Robust lubrication solutions working all day, every day

SKF and Lincoln automatic lubrication systems for the metals industry

The Power of Knowledge Engineering

Metal production processes around the world operate more reliably and efficiently because of SKF and Lincoln automatic lubrication systems, both upstream and downstream. SKF has the right lubrication solution for critical components.

SKF and Lincoln have joined forces to provide the world's most complete portfolio of lubrication solutions, from manual lubricators to the most advanced centralized and automatic lubrication systems on the market. Together, we provide a full range of lubrication tools and expert services, from turnkey design and installation to testing and training.

Drawing on more than 200 years of combined lubrication management experience, we can help you improve machine reliability, reduce maintenance costs, improve productivity, enhance safety and optimize manpower resources.

Two leading brands. One global resource.

Leveraging our combined knowledge of lubrication

Why choose SKF and Lincoln lubrication systems? In a word, experience. We have drawn upon our combined knowledge of lubrication to develop efficient automatic lubrication systems tailored specifically for the requirements of the metals industry.

Utilizing our expertise in bearings, seals, mechatronics, lubrication systems and services, SKF offers complete solutions to increase productivity, reduce unplanned downtime and extend machine service life, as well as minimize energy use and costs.

When it comes to equipping metal making, continuous casting or rolling mill processes with high-quality components and rugged lubrication system solutions, SKF is the ideal partner.

With the combination of Lincoln and SKF lubrication portfolios and capabilities, you now have one resource for best-in-class lubrication services and advanced automatic lubrication systems. Representing both brands, your local distributor maintains a broad lubrication product offering and is prepared to provide installation or service as needed. In addition, local market specialists are available to share expertise and support based on specific applications.

Smooth integration from the very start

Meeting the lubrication challenges of the metals industry is no small task. However, with more than 50 years of industry experience, SKF offers advanced technological solutions for every stage.

At SKF, service begins as soon as the project does. SKF Lubrication Management defines a structured process to help you build a strong lubrication programme. Our state-of-the-art analytical tools enable condition and suitability testing of lubricants to help you operate your systems reliably. Also, our engineering data can be integrated seamlessly into your documentation.

Customer orders are implemented by experienced, specially trained application engineers to ensure that your system meets your specific needs. Also, when it comes to roller bearings, we can interpret lubricant selection and re-lubrication in collaboration with SKF bearing experts.

