



# SKF solutions for elevators

Achieving new levels of reliability, service and efficiency



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materialhandling](http://www.skf.com/materialhandling)

The Power of Knowledge Engineering

Optimize your  
people-moving  
machinery



## Keeping up with an industry on the move

With urbanization increasing worldwide, so is demand for taller, more energy-efficient buildings. Urban centres are also becoming denser, driving growth of public transportation systems. Both trends are pushing people-moving asset design and maintenance in challenging new directions.

Equipment owners and operators want low- or no-maintenance assets that can move more people more reliably, safely and cost-effectively than ever before. To meet these demands, OEMs are looking for ways to design more robust, compact, energy-efficient equipment.

## SKF solutions can help

SKF is helping the industry build the next generation of people-moving assets while optimizing the maintenance of equipment already in service. Our solutions feature a range of bearings, lubrication systems, maintenance products and condition monitoring services.

Whether you're a manufacturer or facility manager, a design engineer or a service provider, elevator and escalator solutions from SKF can help deliver:

- **Improved reliability**
- **More compact designs**
- **Less noise and vibration**
- **Reduced maintenance**
- **Better rider comfort**
- **Greater flow of people**



Gearless traction machines



Geared traction machines



Pulleys and sheaves



Maintenance solutions and services

Gearless traction machines



# Gearless traction machines

## The drive to save space and energy

Today, about 50% of the world's population live in urban centres that consume about 75% of the world's energy. To address these rising percentages, new building designs must maximize usable space and minimize energy consumption. Elevator manufacturers are responding with machine room less (MRL) designs and gearless traction machines that enable higher speeds and require less energy and space.

## The challenges of going gearless

But going gearless does present new challenges. Gearless traction motors demand highly robust bearings that can handle heavy-load requirements while minimizing friction, noise and machine wear. For MRL gearless traction designs that integrate the sheave and motor, most of the system's load will be carried on the sheave side, placing even higher stresses on the bearing.

No gearbox also means no gear oil, which means that the bearings supporting the rotating shaft must be regularly lubricated – a difficult and potentially dangerous proposition for the workers who must access sheaves in hard-to-reach positions.

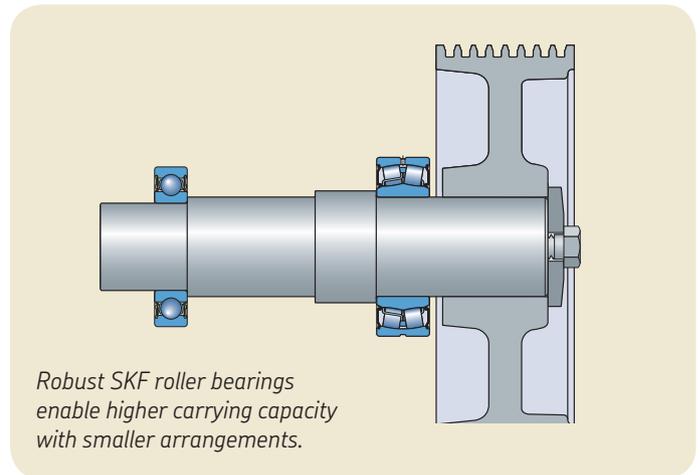
## Meet your requirements with SKF

Advanced bearing and sealing solutions from SKF can help. By moving from conventional ball to SKF roller bearings, for example, manufacturers are increasing carrying capacity while maintaining, or even downsizing bearing arrangements. SKF ball and roller bearing units with integrated seals are virtually maintenance-free, and can help reduce noise and vibration levels.

From performance upgrades to maintenance, energy and space-saving approaches, SKF's solutions are enabling a new generation of gearless, direct drive elevators.

## Real-world success stories

*SKF bearings are helping many of the world's leading elevator manufacturers develop a new generation of safer, smoother gearless traction machines. See the grey sidebars in this section to find out how SKF's solutions are helping OEMs optimize designs, boost machine reliability, extend service life, and more!*



# SKF Explorer sealed spherical roller bearings



## Engineered for robust performance and functionality

Combining cutting edge design and advanced materials treatment, the SKF Explorer sealed spherical roller bearing units address several gearless traction machine performance requirements at once.

