

FOCUS

issue 65 www.skf.co.uk

NEW General Catalogue



New lubrication campaign

Solutions for the printing industry

Extensive linear motion range

The latest bearing-related solutions

SKF®

At 3am, who's still up if your production line goes down?..... Your SKF Distributor



To meet productivity demands, your plant is operating around the clock. Fortunately, so is your local SKF Distributor. So, even if it's the middle of the night, you can still get the products and services you need:

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Editorial comment

Welcome to FOCUS 65, which sees us launch the new SKF General Catalogue. This is the first General Catalogue since 1989 to be completely revised and redesigned. The catalogue is the industry-standard guide for rolling bearing and accessory design, selection and application, and is considered by many industrial commentators to be one of the most comprehensive and authoritative reference sources of its kind. Turn to page 7 for further details.

Another important launch for us is our Lubrication Campaign. There's no doubt about it that optimum bearing performance in any application is only attainable when the correct lubricant is used with the right bearing. Our new campaign, detailed on pages 10 and 11, provides you with free advice that helps you maximise the performance of your applications through selecting the correct bearing grease.

Finally, it is with great disappointment that we note the cancellation of this year's PAPEX, a pulp and paper exhibition and conference where we were due to exhibit. In this issue, among our regular product features and news items, the importance to us of the pulp and paper, and print industries is shown by our coverage on pages 12 to 15. We take a look at some of our specially designed products and examine the advantages of condition monitoring programmes in these industry sectors.



PHIL BURGE EDITOR

CONTENTS

- 4 News**
The latest local and international news
- 7 New SKF General Catalogue**
The definitive engineering guide sees first full revision since 1989
- 8 New solutions**
SKF Explorer spherical thrust roller bearings, Smart Housing, Hyperspin spindle and Ampep's XLNT spherical plain bearing
- 10 SKF bearing greases**
New campaign provides free lubrication advice
- 12 St. Regis case study**
SKF stops milling around in unplanned downtime
- 14 Solutions for the printing industry**
All the bearings that are fit to print
- 16 SKF Engineering Products Limited**
Experts in linear motion
- 18 Maintenance and lubrication products**
Increasing plant performance and profitability
- 20 New solutions**
Machine Condition Transmitter (MCT), BeltAlign tool and digital thermometer TMDT 1300
- 21 Literature**
The latest brochures and catalogues
- 23 Reader reply service**
For further information on featured products systems and solutions
- 24 Win a Philips portable television**
Spot the difference competition

PUBLISHER SKF (U.K.) Limited
EDITOR Phil Burge
EDITORIAL Houston Associates
DESIGN Samantha Carberry

CONTRIBUTORS
Suzaini Sukhram, David Floyd, Andrew Grogono, David Worth, Tim Petzing, Graeme Poole, Linda Widbro, Damian Lewis, Gerald Rolfe and Chris Moon.

CONTACTING SKF

MAIL

SKF (U.K.) Limited
Sundon Park Road, Luton, Bedfordshire LU3 3BL

TEL
+44 (0)1582 490049

FAX
+44 (0)1582 848091

EMAIL
marketing.uk@skf.com

WEB
www.skf.co.uk
www.skf.co.uk/reliability
www.skfepl.co.uk
www.mtsr.co.uk
www.ampep.com



INVESTOR IN PEOPLE



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LOCAL NEWS



Brian Taverner retires

■ Brian Taverner, Managing Director of SKF Engineering Products Ltd. and MTSR Ltd. retired on 2nd June after 29 years service with the company.

Brian started at SKF as a toolmaker in the old Leagrave factory in Luton. During the early 90's Brian was responsible for Sales & Marketing within the Industrial Division, based at Tilbrook in Milton Keynes. In 1996 he moved to the USA for four years, working in the Fluid Machinery segment, and returned in July 2000 to assume responsibility for the Wind Energy growth team. He took over at SKF EPL and MTSR in September 2001. We all wish him well in retirement.

UK appointments

■ As a result of Brian Taverner's retirement, Peter Hayward, General Manager of SKF EPL, has been appointed its Managing Director and will report to Denis Mathieu, Director Linear Motion Sales Europe.

MTSR Ltd. was operationally integrated into SKF (U.K.) Limited on 1st August. On the business side, Clive Whittle, General Manager of MTSR, continues to report to Daniel Bru, Director Machine Tool Service, while Sharon Smith has assumed the role of MTSR's Managing Director.

The Machine Tool sales within SKF EPL was transferred to MTSR on 1st August and Brian Sullivan, Business Leader for Machine Tools continues in this role at MTSR (SKF (U.K.) Limited).

e latest news and products as it happens

■ Customers are now better informed about the latest news and product releases at SKF thanks to E-focus, our monthly e-news bulletin.

E-focus was first launched in August 2002, due to increased customer interest in new SKF products and developments. Since its introduction, the E-focus subscription base has grown to 3100.

E-focus works as a supplement to this FOCUS magazine. As a subscriber to

E-focus you will no longer waste time searching the Internet for new products that will enhance your business. The latest product information lands in your inbox every month and you can use the links in

E-focus to find out more information about a product or story that particularly interests you. You are never out of touch with the new industry developments that could make your life easier and your plant run more efficiently. Reading E-focus only takes a matter of minutes, but the information could greatly change the way your business runs.

Subscribing to E-focus couldn't be easier. Simply visit the SKF (U.K.) website, www.skf.co.uk and click on the flashing E-focus box. This will load a new screen with instructions on how to subscribe. Once subscribed, you will receive your copy of E-focus every month.

SKF on MaPro tour

■ After tours of East Europe the SKF maintenance and lubrication products demonstration truck has been travelling the UK over six weeks this summer.

SKF is the only bearing manufacturer in the world to provide a comprehensive portfolio of tools and equipment for mounting, dismantling and monitoring bearings, together with a full line of lubricating greases. The nine meter long truck has enough space to display a complete range of these maintenance products while still comfortably accommodating up to 12 people. In addition, a fully equipped workbench is available for hands-on training, and a video wall shows product and segment-focused presentations, and mounting and dismantling training videos.

The demonstration truck has given SKF Reliability System's staff the opportunity to demonstrate that SKF is not just a source for quality bearings, but also for the tools and



training needed to maximise bearing life.

One stop on the UK tour was at the Trostre Works of Corus Packaging Plus, in Llanelli which gave all the Trostre engineering staff the opportunity of viewing the latest maintenance equipment without leaving the works.

SKF also arranged a drop-in workshop in the truck. This provided an opportunity to discuss bearing application problems, with SKF applications engineers able to view any problems on the site first hand.

During the day, the truck also served as a mobile classroom enabling apprentices to train on the correct methods for mounting and dismantling bearings.

In total, around 50 Corus staff visited the demonstration truck at the Trostre site.



Lynx drops in for 40th celebration



Left to right: Fred Rendell, Technical Sales Director; Bernard Lefevre, Chairman; Andrew Grogono, Managing Director and Captain Al Moyes

■ Ampep, Clevedon's largest engineering company, recently completed 40 years in business. To mark the occasion, a party was held for more than 300 current and former employees, suppliers, customers, agents and distributors at its Strode Road premises.

The highlight of the event was the arrival of an Army Lynx helicopter which gave partygoers the opportunity to see where Ampep's products are installed. Also being displayed was a Formula 1 racing car provided by the Jordan team and a TVR

Tuscan, provided by Ampep's distributor to the racecar market, Goldline Bearings.

In his welcome speech, Ampep's Managing Director, Andrew Grogono, thanked its new Chairman, Bernard Lefevre, for attending. Mr Grogono said Ampep's success could be partly attributed to its technological leadership in bearing design and manufacturer, but it was their employees who had contributed most to the company's success.

Ampep has 140 employees and is part of SKF's Aero & Steel Division.

GLOBAL NEWS



US subsidiary wins nuclear contract

■ SKF subsidiary and sister company to SKF Reliability Systems, ERIN Engineering, has entered into an agreement with Exelon to establish and manage an integrated risk management organisation

supporting all Exelon nuclear plants in the USA.

Exelon is the largest nuclear utility in the United States, with seventeen reactors at ten stations, and ERIN Engineering has been a significant participant in the Exelon Risk Management Programme.

The Primary motivation for the agreement is to achieve significant integration of staff and personnel engaged in risk assessment activities so that greater efficiency and consistency can be achieved throughout Exelon facilities.

The contract has an initial performance period of five years, and requires that excellence measures be achieved by the integrated risk management team.

