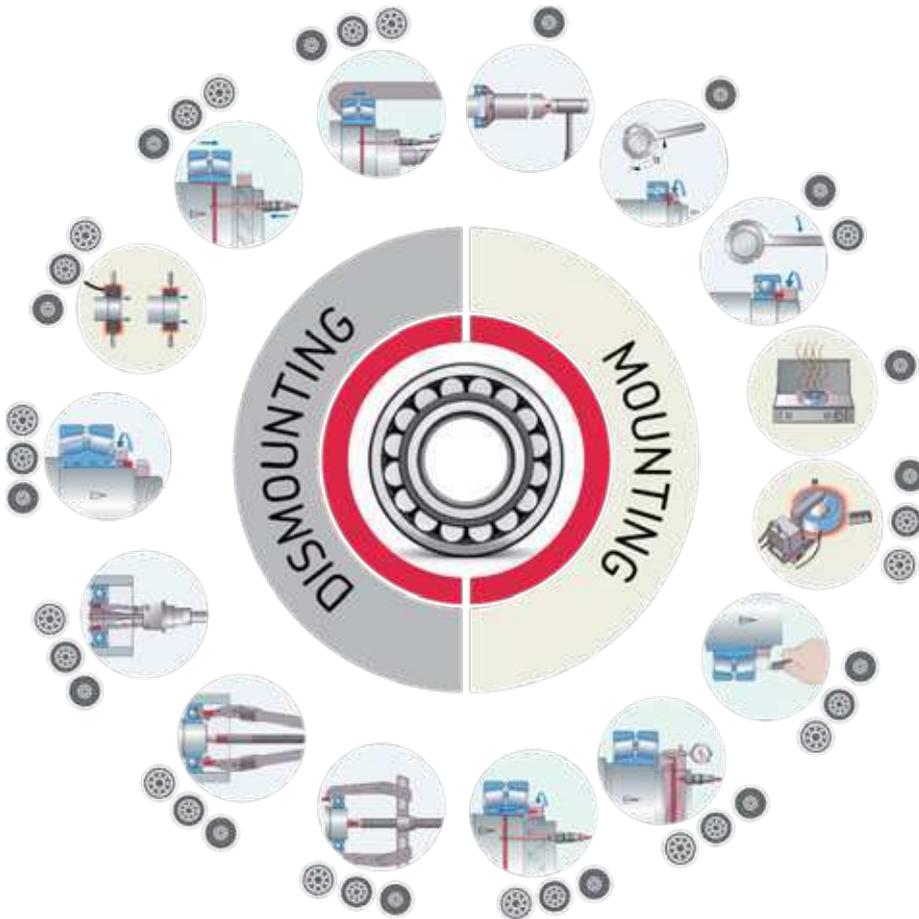


Low profile chock (-ASTR)



Carbon steel chocks (-CS)

Mounting and dismounting solutions



Depending on the size of the bearing to be mounted or dismounted, and on the seating arrangement, there are different recommended methods which vary from:

- Cold mounting / dismounting
- Hot mounting / dismounting by using oil injection, mechanical or hydraulic tools and induction heating.

The portfolio of SKF induction heaters varies from heating plates, portable heaters to very large induction heaters to heat up bearings and solid components of up to 1 200 kg and 800 mm bore diameter.

SKF TWIM 15

A portable solution for bearing heating

The unique on the market SKF portable induction heater TWIM 15 is designed to heat up roller bearings that are mounted with an interference fit onto a shaft. Heating the bearing causes it to expand, which eliminates the need to use force during installation. Generally, using the TWIM 15 to generate a 90 °C (162 °F) temperature difference between the bearing and shaft is sufficient to enable installation.

In addition, the TWIM 15 can be used to heat other ring-shaped, metallic components, providing flexibility of use.

TWIM 15 advantages:

- Innovative heating of bearings
- Portable, compact and lightweight
- No support yokes required
- Automatic temperature monitoring
- Detects bearing size and heats appropriately
- Different power levels
- User-friendly LED control panel
- Quiet operation



Large induction heater SKF TIH 220m

With a 300 kg bearing heating capacity, the large induction heater TIH 220m is a reliable and robust induction heater from the TIH...m range suitable for heating bearings up to a maximum weight of 300 kg (660 lb.) and solid components up to a maximum weight of 150 kg (330 lb.).