The unit's optimized internal geometry can handle very high radial and axial loads, while its self-aligning capabilities can accommodate misalignment and shaft deflection. Bearing rings feature a low-oxygen steel that results in high surface hardness that further supports robust performance.

SKF Explorer sealed spherical roller bearings also offer high running accuracy and excellent control of roller skewing, both of which help minimize noise, vibration and friction levels. Lower friction means lower energy use vs. conventional bearings, enabling lower working temperature and longer grease life.

## Designed to last as long as the drive system itself

By integrating the seals in the bearing, these units are virtually maintenance-free. Along with their optimized steel material and patented heat treatment, SKF Explorer sealed spherical roller bearings can deliver robust, reliable performance for the life of an elevator's drive system – up to 20 years or more, depending on operating conditions.

- **Virtually maintenance-free**
- **High load carrying capacity**
- **Low noise and vibration levels**
- **Enables more compact designs**
- **No relubrication required**



## SKF delivers “20-year” bearing solution

*A major Asian elevator manufacturer sought a low-maintenance bearing solution that would perform for the life of the machine – a minimum of 20 years. SKF suggested SKF Explorer sealed spherical roller bearings. After subjecting the bearings to 3 months of endurance and function testing, the OEM switched their entire production to SKF Explorer sealed spherical roller bearings.*



# SKF Explorer spherical roller bearings

## Large-size solution for high-rise machine

*One of Europe's largest elevator manufacturers needed a quickly mountable bearing solution for its first-ever high-rise gearless traction machine. SKF suggested SKF Explorer large size spherical roller bearings with adapter sleeves, and then trained the OEM team on the fast bearing mounting process.*



## Big performance for the biggest machines

SKF Explorer spherical roller bearings combine higher load carrying capacity, with the ability to withstand shaft deflections. Proven to last several times longer than competitive bearings when tested under typical heavy-duty conditions, SKF Explorer open spherical roller bearings are well suited for large traction machines.

- **Increased uptime and productivity**
- **Lower maintenance and operating costs**
- **Low noise level**



## SKF solves a 10 m/s challenge

*Looking for a bearing solution for a 10 m/s high-rise machine, a leading elevator OEM subsidiary in Asia turned to SKF. Capable of allowing both axial displacement and angular misalignment, SKF Explorer large size spherical roller bearings were the obvious choice.*