SKF wins Ferrari Maserati Group Innovation Award

■ At the third annual 'Podium Ferrari' award ceremony, held in Maranello, Italy, SKF was honoured for "its continuous ability to innovate, supplying bearings of the highest possible standard for the Formula 1 single-seater, as well as the Ferrari and Maserati Grandturismo road cars".

The annual 'Ferrari Innovation Award' was presented by Ferrari's Technical Director of the Scuderia, Ross Brawn, Engine Technical Director, Paolo Martinelli and by Scuderia Ferrari drivers Michael Schumacher and Rubens Barrichello to SKF Automotive Vice-President, Riccardo Dell'Anna.



SKF is an official supplier and technical partner to Scuderia Ferrari, and a major supplier of bearings and related products for the Ferrari Maserati Group's Grandturismo production road cars. SKF's relationship with Ferrari started in 1947, and continues, unbroken, to this day.

Riccardo Dell'Anna pictured with the Ferrari Innovation Award, flanked by (left) Rubens Barrichello, Ross Brawn and (right) Michael Schumacher.

FAQS

Please find below four of the most popular questions directed towards our Technical Helpdesk.

Q: What is the shelf life of SKF bearing grease?

A: SKF guarantees the quality of its bearing greases for five years after the packaging date, provided the grease is kept under storage conditions recommended by SKF.

SKF bearing greases do not have an expiry date after which they cannot be used. If properly stored, an SKF bearing grease with a packaging date over five years may still be suitable for service.



Q: What is a SPEEDI-SLEEVE?

A: SPEEDI-SLEEVE is a thin wall shaft repair sleeve, which requires no change in seal size after repair of the shaft. It's the quickest and

smartest way to repair seal worn shafts, taking less than five minutes to install. SPEEDI-SLEEVE is manufactured to precise specifications by Chicago Rawhide, a company within the SKF Group.

Q: Can SKF SYSTEM 24 automatic lubricator be filled with any grease?

A: No, many types of grease do not work in automatic lubricators as the constant pressure on the grease promotes the oil and thickener system to separate, which can cause blockage in the SYSTEM 24 unit (piston will not go down 100%).

Q: Can bearings carry moment or tilting loads?

A: Singular bearings like slewing rings and crossed roller bearings can accommodate these loads, and paired bearings such as taper roller and angular contact ball bearings can also accept these loads.

If you have a bearing-related problem and would like it solved please contact our Technical Helpdesk on 01582 496531 or via their e-mail address: technical.helpdesk.uk@skf.com

New railway contract gained

■ SKF's slewing bearings have been chosen by the leading railway supplier Bombardier Transportation, for the new generation of metro cars for Mexico City.

SKF offered a package based on high performance SKF slewing bearings as well as technical, commercial and aftersales customer service.

The new rolling stock, 45 trains consisting of nine wagons each, for the Metro Mexico, will be equipped with SKF slewing bearings. SKF has been working in close co-operation with Bombardier Transportation to select the optimum solution with regard to safety, comfort and length of maintenance-free service.

SKF bearings on high speed train

■ Japan's largest railway rolling stock manufacturer, Kawasaki Heavy Industries (KHI), has chosen SKF to supply axlebox bearings for 360 cars of its Shinkansen High Speed Train. The train, which is designed for a maximum speed of 300km/h will be exported to Taiwan. Based on its unique experience with several high-speed train applications at major European railways, SKF was able to offer a package of wheel bearing units with spare parts. The high performance of the SKF solution, combined with its strong focus on safety, were the deciding factors in the eyes of both KHI and the Taiwan High Speed Corporation.

Training courses

Condition monitoring training programmes

Reference	Course description	Dates
CMTR 504	Introduction to Machine Analyst	1 - 2 October
CMTR 704	Balancing with the Microlog	29 October
CMTR 201	Condition monitoring awareness course	30 October
CMTR 703-50	Microlog CMXA50 and Machine Analyst course	11 - 13 November
CMTR 504	Introduction to Machine Analyst	25 - 26 November
CMTR 502-50	Introduction to the CMXA50 Microlog	9 December
CMTR 502-60	Introduction to the CMVA60 Microlog	10 December
CMTR 503	Introduction to on-line system	Onsite only
CMTR 508	Introduction to the M800A machinery protection system	Onsite only

Bearing maintenance and reliability training programmes

Reference	Course description	Dates
BMR 603	Bearing maintenance and service	7 - 8 October
PRM 801	Proactive Reliability Maintenance for maintenance staff	14 - 17 October
BMR 607	Root cause bearing failure analysis	21 October
BMR 601	Oil injection mounting	4 November
PRM 804	Precision shaft alignment	18 November
BMR 603	Bearing maintenance and service	26 - 27 November
PRM 801	Proactive Reliability Maintenance for maintenance staff	2 - 5 December

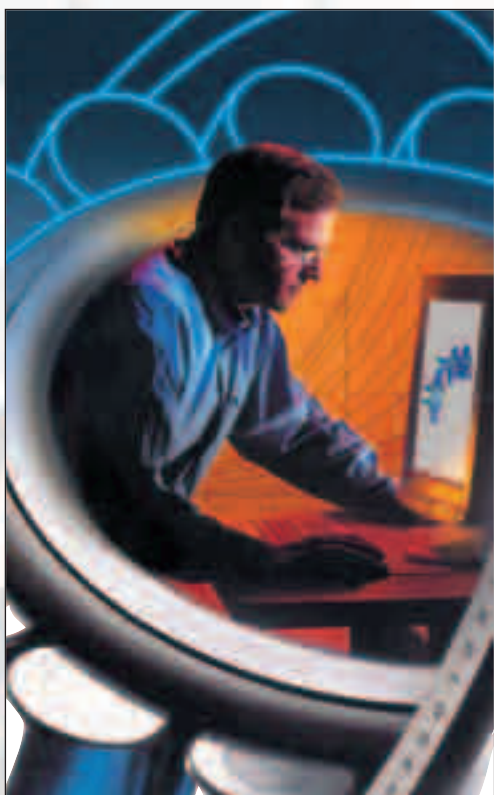
SKF also offers the following courses (dates to suit)

Reference	Course description	Duration
CMTR 701-60	CMVA60 with PRISM ⁴	3 days
CMTR 701-50	CMXA50 with PRISM ⁴	3 days
CMTR 703-60	CMVA60 with PRISM ⁴	3 days
MPTR 701	TMEA1 Laser shaft alignment system	1 day

For further information please contact Sue Sharpe on 01582 496665 or via e-mail: ukrmi@skf.com

New SKF General Catalogue

The definitive engineering guide sees first full revision since 1989



Hot off the presses is the new, completely updated and revised edition of the SKF General Catalogue. The catalogue is the industry-standard guide for rolling bearing and accessory design, selection and application, and features advanced technical information as well as the latest product assortment.

Considered by many industrial commentators to be one of the most comprehensive and authoritative reference sources of its kind, the SKF General Catalogue features specifications on standard rolling bearings and accessories for equipment design, manufacture and maintenance. The General Catalogue includes highly detailed technical information to assist design engineers in understanding the optimum performance parameters of bearing arrangements.

The new General Catalogue includes three major improvements. Firstly, a friction model section with revised speed ratings has been added, which calculates the friction of all contacts in the bearing from four sources; rolling, sliding, seal friction and drag, splashing and churning losses.

Significant innovations have been included in these four sources such as the effects of starvation (lack of lubricant compared to the level needed for the maximum film possible under the operating conditions) and shear inlet heating (thinning of the lubricant from the heating in front of the rolling element and raceway contact resulting in some film reduction). The frictional effects of metallic contact and a seal friction model have also been added. All these model improvements are underpinned by the use of up-to-date film thickness formulae ensuring improved performance.

The revised speed ratings within the friction model include thermally permissible reference speeds and new limiting speeds which indicate practical maximum speeds for normal operational conditions.

The second improvement is a new model for determining required lubrication viscosity. The calculation of the requisite lubrication viscosity now takes into consideration the roughness deformation in the lubricated contacts, the effects of starvation, shear inlet heating, more accurate lubricant properties and the up-to-date film thickness formula which results in an improved bearing life prediction.

The third enhancement is a new method for determining lubricant service life for grease-lubricated bearings. Using new diagrams and extensive information on greases, the 'traffic light' approach is used; a green zone indicates safe functioning with the predictable grease life shown, a yellow zone represents unsafe functioning for short periods, while operation in the red zone is forbidden.



The new SKF General Catalogue also features enhancements to the SKF Life Theory, a bearing life expectancy formula first introduced by SKF in 1989, which became the de-facto standard for determining bearing life expectancy.