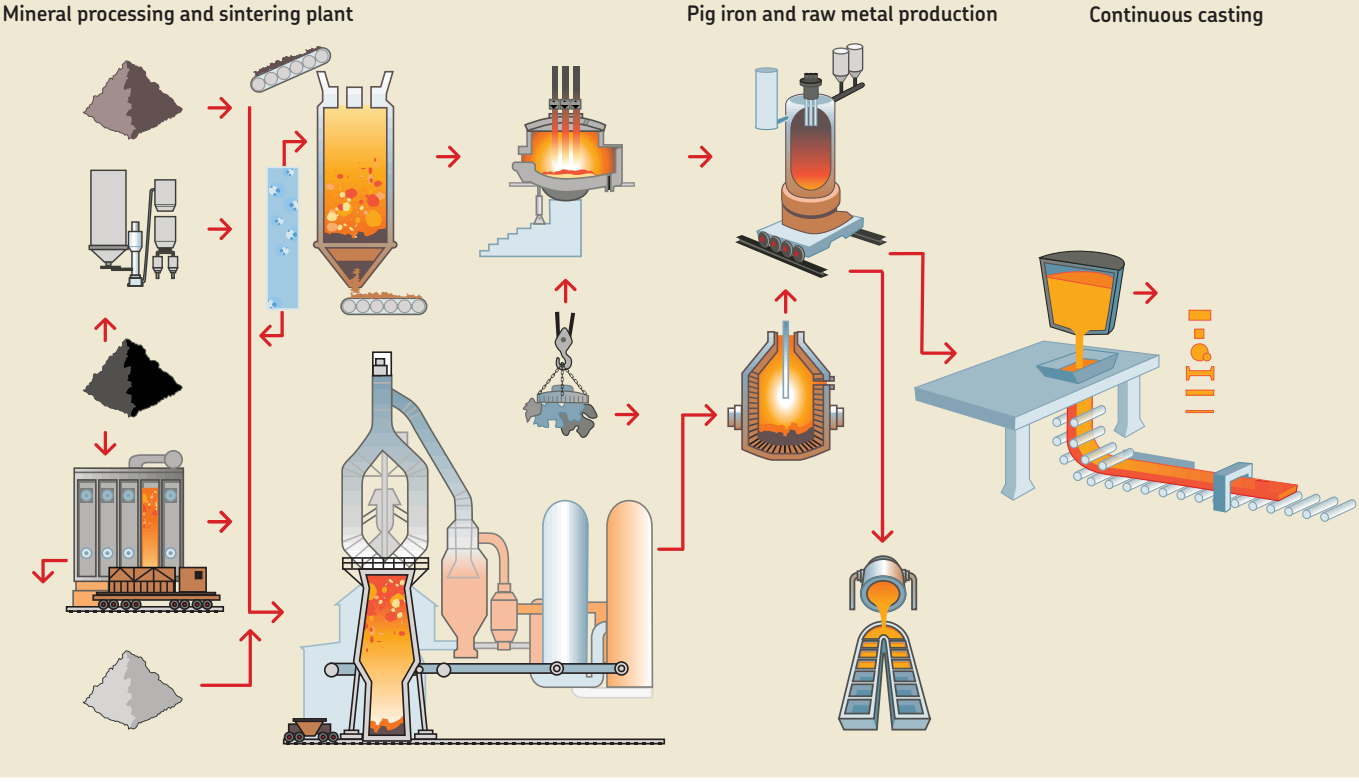
SKF and Lincoln – A powerful formula for reliability:

- **Superior product innovation:**
  The broadest and most advanced lubrication offering in the industry
- **Unequalled global support:**
  Two teams of lubrication experts join forces
- **World-class installation support:**
  The combined expertise to install the right solution

To explore our solutions, visit **skf.com/TheFormula**

Solutions for challenging applications

Friction and wear occur across the entire delivery chain. Efficient lubrication is critical for each individual area using rotating machine components. Upstream or downstream, SKF supports you in every phase by providing automatic lubrication systems that are tailored to the specific characteristics of the job.