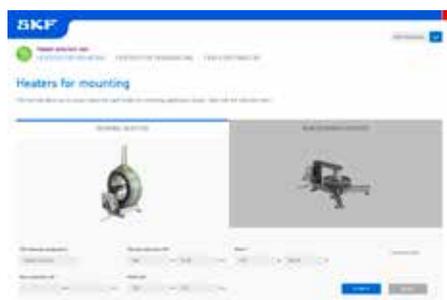


Advanced design of the power electronics including current and overheating control, combined with user friendly features such as sliding arms and remote control are standard to the TIH...m range.

- Capable of heating a 220 kg (480 lb.) bearing in just 20 minutes
- Supplied standard with two yokes, allowing bearings with a bore diameter from 60 mm (2.3 in.) up to a maximum weight of 300 kg (660 lb) to be heated
- Sliding arm for large size yoke

SKF Online heater selection -

Available on <https://www.skf.com/group/support/engineering-tools/heater-selection-tool>



SKF Hydraulic pumps

Technical data				
Designation	TMJL 50	729124	TMJL 100	728619 E
Maximum pressure	50 MPa (7 250 psi)	100 MPa (14 500 psi)	100 MPa (14 500 psi)	150 MPa (21 750 psi)
Oil container capacity	2 700 cm ³ (165 in. ³)	250 cm ³ (15 in. ³)	800 cm ³ (48 in. ³)	2 550 cm ³ (155 in. ³)
Volume/stroke	3,5 cm ³ (0.21 in. ³)	0,5 cm ³ (0.03 in. ³)	1,0 cm ³ (0.06 in. ³)	1st stage: 20 cm ³ below 2,5 MPa (1.2 in. ³ below 362 psi) 2nd stage: 1 cm ³ above 2,5 MPa (0.06 in. ³ above 362 psi)
Length of pressure hose fitted with quick connection coupling	3 000 mm (118 in.)	1 500 mm (59 in.)	3 000 mm (118 in.)	3 000 mm (118 in.)
Connection nipple (included)	G ¹ / ₄ quick connection			
Weight	12 kg (26 lb)	3,5 kg (8 lb)	13 kg (29 lb)	11,4 kg (25 lb)



SKF Oil Injection Method

The SKF Oil Injection Method allows bearings and other components with an interference fit to be fitted in a safe, controllable and rapid manner. The method does not require keyways to be machined on the shaft, saving valuable time and money in materials and production.

SKF Oil injection program -

Can be downloaded at <https://www.skf.com/group/support/engineering-tools/oil-injection-method-program>



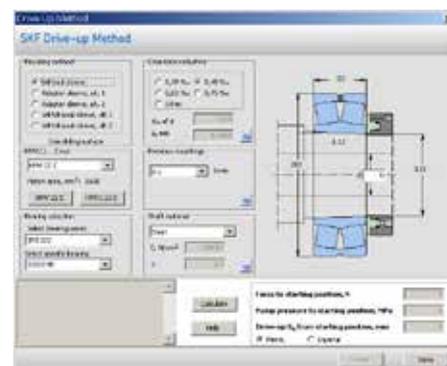
SKF Drive-up Method

The SKF Drive-up Method is a well-proven method, unique to SKF, of accurately achieving the adjustment of SKF spherical roller and CARB toroidal roller bearings mounted on tapered seatings. The method incorporates the use of an SKF HMV ..E hydraulic nut fitted with a dial indicator, and a high accuracy digital pressure gauge, mounted on the selected pump.

The correct fit is achieved by controlling the axial drive-up of the bearing from a pre-determined starting position, defined by the pressure in the SKF HMV..E hydraulic nut.

The second stage is monitored by driving the bearing up a calculated distance on the taper seating.

The program can be downloaded at <https://www.skf.com/group/support/engineering-tools/drive-up-method-program>



SKF Sealing Solutions

Radial shaft seals

SKF's main offer of sealing solutions for oil & gas applications includes all-rubber HS and HSS seals as well as metal-cased HDS seals, also known as SKF Edge seals as part of the CR Seals assortment, with optional add-on features and the machined HRS seals made of Polyurethane. The offer is based on a flexible concept to customize the solutions in terms of design and dimension to optimize them to the varying demands of different applications without additional tooling.



Axial shaft seals

If contaminants enter the bearing area of an axial shaft, they can pollute the lubricant, causing corrosion and premature bearing failure. To combat these issues, axial shaft seals are designed as a suitable secondary seal in applications where seals are subjected to excessive quantities of contaminants.