The SKF Explorer class bearings which feature improved key performance characteristics, including endurance and service life are also detailed in the new catalogue.

The SKF General Catalogue is available in print, on CD-ROM, and online via www.skf.co.uk. The CD-ROM and online versions are referred to as the SKF Interactive Engineering Catalogue.

The new catalogue is available free-of-charge to our direct customers, and a nominal fee of £15 for the printed version and £7.50 for the CD-ROM may be charged for all other requests.



Spherical roller thrust bearings join SKF Explorer class

SKF's range of spherical roller thrust bearings (SRTBs) has joined the company's Explorer class. SKF Explorer is a new performance class of rolling element bearing, and SKF Explorer SRTBs offer

increased dynamic load carrying capacity and a service life up to three times longer than that of conventional SRTBs.

SKF Explorer SRTBs benefit from added strength to the raceways, high dimensional

stability and long life. An improved surface finish and optimised internal geometry gives better lubrication and load distribution.

Thanks to the increased dynamic load carrying capacity, SKF Explorer SRTBs enable either downsizing or upgrading the strength and performance of existing assemblies. New arrangements of identical performance can be designed smaller and more compact, which saves material and improves power density.

A smaller bearing also provides the benefits of having a lower operating temperature, as well as issuing lower noise and vibration levels.

By design, SRTBs are the only roller thrust bearing that can accommodate radial loads in addition to thrust loads. They are also the only thrust bearing that can accommodate very large misalignment and shaft deflections to give smooth, friction-free adjustment, with lower running temperatures and no adverse effect on bearing life.

SRTBs are frequently used in metal working, plastic machines, marine equipment, industrial gearboxes, pulp and paper, materials handling, fluid machinery and the mining and construction industries. Applications include bridges, cranes, wind and water turbines, hydraulic and electric motors, robots etc. Smaller sizes of SRTBs are found in a number of demanding applications, such as gearboxes and pumps.

A smarter way to house bearings



The new Smart Housing for bearings offers a robust integrated solution to monitor and control critical process applications and will increase safety, application knowledge and production efficiency. As a new addition to the SNL range, Smart Housing contains sensors and electronics for both periodic and continuous monitoring for a range of applications, including fans, conveyors, industrial washing machines and agricultural equipment.

Monitoring via Smart Housing ensures production reliability is increased, as unplanned stops are reduced, and planned stops

are less frequent and shorter. Safety is also increased, as the monitoring reduces the risk of fires, breakdowns and explosions.

This in turn leads to a lower insurance premium. The Smart Housing offers improved signal quality and reliability over previous housings of similar style and, for many environments, the robust integrated design eliminates the need for external protection shields.

Smart Housing is available in three different formats to suit the needs of different applications: vibration; speed and temperature; and speed, temperature and vibration monitoring.

Magnetic bearings turn Hyperspin spindle



The new Hyperspin spindle is the latest SKF product to use magnetic bearings, which provide faster, more efficient solutions than traditional bearings, and provide cleaner rotating equipment due to the absence of lubrication. Through the magnetic bearings, Hyperspin spindles also benefit from major improvements in motion control and monitoring systems, developed by SKF via its Canadian subsidiary Revolve Magnetic Bearings Inc.

The Hyperspin spindles include motor, housing, controller and cable, together with the magnetic bearings. The magnetic bearings levitate the shaft by controlling the electro magnetic fields, i.e. the shaft is rotated without contact. A control system measures shaft position and adjusts the current in the bearing coils, maintaining the shaft at a preset position.

Equipped with magnetic bearings, and motors that range in power from 300 watts to 55 kilowatts, Hyperspin spindles are capable of speeds up to 60,000 rpm. The spindles have a high level of reliability, working at very high speeds with no vibration, making them ideal for a variety of applications such as semiconductor fabrication equipment, vacuum applications and turbo machinery.

Hyperspin spindles are extremely efficient and offer a versatile shaft interface to mount nearly any type of payload. Shaft extensions can be customized to suit individual application requirements whether it is a turbopump impeller or a unique neutron-absorbing disk. The spindles are offered in a range of frame sizes, speeds and power ratings. Synchronous Hyperspin spindles are available up to 60,000 rpm and 900W. Asynchronous Hyperspin spindles are available up to 50,000 rpm and 55 kW.

Augusta Westland choose Ampep bearings to reduce costs

Agusta Westland, the world's second largest helicopter manufacturer, has chosen to install new technology Ampep self lubricating bearings in its Merlin helicopter. The XLNT ceramic coated, spherical plain bearings give a greatly extended service life and therefore reduce operating costs.

Ampep has developed these new self-lubricating bearings especially for helicopter flight controls. The XLNT bearings will be used in the Merlin tail rotor flapping hinge and the main rotor control pitch links of the helicopter.

Extensive laboratory tests confirmed that the ceramic coating combined with Ampep's traditional 'XL' liner would provide a greatly extended life for the bearings. Longer bearing lifespans are vital for helicopter manufacturers to reduce maintenance, which results in lower cost of ownership. Before using XLNT high technology bearings, the helicopter operators incurred high costs due to blade pitch control bearings having to be replaced between

major overhaul services. The XLNT bearings eliminate these interim maintenance requirements, and so minimise down time and save operating costs.

The decision to use the XLNT bearings confirms Ampep's continuing lead in the field of self-lubricating bearings for helicopter flight controls. The company offers a free design service to its customers to meet specific applications and ensures that all design features are fulfilled by working closely with the customer to ensure his design requirements are met.



New SKF campaign provides free lubrication advice

Laurel's performances would not have worked anywhere near as well without the presence of Hardy, and the same goes for a bearing without the appropriate lubricant: it just won't operate at its optimum level. However, our new lubrication campaign now gives you expert advice, free-of-charge, to ensure that your bearings give you the highest possible performance.

Many people still think "Grease is just grease", but this is far from true. Although each grease consists of 90% base oil and 10% so-called "thickener", the various SKF bearing greases have totally different properties. They are as individual as the different applications in which bearing technology is used and cover a range of operating temperatures and pressures. There are also special greases which are formulated for use in particular industries such as food processing applications.

Today, approximately 20,000 different types of bearings are being used in more than one million applications. This alone makes it difficult to select the most suitable lubricant and, as a result, 36% of all bearing failures are caused by incorrect lubrication.

The perfect running combination consists of the right bearing and the right bearing grease. Our new campaign will help you navigate through the sea of lubricants to make the correct match.

As the world's leading manufacturer of rolling bearings, with nearly 100 years of experience in bearing technology, SKF is ideally placed to specify the most appropriate grease for any given bearing application. Being precisely formulated to meet the most stringent quality demands, using SKF bearing greases ensures perfect synergy and maximum performance.

Research and development play an important role at SKF. This is also true when it comes to bearing greases. The product range has been specially developed and refined over many years of extensive work at SKF's Engineering and Research Centre. Today, the strict quality standards and testing methods applied by SKF specialists, enjoy worldwide recognition.

Now you can also benefit from our expertise. If you would like to optimise the performance of your rolling bearings, simply complete and return the LubeSelect form

opposite and we'll do the hard work for you. Based on your specifications, SKF lubricant specialists will recommend the most suitable grease for your particular needs.

In addition, they will provide information about the correct grease supply method, together with the appropriate re-lubrication interval and amount of SKF grease to use. You're welcome to put our service to the test and we are sure you will be impressed with the results.