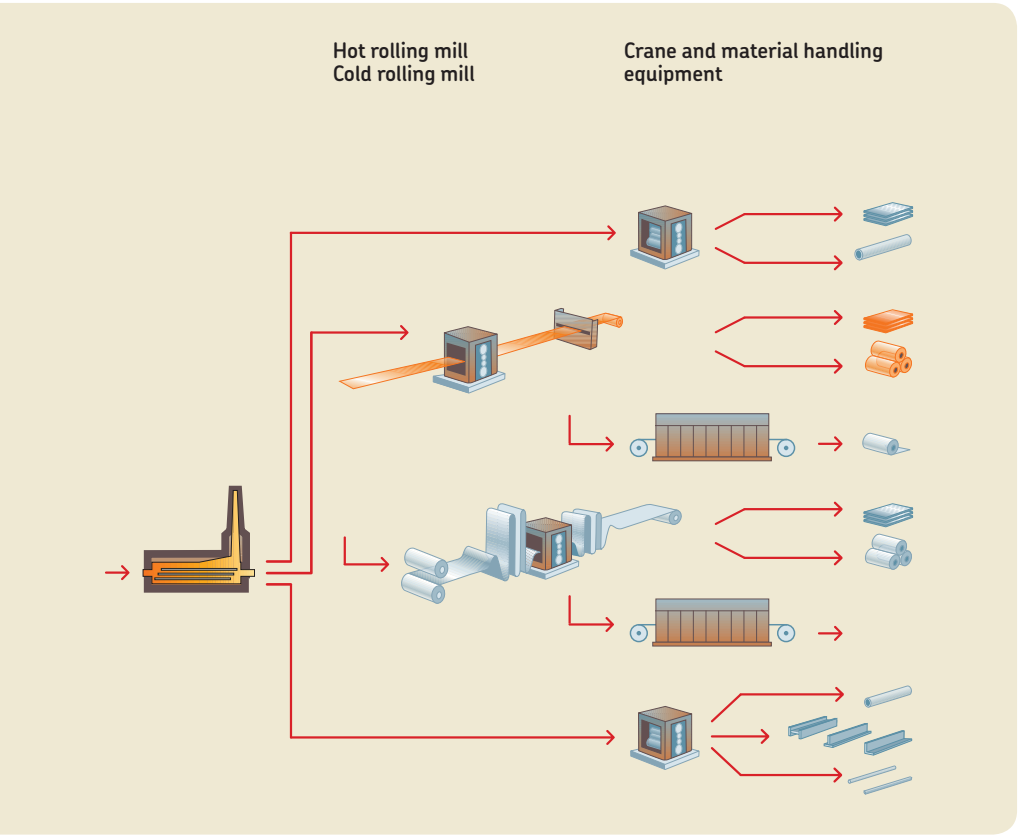
Increasing demands

Few industries experience the extreme operating conditions found in steel and other metal mills – temperature, speed, high and constant shock loads, abrasive dust, aggressive chemicals and high humidity. Combined, these conditions degrade equipment, cause unplanned downtime and make effective maintenance difficult at best.

SKF solutions can help

With expertise in bearings and units, seals, lubrication systems, mechatronics and services, SKF offers unique system solutions for upstream and downstream applications.

Our advanced tools and technologies include SKF Life Cycle Management – a proven approach to reduce total cost of ownership for machinery at every stage, from specification and design to operation and maintenance.



World-class lubrication programme

The SKF Lubrication Management programme helps prevent the most frequent failure modes occurring in an industrial plant related to lubricant contamination, chemical degradation or cross contamination.

Important benefits of a world-class lubrication programme include cost savings related to downtime, spares, man hours, overtime labour and energy consumption.

The right lubrication system for your needs

Lubrication system components have been tailored to the industry and help to ensure that processing operations run properly. Using the right lubricant is just as important as having a reliable lubrication system.

SKF offers the world's most complete portfolio of reliable lubrication solutions for all applications in the metal industry. This broad product line includes both oil- and grease-based automatic lubrication systems, as well as high-performance lubricants.

Maximize machinery and equipment dependability, minimize maintenance tasks and costs

Because the metals industry is one of the most demanding and challenging, efficiency and safety are key. Automatic lubrication systems can help equipment and machines run longer with fewer interruptions and require fewer manual touches, reducing the possibility of accidents.

In addition to helping increase reliability and availability, the systems help to extend service life, reduce operational and lubricant costs and minimize environmental impact by avoiding over-lubrication.

Maximize availability

Precise automatic lubrication provides a significant benefit for operators. Reliably delivering lubricant from a central source to all of the connected friction points, SKF and Lincoln automatic lubrication systems help prevent bearing damage and unscheduled equipment downtime, while optimizing manpower resources.

Reduce operating costs

Utilizing high-quality SKF and Lincoln automatic lubrication systems pays off in many ways. When a system is installed, the lubricated equipment will operate virtually maintenance free, reducing total cost of production and operation. Automatic lubrication can reduce lubricant consumption significantly and is much cleaner than manual lubrication, resulting in less lubricant to affect the environment.

Operational benefits

- **Reduces unplanned downtime and production interruptions**
- **Increases reliability**
- **Improves profitability**

Maintenance benefits

- **Reduces labour costs**
- **Extends repair and maintenance intervals**
- **Eliminates over- and under-lubrication**
- **Reduce parts replacement and spare parts inventory**

Safety benefits

- **Increases worker safety by eliminating manual lubrication of difficult-to-access points or of points in demanding areas**
- **Fewer accidents**

Environmental benefits

- **Minimizes environmental impact by avoiding over-lubrication**

All of this means increased production uptime and improved operations.

A complete portfolio of lubrication solutions to improve system reliability

Automatic lubrication systems

Like any mechanical system, moving parts in a metal-producing plant need proper lubrication to function optimally. High mechanical loads, contamination, moisture, high temperatures and humidity are all threats to bearing and gear service life.