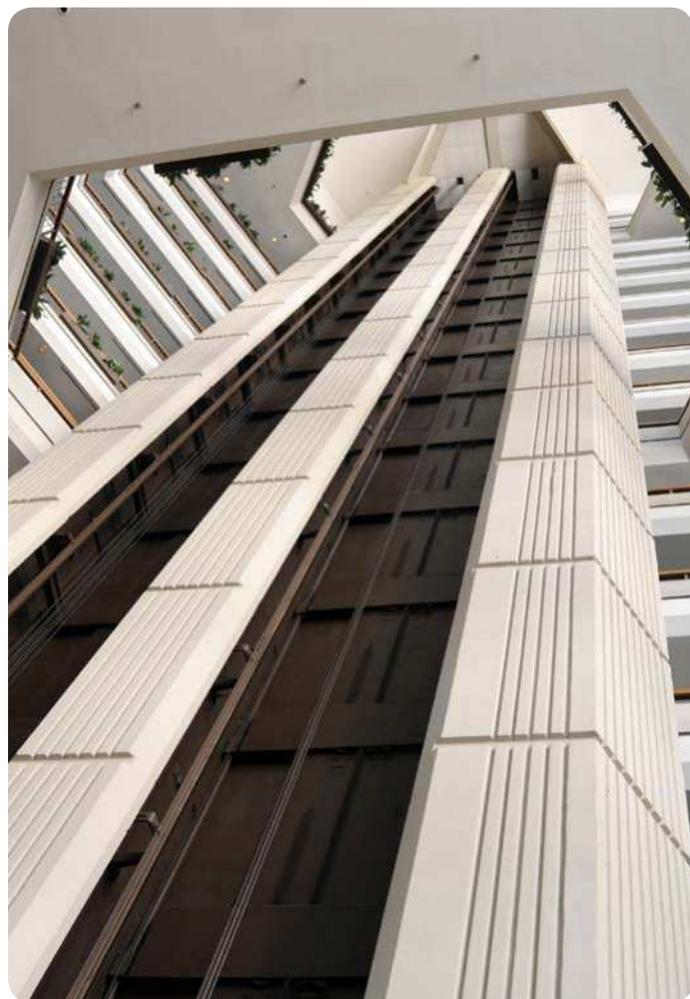
# SKF radial shaft seals



## Robust protection for open bearing arrangements

SKF radial shaft seals HMS5 and HMSA10 feature a rubber-covered outside diameter for optimized sealing ability. Designed to handle considerable surface roughness and thermal expansion, the seals are specifically suitable in open bearing arrangements for gearless traction machines.

- **Robust sealing performance**
- **Excellent pumping ability**
- **Outstanding lubricant compatibility**
- **Good wear resistance**



## Safeguarding gearless traction bearings with SKF seals

*In collaboration with SKF, an elevator manufacturer based in Asia developed a new range of gearless traction machines using SKF open roller bearings. To help ensure that the lubricant would stay inside the bearings and that contaminants would stay out, the OEM chose proven SKF radial shaft seals HMS5 and HMSA10.*

# SKF Explorer sealed deep groove ball bearings



## Low noise operation and extended service life

SKF has developed knowledge enabling optimized grease filling in order to ensure longer service life and minimize the risk of grease leakage.

Our sealing solutions are designed to ensure excellent pollution ingress protection together with a low friction operation.

Due to their homogenous, extremely clean steel with reduced oxygen level content, the bearings can also help extend fatigue and service life for gearless traction machines themselves.