They are available as V-ring seals, metal-clad V-type sealing rings, axial clamp seals and mechanical seals. With the exception of axial clamp seals, axial shaft seals rotate with the shaft and act as flingers, tolerating small misalignments of the shaft and providing reliable sealing if the shaft is out of round or rotates eccentrically.



SKF Speedi-Sleeve

Over time, contaminants, high pressure and speed, or inadequate lubrication can cause particles to become trapped underneath a shaft sealing lip. Wear grooves begin to form on the shaft as it rotates, eventually leading to sealing failure and severe shaft damage. Repairs usually involve dismantling and re-machining the shaft, and installing a new seal size. SKF Speedi-Sleeve and large diameter wear sleeves offer a much faster, more cost-effective alternative.



SKF Speedi-Sleeve is a well-proven solution used to provide an excellent sealing surface for radial shaft seals, while reducing the need for costly shaft machining or maintenance. SKF Speedi-Sleeve combines a proprietary stainless steel material and manufacturing process, resulting in an optimized seal counterface that minimizes wear on both the sleeve and sealing lip.

- Standard size range covers shaft diameters from 11.99 to 203.33 mm (0.472 to 8 in.). Each sleeve is designed to fit a specific shaft range to accommodate variations in the actual shaft diameter. If the right size is selected, the sleeve will have an adequate tight fit on the shaft and will not require any adhesive.
- Seal contact surface is wear resistant and manufactured to minimize directionality ($0^\circ \pm 0,05$) with a finish of Ra 0,25 to 0,5 μm (10 to 20 $\mu\text{in.}$).
- Available in two versions: Standard for general purpose and SKF Speedi-Sleeve Gold with a thin, metallic coating for use under highly abrasive conditions.
- No need to take apart the shaft or to machine it again.
- Reduces maintenance and repair costs.
- Fixes problems in minutes and reduces environmental impact.
- Allows manufacturers of machinery to avoid costly superficial and finishing treatments on the shaft.



Power transmission solutions

Power transmission products play an important role in overall bearing performance and are the vital link between moving parts in equipment. By creating its own range of power transmission products, SKF can offer products that are well-matched and give engineers a wide design choice according to performance and cost considerations.

Belts

SKF Cogged Raw Edge Wedge and SKF Cogged Raw Edge Narrow Wedge Belts have been developed to handle oil & gas applications.

The tension cords are made from polyester yarn. Pre-loading the cords during their rubber impregnation process results in low stretch during operation. The rubber cushion is fibre loaded chloroprene compound giving good transverse belt rigidity.

Features:

- High transverse rigidity
- High flexibility
- Temperature range from -30 to +75 °C
- Constant length per ISO matching set tolerances
- Suitable for tropical climates
- Lengths available up to 3 500 mm



Couplings

SKF also offers disc couplings. These are the ideal solution in medium to high torque applications that require torsional rigidity, offer some allowance for misalignment, and do not require lubrication. These applications typically have a capacity range up to 178 kNm in a range of configurations including single disc, double disc, and spacer for both horizontal and vertical mounting. Standard shaft capacities are up to 289 mm.

- High torsional stiffness – zero backlash
- Energy efficient – no frictional losses *
- No internal moving parts – no lubrication required *

- Quiet running – no meshing *
- Temperature tolerant
- Fully machined surfaces – high speed capability New SKF (may require dynamic balancing over 50 m/s)

* Assuming proper alignment



Pulleys

- ISO and RMA profiles – dimensions according to applicable standards
- Phosphate coated for ISO pulleys a measure of corrosion protection
- RMA pulleys powder coated for economical protection
- Taper bush and QD locking systems as standard

SKF Training Solutions

SKILL

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. Uptime again has a direct impact on quality and cost of product and service delivered.

SKF Training Solutions offer a comprehensive range of training courses touching every stage of the life cycle management, designed to help increase equipment reliability and reduce waste. SKF courses have been developed by leaders in the field of dynamic machinery design, operation and maintenance. These courses are developed and delivered with best practices always in mind. SKF can help customers achieve greater machine reliability and availability through the training of fitters, technicians, engineers, supervisors, etc. through these programs.

Training needs analysis

If you don't know where to start, we can help. SKF has developed programs to assess the maintenance skills of your team and identify individual strengths and weaknesses. Together we then create a program that fits your needs and gives the best return on your investment in your people.