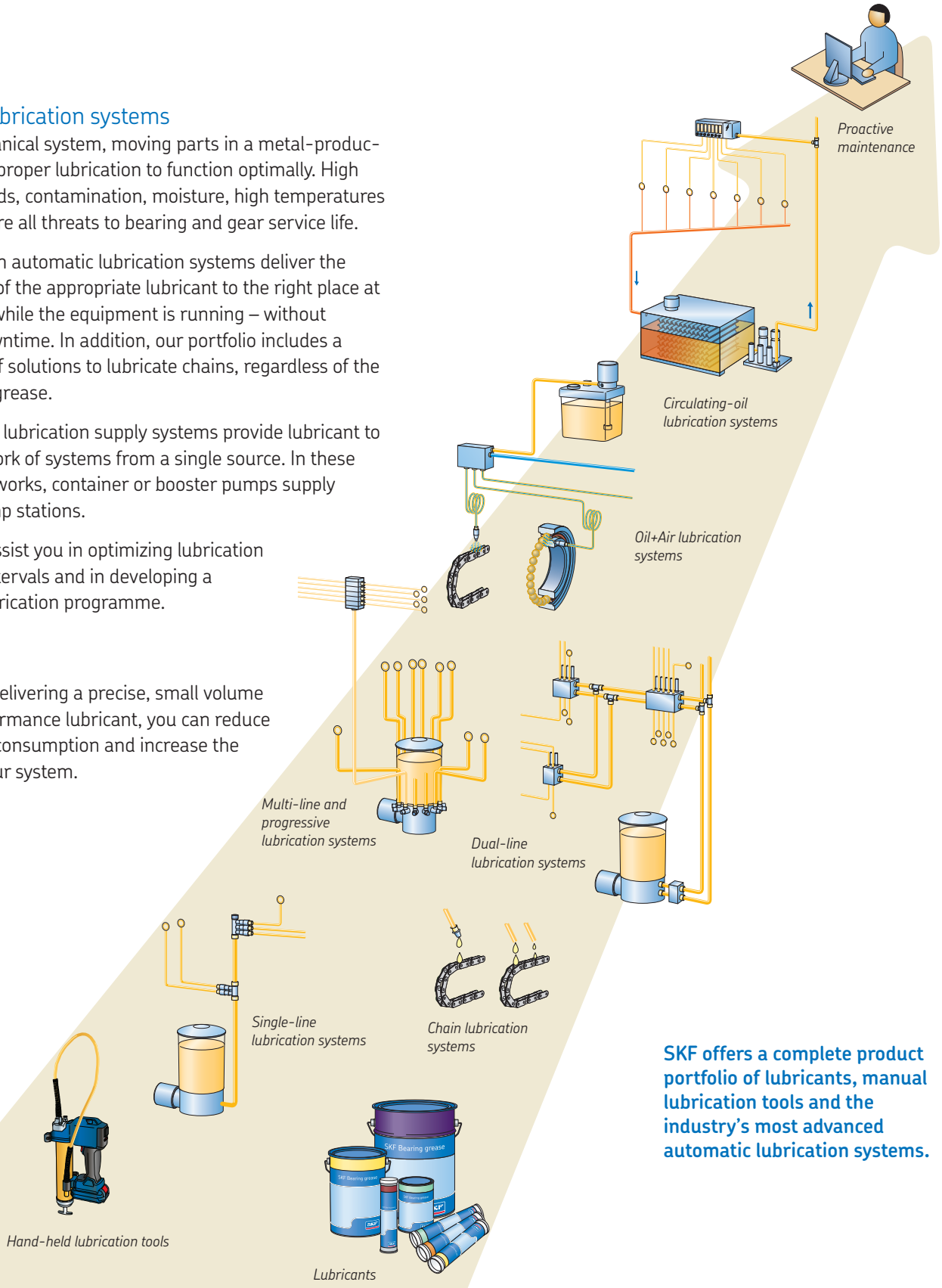
SKF and Lincoln automatic lubrication systems deliver the exact quantity of the appropriate lubricant to the right place at the right time while the equipment is running – without production downtime. In addition, our portfolio includes a broad variety of solutions to lubricate chains, regardless of the need for oil or grease.