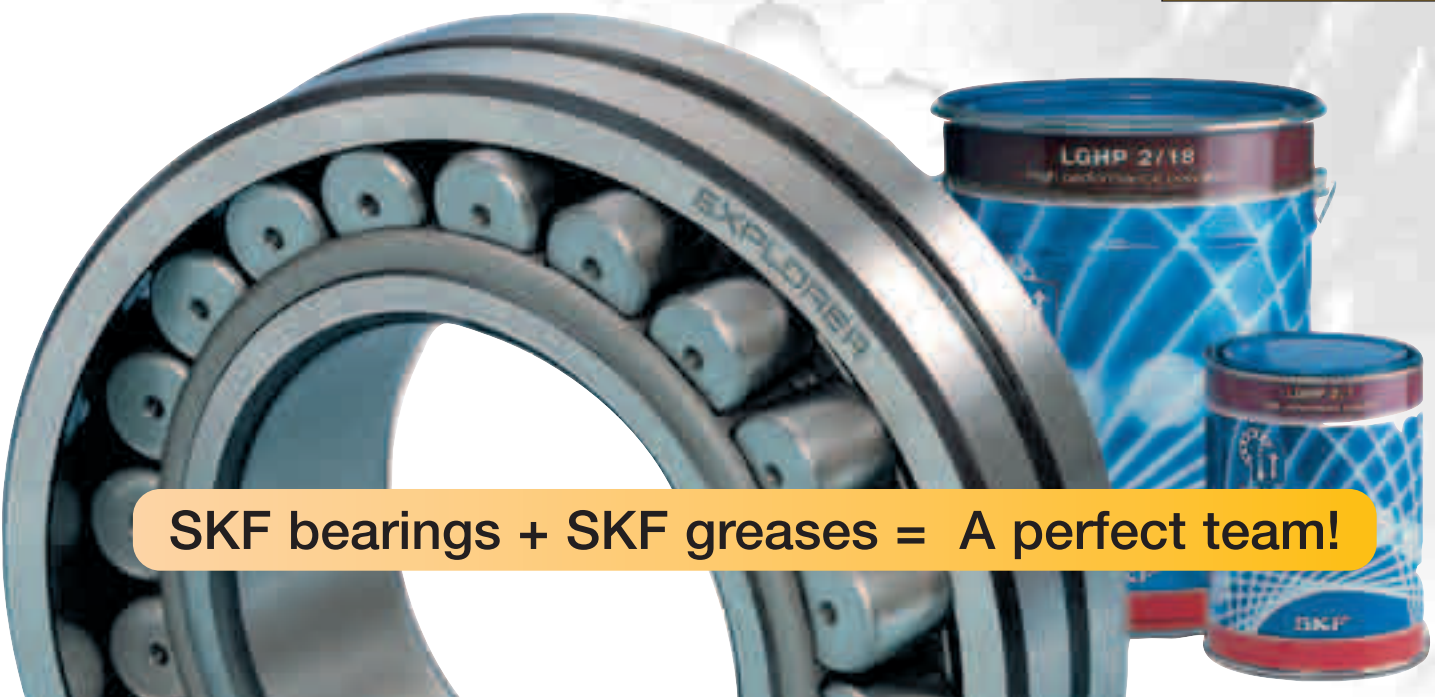
Complete the **LubeSelect** form opposite, return to SKF, and we will provide you with a **free-of-charge** professional bearing grease recommendation.

Plus

If, on receiving our recommendation you spend **£15** or more on the specified **SKF Bearing Grease** we will give you a ***FREE SKF bubble radio**.

Terms and conditions

* To qualify for the free SKF bubble radio a completed LubeSelect form needs to have been received by SKF. Campaign period runs from 1st October to 31st December 2003. Only available to UK and Ireland based customers. Bubble radios are subject to availability, whilst stocks last, and only one per customer. Bubble radios will be sent within 28 days from the date the order is received. SKF reserves the right to offer an alternative gift of equivalent or greater value. Campaign is only applicable to SKF bearing greases, not lubricators or lubrication systems.



SKF bearings + SKF greases = A perfect team!

Simply complete, photocopy and either faxback on 01582 496324 or post (no stamp required) to: SKF (U.K.) Limited, FREEPOST MK 150, Luton LU3 3BR

LubeSelect

Grease selection on application conditions *= Entry required

Application _____ Company _____ Contact person _____ Position _____ Telephone _____ Fax _____ E-mail _____ Address _____ _____ Town _____ County _____ Postcode _____ Date _____	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2"> Dimensions <i>Bearing type*</i> <input type="checkbox"/> Deep groove ball bearing <input type="checkbox"/> Self-aligning ball bearing <input type="checkbox"/> Angular contact ball bearing <input type="checkbox"/> Cylindrical roller bearing <input type="checkbox"/> Needle roller bearing <input type="checkbox"/> Spherical roller bearing <input type="checkbox"/> Taper roller bearing <input type="checkbox"/> CARB bearing <input type="checkbox"/> Y-bearing </td> </tr> <tr> <td style="width: 60%;"> <i>Bearing designation</i> Typical designation _____ Inner diameter d* _____ mm Outer diameter D* _____ mm Bearing width/height _____ mm </td> <td style="width: 40%;"> <i>Load (C/P)*</i> <input type="checkbox"/> Low (>10) <input type="checkbox"/> Medium (5-10) <input type="checkbox"/> High (2-5) <input type="checkbox"/> Very High (<2) </td> </tr> <tr> <td colspan="2"> <i>Filling type*</i> <input type="checkbox"/> Pre-greased <input type="checkbox"/> Relubricated </td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2"> Operating parameters Typical temperature (outer ring)* _____ °C Minimum temperature (start-up) _____ °C Maximum temperature (peak) _____ °C Speed* _____ RPM </td> <td style="width: 30%;"> <i>Shock load*</i> <input type="checkbox"/> No <input type="checkbox"/> Yes </td> </tr> <tr> <td colspan="2"></td> <td> <i>Ambient temperature*</i> <input type="checkbox"/> Less than 35°C <input type="checkbox"/> More than 35°C </td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2"> Special conditions (optional) Vertical shaft <input type="checkbox"/> No <input type="checkbox"/> Yes Oscillating movements 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SKF stops milling around in unplanned downtime

Unplanned downtime on high-speed paper machines cuts into a mill's profitability through both lost production and the diversion of engineering resources to get a machine back up and running. Since installing SKF Reliability Systems condition monitoring technology and equipment, St. Regis, a paper and board manufacturer, has significantly reduced unscheduled stoppages at its Wansbrough Mill in west Somerset.

St. Regis produces nearly one million tonnes of paper every year from six mills. It is the leading supplier of recycled, plain and textured buff envelope papers, coreboard, corrugated casemaking and packaging papers.

The company's Wansbrough Mill, in Watchet, is a converting mill which recycles paper and card and has an annual output of 135,000 tonnes. The mill uses 100% recycled fibres on two machines: Paper Machine One (PM1) is a single-wire machine glazing unit which produces recycled envelope papers and Paper Machine 5 (PM5) is a twin-wire Fourdrinier producing coreboard for packaging.

As with any modern plant, in order to be competitive, the Wansbrough Mill must maintain high levels of productivity. In a continuous, five shift, 24/7 operation this means minimising downtime, particularly unplanned stoppages.

Planned maintenance is scheduled at the plant to take place on a monthly basis. However, before installing an SKF Reliability Systems online condition monitoring surveillance system on its PM5, unplanned stoppages were commonplace.

The previous machine condition monitoring regime relied on operators listening to and observing the machinery and using their experience to identify any problems. This process usually resulted in problems being identified at a late stage, when an immediate unplanned shutdown was often the only suitable solution.

Problems, such as bearing failures, may only have been discovered at the point where the danger of a fire starting was imminent. Loose or badly misaligned rollers were also frequently only discovered when they were already causing damage to the product or were in imminent danger of dislodging and causing a catastrophic failure. This usually resulted in the unplanned replacement of a felt roller or a drying cylinder assembly, which could cause a shutdown of up to six hours.

Previously, at least one felt roll problem necessitated an unplanned shutdown every month.

In June 2000, St. Regis approached SKF to review its condition monitoring and maintenance strategy with the goal of maximising the efficiency of the mill and minimising downtime. On examining the two paper machines, SKF engineers decided to apply two

different strategies.

PM5 consists of a headbox, wire section, three press sections and seven drier sections, plus a calendar and reeler. This machine now has a full SKF online condition monitoring surveillance system incorporating 18 SKF Local Monitoring Units (LMUs), which log and process machine data using 32 channels per LMU and 564 fixed sensors (accelerometers) to monitor the felt rolls, drying cylinders and press rolls. An additional 60 fixed sensors are terminated to switchboxes outside the machine guards.

The sensors convert machine vibrations into a velocity signal which takes the form of a sinusoidal waveform. Different waveforms are indicative of specific problems with bearing wear and fatigue, machine imbalance, misalignment and mechanical looseness. Acceleration values are also derived from the sensor output, as well as an acceleration envelope signature, which is essentially a band passed signal, with the low order and high order frequencies removed. Acceleration enveloping is a special technique unique to SKF condition monitoring tools, which detects the early stages of bearing defects, again with different defects being associated with different frequencies.

The sensor measurements are passed from the networked LMUs to a standard office PC running SKF Reliability Systems proprietary PRISM⁴ software, a Windows-based data management and analysis tool.