The SKF Client Needs Analysis (CNA) – Training enables this crucial understanding, combining our experience in training and knowledge of maintenance and reliability. The goal is to provide useful and meaningful information to help you focus on improvements for plant performance. These assessments are conducted with individuals or a group of your staff from the following work areas:

- Mechanical maintenance
- Reliability & Condition monitoring
- Engineering
- Planning & scheduling

Targeting eight areas of competency for improvement

Opportunities for improvement are determined based on findings from the SKF CNA - Trainings. Typical improvements fall in the following areas:

- Bearings and seals technology
- Power transmission
- Lubrication
- Oil analysis
- Vibration analysis
- RCA/RCFA
- Maintenance strategy
- Thermography



Training course categories

While specific course topics vary widely, SKF training courses are organised around the following five facets of the SKF Asset Efficiency Optimisation (AEO) model:

Maintenance and reliability (code MS)

Relates to methods and technologies used to develop a maintenance strategy. Courses emphasise a technically and financially sound maintenance strategy developed to match business goals.

Condition-based maintenance (code CBM) (code WI)

Relates to methods and technologies used to identify maintenance work. Course topics include condition monitoring, data collection, information integration and analysis.

Work control processes (WC)

Relates to methods and technologies used to control maintenance work. Course topics include maintenance planning and scheduling, standard job plans, spare parts alignment and inventory control.

Proactive maintenance or mechanical maintenance (code WE)

Relates to methods and technologies used to complete maintenance tasks. Course topics mainly include bearing maintenance, best practices in lubrication, precision alignment, dynamic balancing, and electric motor maintenance.

Engineering (code LP)

Relates to Engineering or Engineering product, methods and technologies used to evaluate maintenance work and strategy, thereby 'closing the loop' and making maintenance a continual improvement process. Course topics include root cause analysis, reliability analysis, maintenance work feedback and performance management system, machine redesign, and technology upgrades

Protect your business – avoid counterfeit products

SKF products are used for their quality and operational benefits. However, the benefits of SKF products can only be achieved by the use of genuine products. Awareness about the existence of counterfeit SKF products and potential consequences when used, helps customers understand why it is important to select the supplier with care. Sourcing from authorized SKF distributors is the best way to safeguard supply of genuine SKF products.

The image shows two blue and red SKF product boxes sitting on a metal grate. The boxes are identical, with the SKF logo in white on the blue upper portion and a red stripe at the bottom. The background is a blurred industrial setting with cardboard boxes, one of which has the SKF website URL visible.

SKF

SKF



What is a counterfeit SKF product?

All types and sizes of products and packaging marked with SKF trademarks, but not manufactured by SKF or with the consent of SKF, is considered counterfeit. Branding workshops illegally mark unbranded products with SKF trademarks and other look alike markings. The products are packed in counterfeit look-alike packages and marketed as genuine products. However, the pricing of counterfeit products to the end-user is close to the same as for genuine products. Price is not an indicator whether a product is counterfeit or not.

Avoid being cheated

Carefully select your supplier of SKF products. Compromising secure sourcing can cause great harm to your business. A “good deal” from an unknown supplier may end up costing a lot more.

The best way to safeguard authenticity is to buy SKF products from authorized SKF distributors.



The warning signs

Marketing to distributors is done in a way most distributors would recognize. An e mail is sent from a person claiming partnership with premium brand owners, offering industrial or automotive products directly from stock at competitive prices. Be careful! This could be a source of counterfeit SKF products.

Be suspicious when non-authorized suppliers offer short lead times for products known to have longer lead times from SKF. Suppliers of counterfeits may also offer certificates stating that the products are genuine SKF. Such documents are not trustworthy. Mounting difficulties and /or pre mature failures, could be signs that a product is counterfeit.

The risks

The quality and performance of counterfeit SKF products is unknown and unpredictable. All efforts and dedication to improve OEE (overall equipment effectiveness) and operational costs can quickly change if counterfeits get into your operation. If installed in safety critical equipment, counterfeit products may present a great safety risk for people and/or the environment.

What if you suspect a product to be counterfeit?

Only experts from SKF can verify authenticity of a product or package marked with SKF trademarks. Please send sharp pictures of all visual markings on the product and product box to genuine@skf.com and you will be contacted by SKF. For all verification requests, providing name of the supplier and proof of purchase is mandatory.

SKF Authenticate App

The SKF Authenticate application for smartphones allows users to take and send photos of suspect products and proof of purchase directly to SKF for verification. The application can be downloaded for free from App Store or Google play.



[skf.com](https://www.skf.com)

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