Complete plant lubrication supply systems provide lubricant to an entire network of systems from a single source. In these lubrication networks, container or booster pumps supply secondary pump stations.

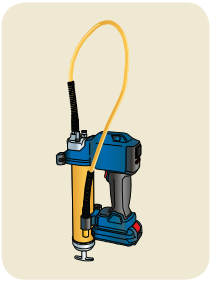
SKF also can assist you in optimizing lubrication settings and intervals and in developing a customized lubrication programme.

Lubricants

By frequently delivering a precise, small volume of a high-performance lubricant, you can reduce your lubricant consumption and increase the reliability of your system.



SKF offers a complete product portfolio of lubricants, manual lubrication tools and the industry's most advanced automatic lubrication systems.



Hand-held, battery-operated lubrication tools

Lincoln's offering of manual lubrication tools is designed with power and performance in mind. Lincoln's PowerLuber family provides the most extensive offering of battery-operated lubrication tools.

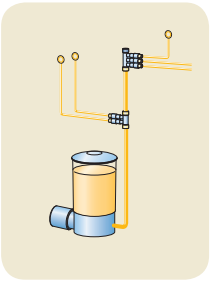
Advantages:

- **Provides easy, point-by-point lubrication**
- **Improves safety**
- **14-, 18- and 20-volt options, also with Li-Ion batteries**
- **Wide range of pressure and volumes, better control of lubricant volume***

Applications:

- **All applications where manual lubrication has to be utilized**

* Compared to traditional manual lubrication tools



Single-line lubrication systems

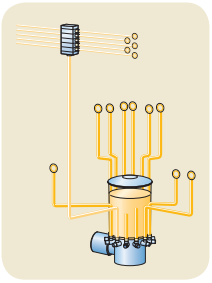
In Lincoln CentroMatic single-line lubrication systems, a pump feeds the lubricant via the main line to the lubricant metering devices, where it is metered and fed to the lubrication points. The individual lubricant requirements for each lubrication point can be adjusted.

Advantages:

- **Cost-effective**
- **Easy to understand, install and maintain**
- **Simple to adjust and expand**
- **Easy to monitor**
- **Lubricates small and large bearings at the same time; small local systems or scaled systems for a complete production line**

Applications:

- **Transport bogies**
- **Cranes**
- **Bearings of roller tables (short line)**
- **Wire rope mills**
- **Blust furnaces (lower seal valve/lower material gates)**
- **Edger mills**
- **Roughing mills**



Progressive and multi-line lubrication systems

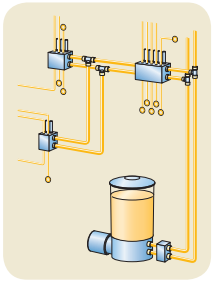
In SKF ProFlex and Multi-Flex or Lincoln Quicklub progressive automatic lubrication systems, a piston pump supplies a defined amount of lubricant through the main line to the metering device that serves each outlet.

Advantages:

- **Delivers frequent and measured amounts of grease to each lubrication point – preset lubrication volumes keep field adjustments to a minimum**
- **Cost effective for smaller lubrication systems**
- **Easy system monitoring and simple blockage control**

Applications:

- **Owen fans**
- **Transport bogies**
- **Cranes, also overhead cranes and trolleys**
- **Ladle turrets of continuous casting systems**
- **Pivots and controls**



Dual-line lubrication systems

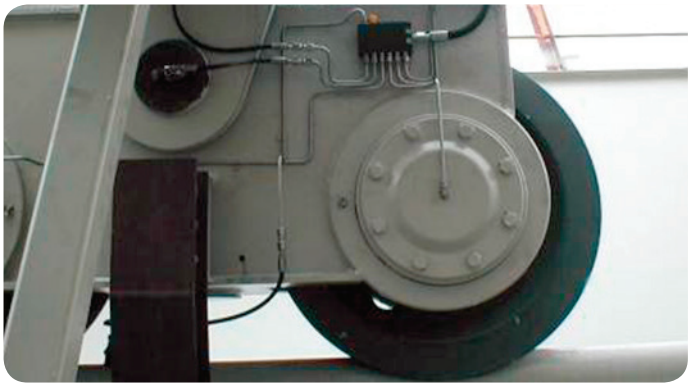
SKF dual-line systems, including SKF DuoFlex and Lincoln Helios, utilize two main lines that are supplied alternately with lubricant. These systems are ideal for applications with many lubrication points over long distances in harsh environmental conditions.