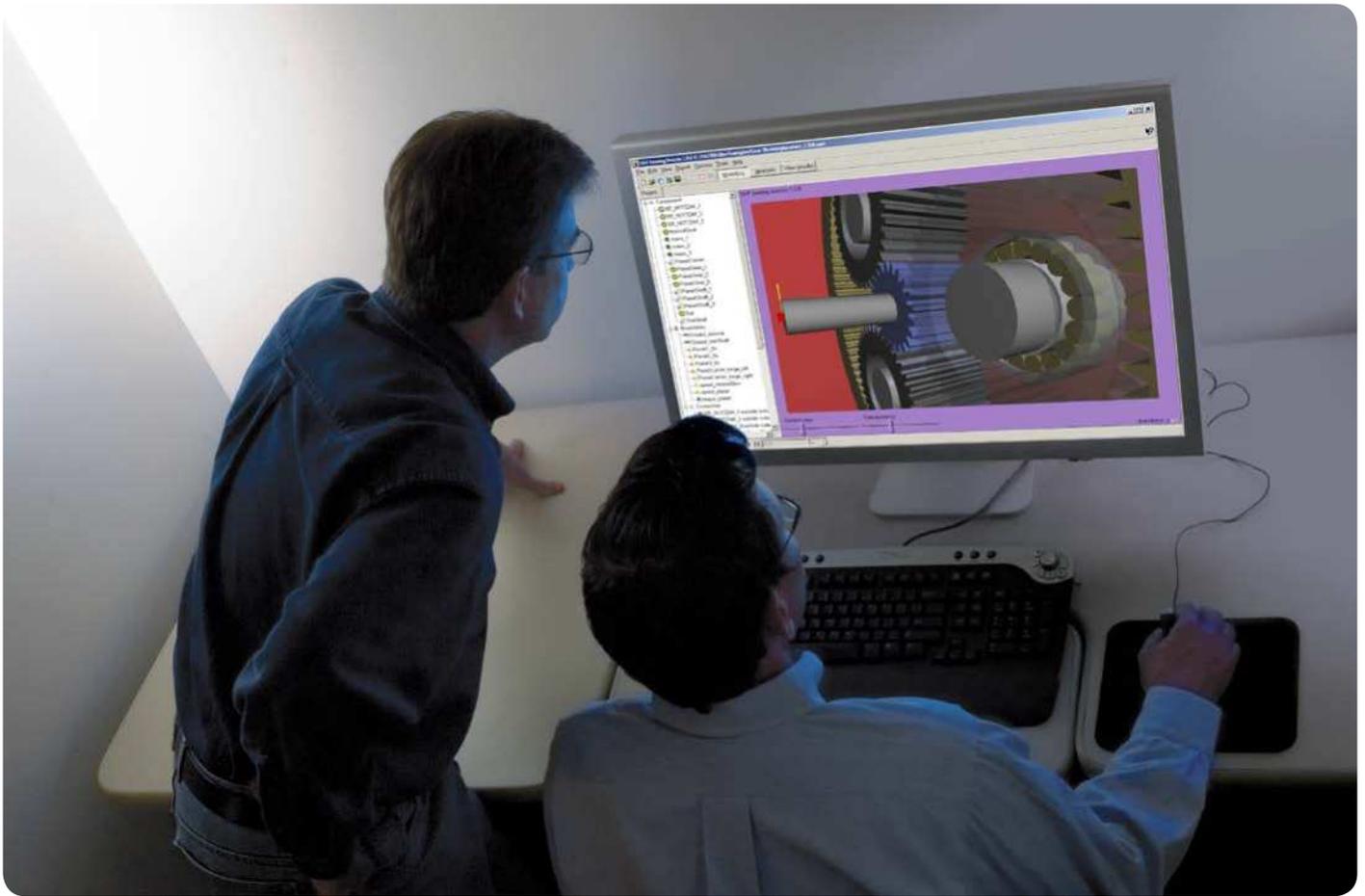
The ball bearings feature an optimized surface finish that maximizes lubricant effectiveness, allowing the bearing to run cooler and extend grease life in the application. Along with optimized cage geometry, the upgraded ball quality enables a quieter, smoother running bearing that helps control potential noise and vibration.

Certified by two independent certification bodies – Det Norske Veritas and Germanischer Lloyd – SKF Explorer deep groove ball bearings deliver higher load carrying capacity and longer service life.

- **Virtually maintenance-free**
- **Excellent protection against grease leakage and pollution**
- **Longer service life**
- **High load carrying capacity**
- **Low noise and vibration**

## Deep groove ball bearing enables design upgrade

*A leading European elevator manufacturer was developing a range of gearless traction machines with maximum speeds of 2 m/s for low to mid-rise applications. SKF Explorer deep groove ball bearings allowed the OEM to keep the initial arrangement while boosting carrying capacity and service life.*



# Engineering solutions

Informed by decades of industry experience, SKF Engineering Services can help OEMs optimize new or existing elevator equipment designs. Our expertise across five core areas – bearings and units, seals, lubrication systems, mechatronics and specialized services – allows us to take a systems approach to design, providing complete solutions that improve equipment reliability.

SKF has also developed some of the most comprehensive and powerful sets of modelling and simulation packages in the bearing industry. These proprietary programs enable design optimization very early in the prototyping stage and range from easy-to-use tools to sophisticated calculation and simulation systems running on parallel computers.

SKF Bearing Beacon 3D modelling software, for example, can help OEMs find the best solution for a new gearless traction machine bearing arrangement, while Beast simulation software virtual test rig performs detailed studies of forces, moments, etc., inside a bearing under virtually any load condition. It facilitates “testing” of new concepts and designs in a shorter time and with more information gained than traditional physical testing.