SKF PRISM⁴ analyses the incoming signals and converts them into an easy to read, traffic light display for each point, with green representing a normal reading, amber showing an alert condition, which indicates that there may be a problem, and red showing an alarm condition, which may indicate imminent failure. A pull-down menu navigates all the monitored points on PM5. Clicking on any point will perform a spectral analysis of the incoming signal to show a signature plot that can be associated with



the specific type of defect. Any developing problems, indicated by the amber readings, are therefore identified early enough to be dealt with during the next monthly planned maintenance shutdown. Red lights may warrant an immediate action.

Part of SKF Reliability Systems' maintenance and condition monitoring ethos starts with the belief that 50% of all planned maintenance and machine monitoring is unnecessary and therefore wasteful. It is merely carried out as the result of historical methods and low confidence factors. With the real business risks in mind, the condition monitoring regime recommended for PM1 did not need to involve a complete automated system. In producing a much lighter end product than PM5, in the form of recycled envelope paper, the performance demanded from the bearings in the felt rollers and drying cylinders in PM1 was not at the upper end of the bearings' tolerances. Furthermore, the amount of unplanned downtime experienced on the machine did not warrant the expense of a full online condition monitoring system. It was therefore decided to monitor the Machine Glazing Roll on PM1 on a weekly basis with an SKF Microlog portable data collector/analyser which collects, stores, trends and analyses vibration and process data. The readings from the Microlog are processed within SKF PRISM⁴ in the same way as those from PM5.

All the ancillary plant associated with both PM1 and PM5, such as pumps, motors, fans and gearboxes, is monitored using SKF Reliability Systems MARLIN process data collectors/analysers. Each machine is bar-coded to allow a pre-defined set of inspections to be made using touch-screen technology. Shift technicians follow daily machine inspection routes with the MARLINS which provide immediate feedback on troublesome machine conditions. All the collected data is uploaded to a host PC for the review by the mill's engineering team. Any worrying data is followed up with the SKF Microlog which provides a more detailed analysis. As a matter of course, the daily MARLIN routes are also covered on a weekly basis using a Microlog.

The Wansbrough mill is also the first plant in the UK to use @ptitude, the latest advanced asset management tool from SKF. @ptitude provides an industrial decision support system, which helps retain, build and utilise asset information and intellectual

capital. At the Wansbrough Mill, the @ptitude system is in its early stages of development and is currently used with the online surveillance system on PM5. When decisions have to be made as to what actions should be taken, @ptitude provides a structured and automated process, which provides a consistent decision making methodology, to reduce variability and improve efficiency.

Further SKF maintenance tools and equipment now being used at the mill include BeltAlign and ShaftAlign, two laser alignment tools which prevent machine problems occurring as a result of incorrect installation.

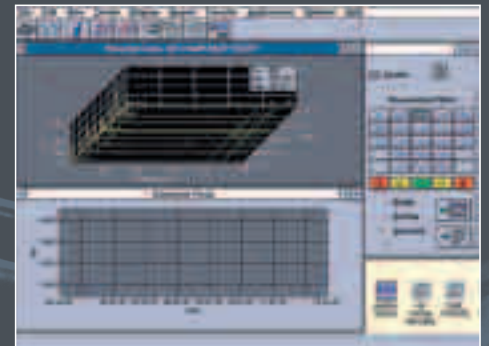
As a result of installing the SKF on-line condition monitoring system and implementing the other condition monitoring and maintenance regimes, the mill has significantly reduced unplanned downtime. On PM5 alone, almost all unplanned mechanical downtime has been eliminated.

As well as improving unplanned downtime, the automatic monitoring system has also helped to improve health and safety at the plant.

Manual handling accidents account for nearly one-quarter of all accidents reported by the paper industry to the government's Health and Safety Executive (HSE). As a result, improvements in condition monitoring techniques, such as the online monitoring system on PM5 have been encouraged by the Paper Federation of Great Britain with the backing of the HSE. With the confidence provided by such automated systems, and the fact that the machine is now heavily guarded, the human instinct to just get a closer look or feel has been removed.

Jason Woodberry, Planning Engineer, has been more than impressed with the savings made by implementing the new SKF Reliability Systems technology. He explained, "We initially went with SKF because of the company's expertise in rotating machinery and we have not been disappointed. It's not only the results that we have achieved that have been impressive. The systems are so easy to use and reliable and we have all been given excellent training in not only using the equipment but in identifying the problems that the spectral analysis shows. The SKF engineers also provided key support with setting the system up which eliminated most problems from the off."

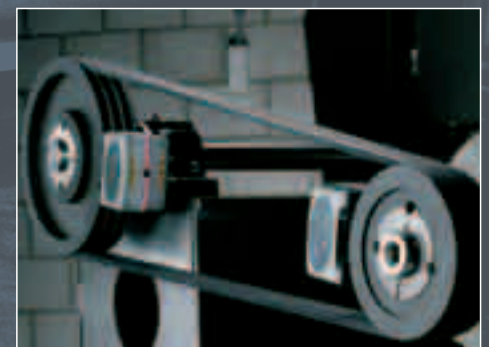
Supporting SKF products



PRISM⁴ software



Microlog data collector/analyser



BeltAlign tool



ShaftAlign tool

All the bearings that are fit to print

The impressive performance of modern printing machines would not be possible without the reliable and precise function of rolling bearings. As the world's leading manufacturer of rolling bearings, SKF has provided ground-breaking, innovative solutions to bearing technology in printing machinery and across these pages we detail a few of the latest innovations.

We cover all the printing industry's needs, including advice on rolling bearing selection and lubrication, together with offering customised solutions for specific application requirements. Furthermore, the pioneering work of SKF, including research and development carried out at the SKF Engineering and Research Centre in The Netherlands, has meant that we have been able to integrate additional functions into the bearing. And, with SKF software allowing the design analysis of complex cylinder bearing systems, we are far and away the market leader for bearing units used in the main cylinders of printing machines.

Today, the bearing is not simply responsible for low friction guidance of the cylinders. It also ensures reliable impression throw-on and throw-off and makes it possible to dispense with bearer rings. Integrated seals are now available and lubrication has been simplified. This significantly

reduces mounting times, the number of components required and the amount of time needed for maintenance tasks. The fact that your costs fall while quality rises should not come as a surprise.

The world's largest manufacturers of printing machinery rely on SKF as a development partner - in Europe, America and Asia. Decades of experience, both in the specialised area of print technology and in other areas of machine construction, protect you from expensive mistakes during the development phase.

PANLOC provides easy mounting for non-locating bearings

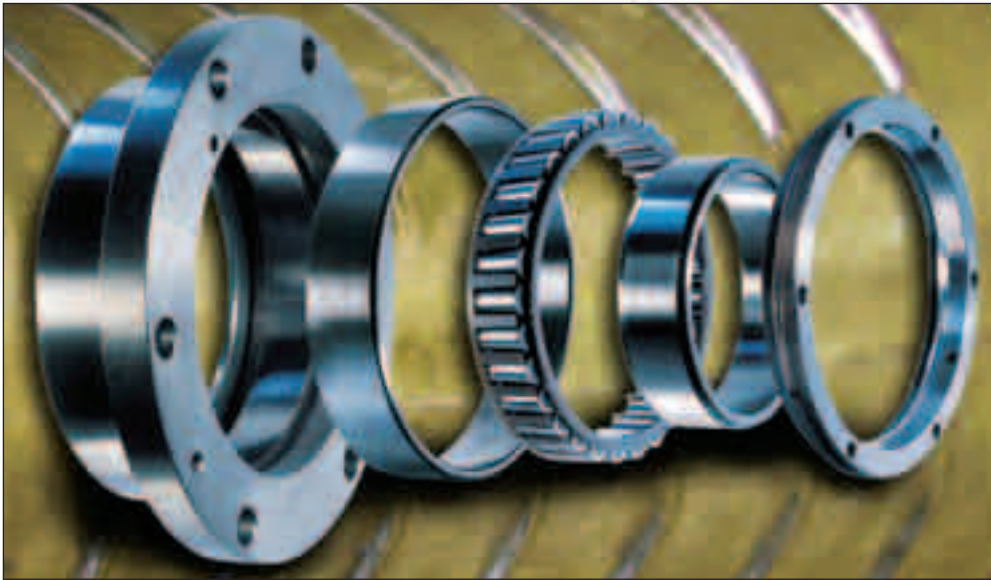
A new bearing unit, called PANLOC (pre-adjustable non-locating bearing unit), will bring greater reliability and efficiency to machines using non-locating bearings. The ability to accurately check preload and clearance makes PANLOC ideal for printing machines, where high quality requires a high positioning accuracy.