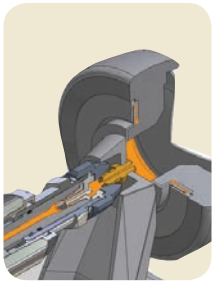
Advantages:

- **Very reliable when using high-viscosity greases**
- **Flexibility in adjusting metered quantity**
- **Parallel metering device setup enables simple system design**
- **Easy to monitor**

Applications:

- **Coilers**
- **Cold rolling stands**
- **Skin passes**
- **Finishing lines**
- **Continuous casting plants**
- **Roller tables**





Grease injecting lubrication systems for chains

Chains and conveyors of a certain size need special treatment. The SKF GVP system and the Lincoln COBRA line inject the grease under pressure directly into the chain pins and/or rollers while the chain is moving. Both systems use grease up to NLGI class 2, and the COBRA system also is suitable for oil. The GVP system features the AEP2-GV programmable control and monitoring unit, including Visiolub Analysis and SKF Visiolub monitoring software. COBRA systems offer visual monitoring via indicator pins.

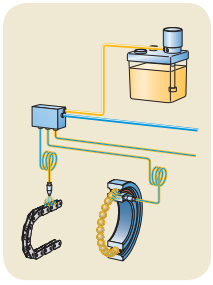
In addition to grease injection systems, SKF also offers oil lubrication systems to lubricate chains and conveyers using pipes, brushes or spraying devices.

Advantages:

- **Lubricant injected under pressure directly into the lubrication point**
- **Load subjected to the chain is substantially lower, reducing energy consumption**
- **Lubricates rollers while in operation**
- **Extends component life and productivity**

Applications:

- **Roller, rivetless, power-and-free, and scraper chains**
- **Coil conveyer belts**
- **Slab transports**



Oil and air lubrication systems

In Lincoln's oil and air lubrication systems for the metals industry, a pump or progressive metering device injects a small, metered amount of oil into a mixing valve. The oil is drawn into streaks in a lubrication line by a continuous air flow (compressed air) and is transported in the direction of the compressed air flow along the tube wall to the lubrication point, where it provides the bearing with a continuous stream of oil and air.

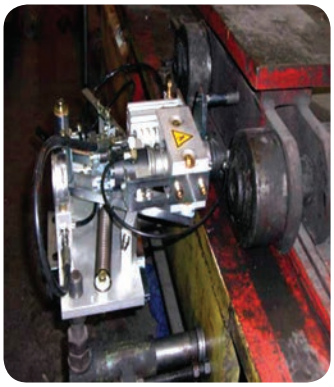
Product lines that support up to four lubrication points from a single inlet or are mounted to the component via bores directly in the housing or axis are part of the portfolio as well.

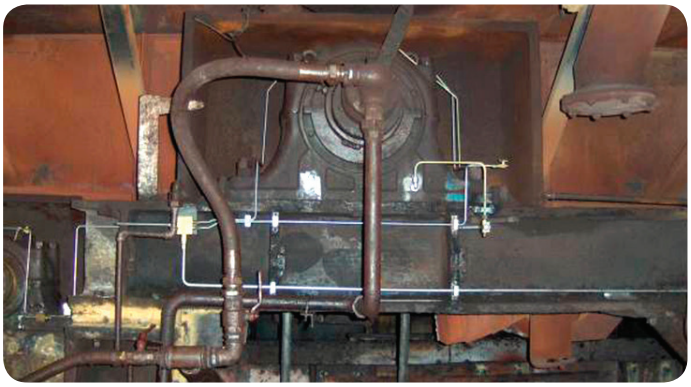
Advantages:

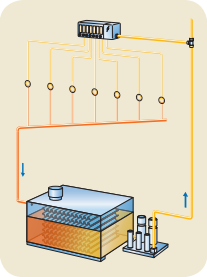
- **Provides a continuous, finely metered oil flow**
- **Protects sensitive bearings from dirt**
- **Does not create oil mist or oil fog**
- **Reduces lubricant consumption rates**
- **Lubricates and cools bearings at the same time**

Applications:

- **Bearings in rolling mills or straighteners**
- **Rollers and roller inserts in continuous casting**
- **Metering rolls**







Oil circulating lubrication

SKF CircOil lubrication systems circulate oil to lubricate and cool bearings at the same time. They also efficiently remove dirt, water and air particles.

An oil supply system delivers the lubricant to the metering devices with individual settings, and the feed rates can be controlled visually or electronically.

SKF CircOil systems include a wide range of customized turnkey solutions. All are simple to service and feature a modular design that can be expanded easily.

Advantages:

- **Lubricates and cools bearings at the same time**
- **Patented air-removal design prolongs oil life**
- **Precise flow meter**
- **One-third the reservoir lubrication volume compared to conventional systems; provides cost savings for oil storage, filling and replacing**

Applications:

- **Ideal for high-speed applications and applications with a temperature of more than 80 °C (*176 °F*) inside and outside the bearing**
- **Converter gears**
- **Rolling-stand drive gearboxes**
- **Pinions**
- **Back-up roll sleeve bearings**

Comprehensive range of lubrication components

SKF offers a comprehensive range of high-quality lubrication pumps, metering devices, control and monitoring units and all necessary accessories for your specific lubrication solution. Individual components are coated for protection against corrosion and combined with stainless steel for durability. Explosion-approved and class-certified components are available upon request.

Lubrication pumps

Certain criteria, such as ambient conditions, required delivery rates, lubricant used and service intervals, determine which lubrication pump should be selected. These pumps are available with varying control and monitoring options.

SKF's portfolio includes mechanically, electrically, hydraulically and pneumatically driven pumps. These pumps feature weather-resistant housings, and saltwater-resistant versions also are available. Operating efficiently in low working temperatures, these pumps are suitable for oil and standard greases up to NLGI Grade 2. In addition, certain pumps are appropriate for NLGI Grade 3 grease.

Our offering ranges from single-point automatic lubricators and pump units with integrated grease reservoirs for single-, dual- or multi-line lubrication systems to tailored pumps for circulating oil systems.

Lubricant metering devices

Depending on the type of lubrication system selected, specific metering devices are required. All metering devices feature high-precision components and are available in versions suitable for various climates and pressures. System operation can be verified easily through electronic or visual monitoring.

The SKF offering is completed by additional system components including spray nozzles and lubricating pinions for open-gear lubrication.

Grease lubrication components

Monitoring

Monitoring and control are essential to the efficient operation of a lubrication system. When installed in conjunction with intelligent monitoring devices, an automatic lubrication system can facilitate economical and optimal lubrication.

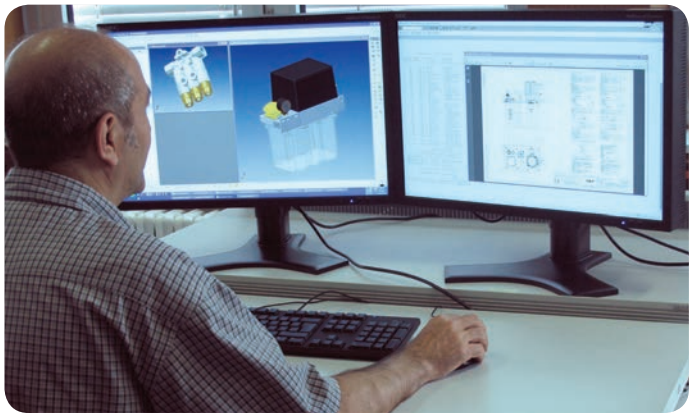
With the instruments we provide, you have access to all values important for controlling your system – temperature, pressure, volumetric flow or fill level – whether through visual monitoring or by utilizing digital or analog signals.