Backed by a proven, systems approach to design, plus the industry’s most robust modelling and simulation software, SKF Engineering Services can help elevator OEMs achieve a range of benefits:

- **Reduced total cost**
- **Reduced development time**
- **Improved reliability**
- **Greater flexibility**
- **Shorter delivery times**
- **Reduced lubricant use**
- **Reduced maintenance**

Geared traction machines



# Geared traction machines

## Heavier duties and lower speeds

Although typically slower than a gearless traction machine, geared traction machines can travel up to 2,5 metres per second, and they require a less powerful motor to turn the sheave. The combination makes them a common alternative to gearless traction motors for heavy-duty, low-speed, or mid-rise elevator applications.

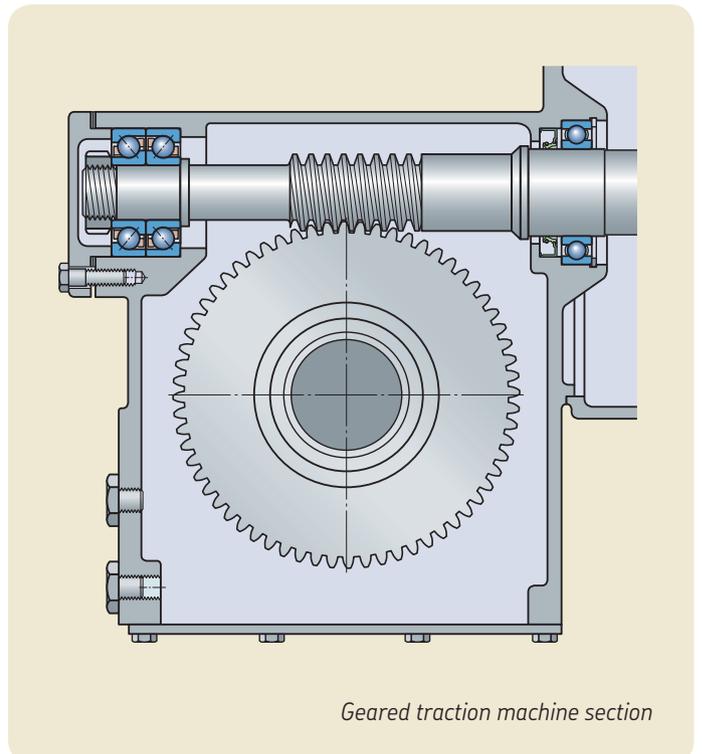
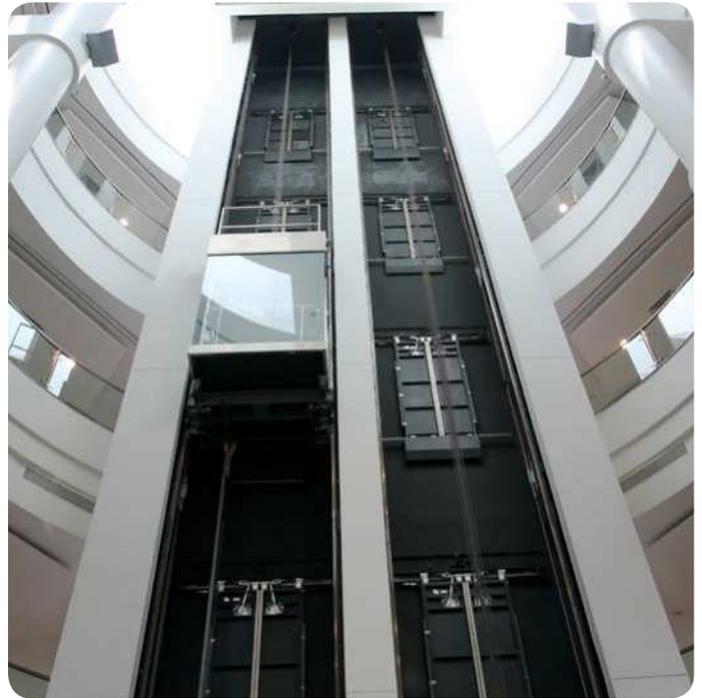
## Worm gear operating challenges

Geared traction machines rely on a high-speed electric motor to drive a worm gear, which then turns the hoisting sheave to move the elevator car. A worm gear operates with two shafts – the primary (input) shaft, and the secondary (output) shaft.