Non-locating bearings are generally intended to compensate for temperature extensions of the shaft without frictional resistance. Unlike other non-locating bearings, PANLOC is easy to mount. After mounting, it can then be precisely adjusted to a specified clearance or preload, which is essential for high running accuracy during operation.

The PANLOC bearing unit is supplied as a complete set and is easy to mount. Separate mounting of the inner ring to a cylindrical inference fit simplifies the mounting process and there is no frictional resistance within the bearing during the displacement process. Another key advantage is that PANLOC precisely records the clearance or preload without the use of tapered bores or shafts.



00% Y:100% K:100%



The PANLOC unit consists of:

- A bearing housing adjusted to the application, usually with a flange.
- A flangeless outer ring with slightly tapered raceway which is mounted in the bearing housing.
- A set of taper rollers retained in a cage
- A flangeless inner ring with a cylindrical bore and raceway which can be mounted to the shaft separately from the set of rollers and the housing.
- A shoulder ring designed as an adjusting ring with outside thread, by which the set of taper rollers can be variably adjusted against the slightly tapered raceway in the outer ring to the pre-adjusted clearance or preload, respectively.

SYSTEM 24 generates revenue and improves lubrication

Printing Press Services International (PPSI) manufactures and refurbishes print presses for the global market. The Preston company's strategy is to sell products based on innovation to give it a competitive edge.

As part of this strategy, PPSI required an accurate and automatic lubrication solution for its print presses' print cylinder units (PCUs) to add as a selling feature. Manually lubricating an entire printing press can be a two or three-day operation, so an automatic lubricating system has the attraction of reducing man hours. Such a system also reduces variability and errors in the amount of lubricant used and reduces spillages to almost zero.

PPSI contacted SKF, which presented SYSTEM 24 as the most cost effective



and simple solution. However, standard SYSTEM 24 units were adjudged not to provide the optimum solution. SKF therefore provided a customised version especially for the application.

A more compact 60ml lubricant cartridge, to fit in the limited space available, replaced SYSTEM 24's standard 125ml cartridge and HP2 grease was chosen as the lubricant. The cartridges themselves were also badged especially for PPSI. This new customised SYSTEM 24 now provides a continual supply of fresh lubricant, at a controlled and consistent rate, to the PCUs and is sealed to prevent any contamination.

Fitting the print presses with SYSTEM 24 has not only ensured that the PCU bearings are lubricated in operation but it also supports the company's innovation strategy and generated extra revenue for spares.

The new solution is already being used on printing presses that have been delivered to New York's *'Daily News'* and units have also been retrofitted on presses at *'The Montreal Gazette'*. So far, over a thousand units have been supplied to PPSI.

Industry consultation leads to new printing cylinder bearing units

Following extensive research with leading printing press builders, SKF has developed a new concept for printing cylinders. The new range of printing cylinder bearing units (PCUs) offers increased speed and print quality by combining the separate functions of the traditional bearing arrangement into a compact, self-contained, easily adjustable unit.

The main application of the unit is in facilitating adjustments to the blanket or plate cylinder during printing press operation. It is also suitable for applications where eccentricity is needed, such as in oscillating inking systems.

Several PCU designs will meet differing needs in the printing industry. The basic PCU design comprises multi-row (two, three or four) cylindrical roller bearings, with an outer ring replaced by an eccentric ring. The range includes designs with one or two eccentric intermediate rings.

High precision is obtained through the combination of a cylindrical roller bearing and a preloaded needle roller bearing to provide totally clearance-free units. Reliable eccentric adjustment is assured, as the preloaded needle roller and cage assembly eliminates any risk of jamming and allows the eccentric adjustment mechanism to have a minimum friction torque.

The compact design allows easy mounting and dismounting, and offers high stiffness through the use of essentially stiff bearing designs. The unit has a low operating temperature, created by the low friction present in the cylindrical roller bearing.

SKF Engineering Products Limited Experts in linear motion



Build your own actuators

The modular

CAPR 43 series of actuators recognises that even relatively simple linear motion applications have different mechanical, load or space requirements.

Different motors, stroke lengths, speeds and front or rear attachment can all be easily specified. Positioning accuracy and long service life has been ensured by using a method that detects position directly on the moving nut, thereby keeping moving parts to a minimum and reducing the scope for error.

Revolutionary rotary actuator

The CRAB 05 rotary actuator is a more compact alternative to linear actuators, maintaining high performance integrity while operating with both torque and radial forces. Two interconnected, slim planetary gearboxes develop a final gear ratio of 1:56, which is equal to the difference between them and allows for a high movement ratio. In operation, an equal loading across the planetary gear set ensures any wear will be consistent and even.

CRAB 05 can be used with or without a motor and has a torque rating of up to 100 Nm. The unit has a thickness of just 18mm and the outside diameter is only 90mm.



SKF Engineering Products Limited offers one of the largest ranges of linear motion products on the market, providing solutions for guiding, driving, positioning and actuation systems across many different industries.

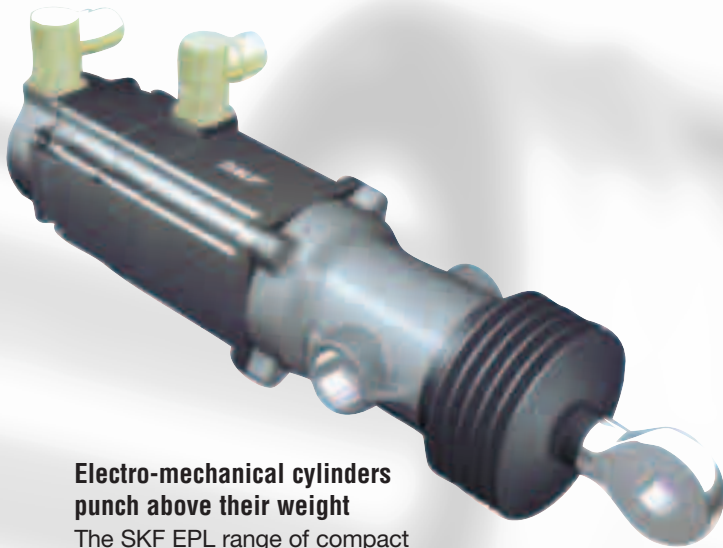
A selection of our product offering is presented here but for more information and products please visit the new SKF Linear Motion website at www.skfepl.co.uk

Advanced linear ball bearings

The LBC series of linear ball bearings gives improved accuracies and load ratings, smoother performance and noise reduction.

The new range includes linear ball bearings with high load carrying capacity and stiffness, together with a broad range of accessories. Options include open, closed and self-aligning linear ball bearings that have lifetime lubrication when equipped with double-lipped seals. In addition, corrosion-resistant linear ball bearings can be supplied for special applications.

The LBC range is 100 percent interchangeable with competitors' products and has already found applications in packaging machines, automatic handling systems, paper processing, printing machines and wood processing.



Electro-mechanical cylinders punch above their weight

The SKF EPL range of compact electro-mechanical cylinders (CEMC) sets a new standard for high performance motion. The cylinders are approximately 40% smaller and much lighter than their standard counterparts and are ideal for both fixed and robot mounted applications.

Inertia is minimised to give excellent control, responsive performance and significantly reduced cycle times which increases productivity. High acceleration, speed, precision, high load and a long life result in high reliability and maximised machine availability.

The cylinders can act as a stand-alone system and operate with a programmable controller. They provide a maintenance free, fully integrated solution with fail safe braking, limit switches, an anti-rotation device and an origin sensor.