SKF has developed many of our products specifically for use in potentially explosive atmospheres. We meet requirements including the European Union Directive 94/9/EC. To comply with this so-called "ATEX" Directive, we follow both the requirements for electrical and non-electrical equipment according to the related EN standards. Furthermore, we can provide some products in which all electrical parts have IECEx certification.

Most products are available for explosion group IIC/IIIC (flammable vapors and gases) and equipment protection level (EPL) Gb/Db (see IEC / EN 60079-0).

Oil lubrication components

Service solutions from SKF



Design in 3-D and electronic CAD product catalogue

3-D CAD data is available in native format in the online product catalogue, which is based on the eCATALOGsolutions technology by CADENAS GmbH. You can configure your products online from the centralized lubrication area and integrate them into your design process free of charge. You can integrate the CAD data seamlessly into your layout plans. The SKF LubCAD app allows you to use the SKF CAD download portal for lubrication systems with its full functionality for your mobile devices.

Access our online catalogue at
http://skf-lubrication.partcommunity.com

Retrofitting centralized lubrication systems

Maintenance and repair costs during system downtime quickly can become unwieldy. That is why we offer on-site professional retrofitting of centralized lubrication systems at your location. We also can assume responsibility for maintenance and repair during ongoing operations.

In addition, our portfolio includes other solutions that can simplify maintenance for you, from electric refilling pumps to appropriate fittings and accessories.

SKF Lubrication Management programme

A lubrication management programme can be defined as the sum of all the activities performed in a given facility to help ensure the right lubricant is provided in the right quantity to the right point at the right time with the right method.

The programme defines a structured process comprised of five major steps: SKF Client Needs Analysis; SKF Lubrication Audit; improvement proposal, design and implementation; and optimisation.

Global experience, global support

More than 200 years of combined SKF and Lincoln experience

SKF has served the metals industry since its inception and offers deep knowledge of its complicated mechanical interrelationships. By uniting the worldwide experience, portfolios and distribution networks of the SKF and Lincoln brands, we offer the industry's most complete range of lubrication solutions across the globe.

Whatever the size or design of your plant, SKF has the products and resources to help you increase bearing life, machine uptime and safety, while minimizing manpower hours, maintenance costs and environmental impact.

A network of experienced partners

SKF- and Lincoln-branded products, systems and services are available through a global network of distributor partners, supported by one unified sales organization committed to your success. Systems house distributors around the world offer turnkey solutions and extensive aftermarket support. In addition to maintaining a local inventory of system components and spare parts, these factory-trained lubrication specialists can provide:

- **Customized lubrication system design**
- **System installation and start up**
- **Service and repair**
- **Lubrication analysis and testing**
- **Lubrication management training**
- **Warranty support**
- **System maintenance contracts**
- **Surveys and recommendations**
- **Return-on-investment (ROI) analysis**
- **Guidance on safety and environmental issues**
- **Pre-assembled lubrication kits for easy retrofitting**

Here for you, wherever you are

With lubrication application centres located on every continent and a worldwide distributor network, SKF has the people, products and support you need to optimize your lubrication management programme. For more information, contact your SKF representative or visit **skf.com/TheFormula**.

The Power of Knowledge Engineering

Combining products, people, and application-specific knowledge, SKF delivers innovative solutions to equipment manufacturers and production facilities in every major industry worldwide. Having expertise in multiple competence areas supports SKF Life Cycle Management, a proven approach to improving equipment reliability, optimizing operational and energy efficiency and reducing total cost of ownership.

These competence areas include bearings and units, seals, lubrication systems, mechatronics, and a wide range of services, from 3-D computer modelling to cloud-based condition monitoring and asset management services.

SKF's global footprint provides SKF customers with uniform quality standards and worldwide product availability. Our local presence provides direct access to the experience, knowledge and ingenuity of SKF people.

PUB LS/S2 15747 EN · May 2015

This publication supersedes publication PUB LS/S2 11763 EN (1-2005-EN).

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