Primary shafts are exposed primarily to axial loads, while the secondary shafts mainly endure radial loads. Both must function with minimal noise, vibration and wear. In worm gears without seals, however, the presence of metallic particles in the gear mesh lubricant can impact all of these requirements, ultimately limiting bearing service life and machine reliability.

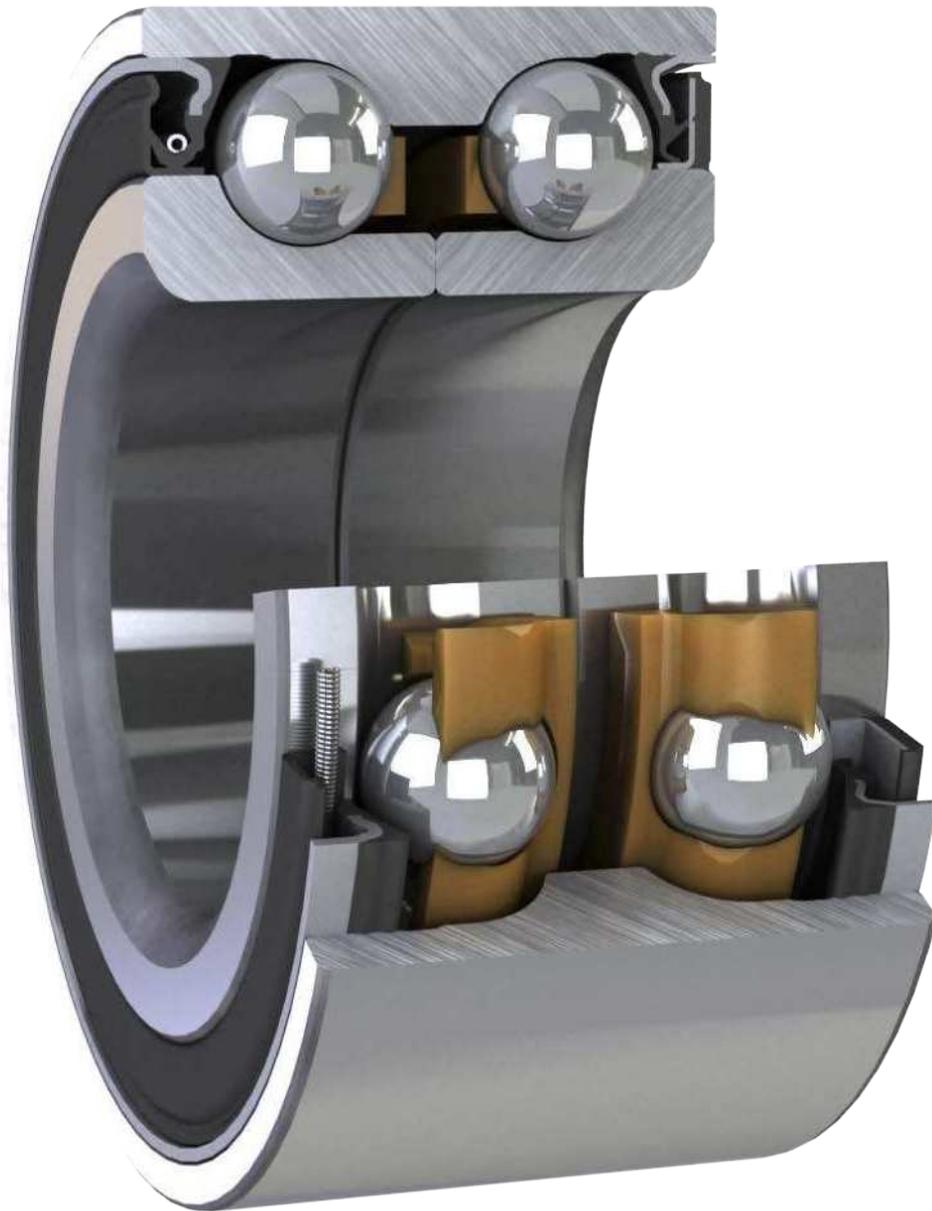
## Primary and secondary shaft solutions