New rail guide system provides high flexibility

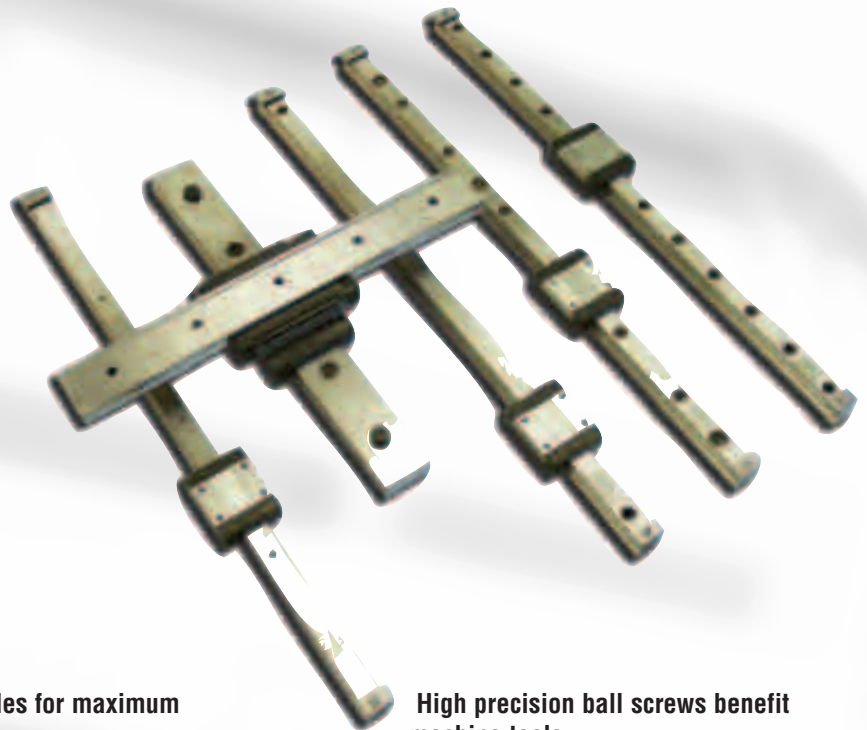
The new 'LLR' rail guide programme is a modular system offering a high degree of standardisation and flexibility. Six relatively flat and two higher carriages are available with or without ball bearings.

Static bearing capacity of between 7.8 and 128.5 kN and dynamic bearing capacity from 6.8 to 90.4 kN combine for high efficiency and facilitate the planning of guiding systems. The carriages are able to operate under the rails as well as on top and the integrated sealing of the carriages,

together with the corrosion protection, gives high machine availability, long life times and low maintenance.

Eight different types of carriage are available in five different sizes.

Rail widths range from 15 to 45mm and system heights from between 24 and 70mm.



Miniature slides for maximum performance

LZM miniature slides offer a high performance solution for linear motion applications which require short strokes coupled with compact boundary dimensions.

The slides deliver high system stiffness and precision guidance, with high running accuracies of up to 2µm, over a stroke of 100mm, delivered with exceptionally smooth motion. The all stainless steel construction and optimised hardness enables high carrying capacity and a long lifespan.

For ease of installation, the LZM slide is a complete slide that can be simply bolted into place, without the use of precision devices to set preloaded parameters. Existing designs can be modified to meet specific technical requirements.

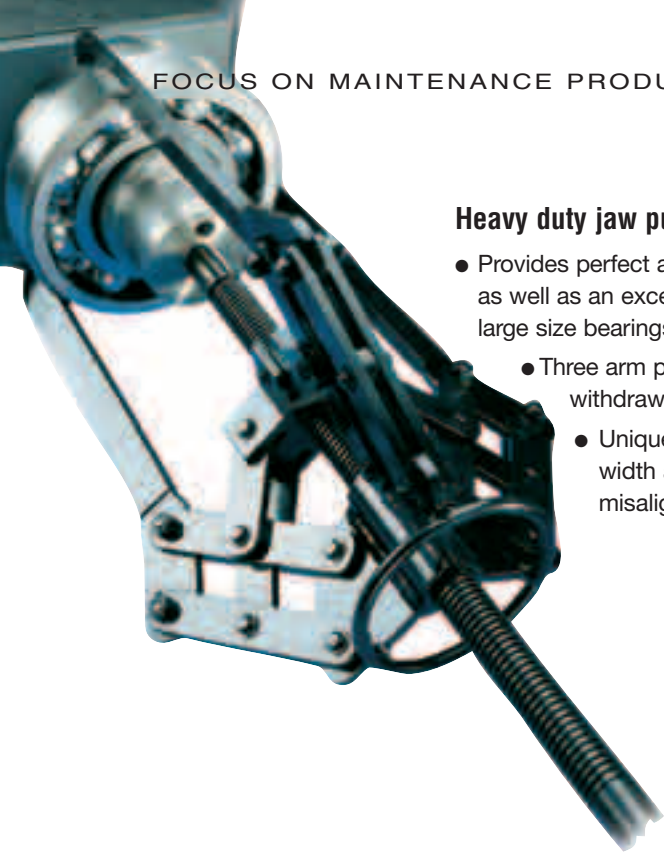
High precision ball screws benefit machine tools

High precision ball screws give high dynamic and static load ratings, high-speed capability, superior axial rigidity and extreme running accuracy, especially in an axial direction.

They will typically be used for high-speed spindles to increase tool performance, accuracy, and service life and easily meet the operating demands of a wide range of machine tool applications, including grinding machines, machining centres, lathes, drilling equipment and milling machines.

Four different versions of the high precision ball screws are available. Complete screw assemblies with machined ends can be manufactured to customer drawings, or screw shafts cut-to-length, with the nut mounted on a sleeve.





Heavy duty jaw pullers, TMMP series

- Provides perfect alignment and shaft protection, as well as an exceptional grip for medium to large size bearings
- Three arm pullers with a maximum withdrawal force of 6 to 15 tonnes
- Unique pantograph system for grip width adjustment that counteracts misalignment during operation

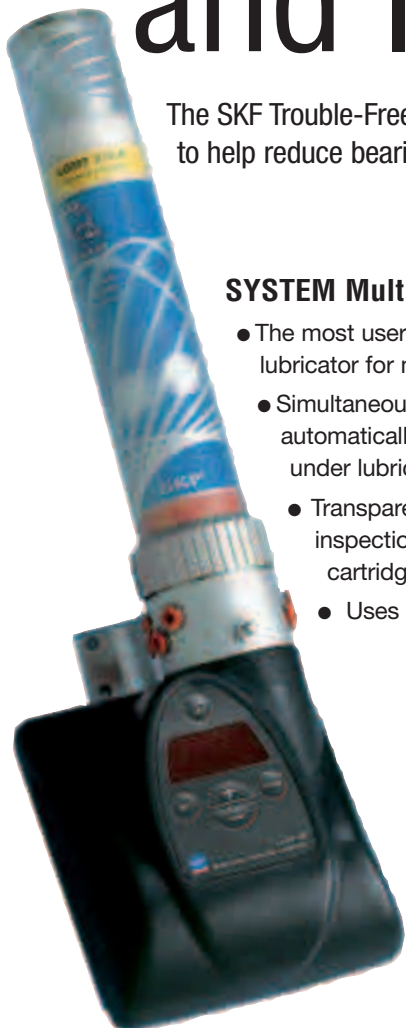


SCORPIO induction heater, TMBH 1

- Lightweight and portable, weighing only 4.5kg
- Suitable for bearings with an inner diameter from 20 to 100mm, with a maximum corresponding weight of 4 to 5kg
- Components are never magnetised
- Also suitable for heating metal components such as gears, pulleys, bushings and shrink rings

Maintenance and lubrication products

The SKF Trouble-Free Operation programme contains a comprehensive range of maintenance-related products designed to help reduce bearing failures, thereby increasing plant performance and profitability.



SYSTEM MultiPoint automatic lubricator, LAGD 400

- The most user-friendly and cost-effective automatic lubricator for multiple grease lubrication points available today
- Simultaneously keeps up to eight lubrication points automatically lubricated, preventing both over and under lubrication
- Transparent cartridge housing allows for easy inspection, with an electronic alarm if the grease cartridge is empty
- Uses standard SKF 420ml grease cartridges



OilCheck monitor, TMEH 1

- Detects and measures the dielectric constant of oil
- Shows changes in oil condition affected by: water content, fuel contamination, metallic content and oxidation
- Hand-held and user-friendly
- Numerical read-out to facilitate trending



Basic condition monitoring package, CMPK series

- Makes basic condition monitoring a simple task for maintenance, operations, reliability and vibration analysis departments
- Choice of two packages, CMPK 200 or 210
- CMVP 40 or 50 vibration pen
- CMIN 400 Inspector 400 ultrasonic probe with headphones
- CMSS 2020 MicroTemp - Noncontact thermometer



Impact spanners, TMFN series

- Designed for safe and easy tightening and loosening of locknuts used to secure and adjust large bearings
- Avoids shaft and nut damage
- Safe and user friendly



The SKF drive-up method

- Accurate axial drive-up of spherical roller bearings mounted on tapered seatings
- Greatly reduces the time taken to mount bearings
- Reduces the use of feeler gauges



Rust inhibitor, LHV1

- Creates a vapour that coats and protects surfaces from corrosion
- Can be added to lubricating oil to improve corrosion protection
- Suitable for use on external components where a tacky film is acceptable
- Optimal corrosion protection in outdoor environments (up to 24 months)



Bearing fitting tools, TMFT series

- Two kit combinations for bearings with bore diameters from 10 to 50mm
- Individually packed rings and sleeves for special requirements
- Special design sleeve head for even force distribution around ring
- Eliminates impact damage to the bearing
- Can also be used to mount bushings, seals, pulleys, etc.



Low cost velocity transmission

SKF Reliability Systems has developed a new, low cost velocity transmitter, which provides continuous condition monitoring. The Machine Condition Transmitter (MCT) provides vital information on bearing performance, helping engineers maximise machine up time by planning maintenance more effectively. The MCT is available as a basic model or as a stand-alone monitor. The basic model provides a sensor input, buffered BNC and screw-terminal outputs and a 4-20mA output suitable for direct connection to a process control system. The monitor option offers an alarm module front panel, a trip-multiply function, two alarm relays and one transducer relay.

The MCT has the capability to convert part of the wide-band input signal to a signal that is proportional to the value of the velocity signal. It can be tailored to specific applications due to having both factory set and user selectable configuration options. The design uses Surface Mount Technology (SMT), ensuring a compact unit.

Customers gets improved BeltAlign tool



After customer feedback, SKF has made design improvements to the popular precision laser tool, BeltAlign, which ensures the perfect alignment of belts and pulleys. The new version, BeltAlign TMEB 2, provides a more user-friendly interface than the previous version and improved manufacturing methods have enabled a 35% reduction in price.

The BeltAlign devices fit within the pulley grooves as greater accuracy can be obtained by placing them exactly where the belt runs. Moreover, this method ensures accurate alignment even when the pulleys are of different diameter or width. Traditionally, belt arrangements are aligned using trial and error adjustments, or one of the mechanical tools that enable the face or edge of the pulley to be aligned. However, neither of these methods is satisfactory for modern, high-speed

precision machinery where misaligned pulleys and belts account for premature damage to both the belts and the bearings.

V-guides and powerful magnets allow BeltAlign to be fitted in the grooves of the pulley. With only two components, a laser-emitting unit and a receiver unit, the BeltAlign is easy and fast to attach. The three-dimensional target area on the receiver unit allows the easy detection of misalignment as well as its nature; for instance whether it is horizontal, vertical, parallel or a combination of all three. Armed with this precise information, the operator can quickly make adjustments until the laser line corresponds to the reference line on the receiver unit.

The BeltAlign tool is powered by two AA size batteries and is packed in its own rugged carrying case for easy portability.



New thermometer gets hot hot hot

The SKF TMDT 1300 portable, dual channel, digital thermometer, now provides high accuracy temperature measurement from -50 to 1300°C (-58 to 1999°F).

Accurate to within 1% at 1300°C, and with a large, easy-to-read display, it is an ideal instrument for use in many industrial maintenance and condition monitoring applications.

The dual channel function allows the simultaneous connection of two measuring probes and can show the difference between temperature 1 and temperature 2,

in °C or °F. In addition, the TMDT 1300 has a hold maximum temperature function and an analogue output for data logging, or for use with a temperature recorder.

A flexible rubber sleeve protects the housing and electronics against impact, and a retractable support allows the thermometer to stand-alone while measurements are taken. A standard surface probe is supplied, but the TMDT 1300 can also be used with all K-type probes from SKF.

The latest catalogues for engineering professionals

On this page you'll find some of the latest brochures and catalogues available from SKF. To receive your own personal copies simply complete the relevant section of the Reader Reply Service on the inside back cover and return to SKF.


■ Angular contact ball bearings



A 44-page catalogue containing information on the recently launched range of SKF Explorer angular contact ball bearings, which provides three times longer life over current standards.

Ref. 5105 E

■ Maintenance and lubrication products



A 124-page catalogue detailing SKF Maintenance and Lubrication products. This includes mechanical tools, heaters, instruments, lubricants, lubricators and oil power. Advice on correct bearing mounting and dismantling techniques is also shown.

Ref. MP3000 E


■ Sealing solution for rolling bearings



This 76-page catalogue provides details on the full range of NILOS-Rings. These are a simple and space-saving sealing solution for rolling bearings.

Ref. Z145


■ Linear guide handbook



A 98-page handbook providing an overview of SKF's range of linear guidance systems and their principles of selection. Products include linear ball and plain bearings, and profile and precision rail guides.

Ref. 4185 E/V


■ SNL plummer block housings



A 84-page catalogue outlining SKF's extensive range of SNL split plummer block bearing housings. These housings are mainly intended for self-aligning ball bearings, spherical roller bearings and CARB toroidal roller bearings.

Ref. 4403/III E

■ Bearings for extreme temperatures



A 24-page catalogue detailing SKF's range of deep groove ball bearings for extreme operating conditions. Applications include baking ovens, kiln trucks, tunnel and chain grate furnaces.

Ref. 4402/111 E

■ Bearing failures and their causes



This 44-page technical brochure provides information on rolling bearing failures and their causes. Types of damage includes wear, indentations, smearing surface distress, corrosion and electric current damage.

Ref. PI 401 E


■ Sealing arrangement design guide



A 32-page brochure providing information on correct seal selection for any given bearing arrangement. Includes bearing damage - a sign of sealing problems, seal selection and installation, repairing worn shafts and seal maintenance.

Ref. 4293/I E

■ Bushings



A 48-page catalogue detailing SKF's range of bushings which include solid, and wrapped bronze, PTFE, POM and stainless, backed composites, PTFE polyamide and filament wound.

Ref. 4741 E


■ Repair for seal worn shafts



A 36-page brochure providing details of CR SPEEDI-SLEEVE, a thin-walled sleeve which repairs seal worn shafts, eliminating the costly process of shaft dismantling and re-grinding.

Ref. 5149 E

■ Bearings in electric motors



This 128-page catalogue gives full guidance on bearing selection when repairing electric motors, correct mounting and maintenance procedures, together with bearing failure analysis.

Ref. 4873 E

Added-value solutions from SKF

Like a finely balanced ecosystem SKF offers a complimentary range of products, systems and solutions designed to maximise your overall plant efficiency and profitability.

- Ball and roller bearings
- Spherical plain bearings, rod ends and bushings
- Slewing bearings
- Speciality and precision bearings
- Seals and wear sleeves
- Bearing housings and accessories
- Housed bearing units
- Maintenance tools and services
- Lubricants and lubricators
- Condition monitoring solutions
- Refurbishment services
- Engineering solutions
- Training programmes

For further information call: 01582 490049 or visit www.skf.co.uk



Reader reply service

SKF, as the leading global supplier of products, customer solutions and services in the rolling bearing and seals business, prides itself on offering in-depth technical advice. So, for further information on any of the articles featured in this edition of FOCUS simply tick the relevant box(es) below and return to:

Stanley Hodgson, Marketing Department, SKF (U.K.) Limited, FREEPOST MK1540, Luton LU3 3BR

Products, systems and solutions

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For further information and/or to enter the competition please enter your details below (BLOCK CAPITALS PLEASE):

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No. of employees: 1-25 26-100 101-500 Over 500

Bearing spend: Up to £1K £1K-£5K £5-£10K Over £10K

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Type of business: _____

No. of employees: 1-25 26-100 101-500 Over 500

Bearing spend: Up to £1K £1K-£5K £5-£10K Over £10K

SKF®

Win a Philips portable television

Spot the difference: circle the eight differences on the right hand picture for your chance to win one of the prizes below.



1st Prize

To enter, please send this page with your details entered on the form overleaf by 31st October 2003.

to: **Stanley Hodgson, Marketing Department**
SKF (U.K.) Limited
FREEPOST MK1540, Luton LU3 3BR

As well as the first prize of a Philips portable television, five Cross ION ink gel pens and ten SKF baseball caps are also up for grabs.

Competition Winners - FOCUS 64

First prize of a Philips video player goes to:
 Mark Davies - Corus

Five, second prize winners each receive a rucksack:
 M. W. Collings - Mixing Solutions Ltd., P. Shaw - Emmark UK Ltd.,
 John M. Curtis - Allen Gears, Dawn Naisbitt - Emerson & Renwick,
 George Rogers - Smurfit Paper Mills

Ten, third prize winners each receive an SKF polo shirt:
 Sandra Stevens - Criptic Arvis, Simon Reynolds - Bridgewater Paper Company,
 Heidi Cockerton - Melles Griot Ltd., Graham Bastow - Mastenbroek Ltd.,
 Karen Camplin - Croda Chemicals Europe Ltd., Frank Robinson - Westwell
 Developments, M. O. McIntosh - Corus, J. D. Smith - Smithech Engineering Ltd.,
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2nd Prize



3rd Prize