Proven SKF bearing and sealing solutions are helping elevator designers and operators handle these worm gear application challenges and more. From new installations to performance upgrades, SKF solutions are increasing reliability and reducing maintenance for geared traction machine elevators.



*Geared traction machine section*

# SKF hub bearing unit



## Optimized performance for worm gears

For manufacturers of elevator winches, preventing contamination, extending component life cycles, and reducing noise and vibration are key goals. But when worm gears operate without seals, metallic gear mesh contaminants and vibration combine to reduce bearing service life and machine reliability. SKF's hub bearing unit can help.

This SKF solution integrates a hub bearing unit into a geared traction machine's primary shaft. Consisting of a double row angular contact ball bearing equipped with cassette seals and a special grease, the hub bearing unit can accommodate heavy axial loads caused by the gear meshing and carry radial loads by supporting the shaft.

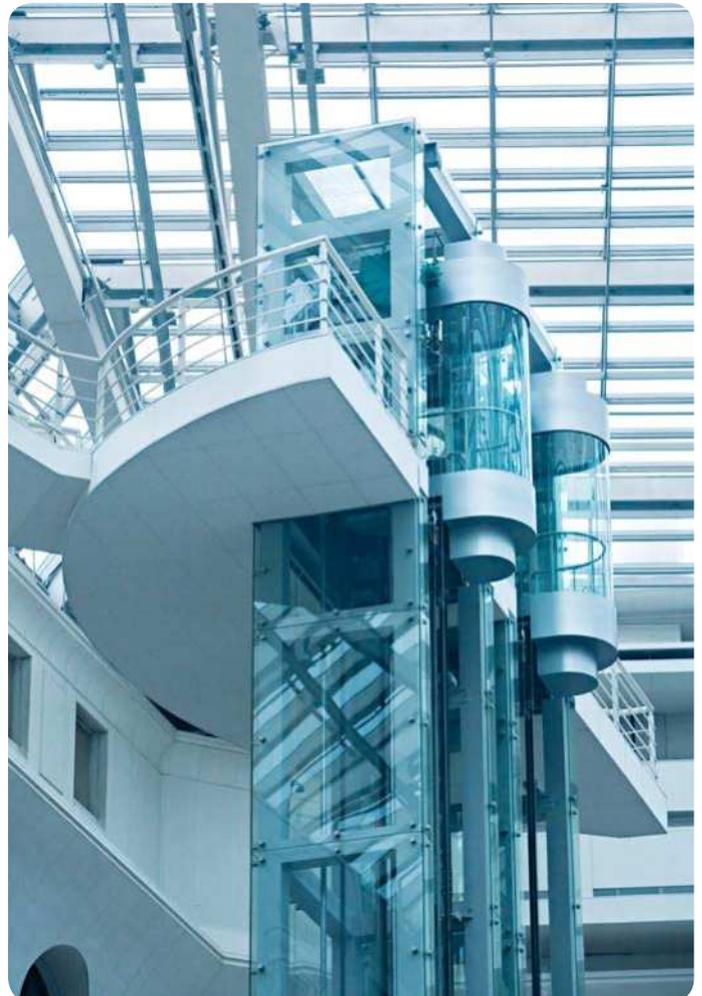
## A robust range of design features

SKF's hub bearing unit is preloaded to provide the required axial stiffness and to help maximize the bearing service life. The unit's integrated, SKF-patented R-safe+ seal prevents bearing contamination, while a special silent running grease helps minimize noise. By integrating the seal, this compact, plug-and-play unit also reduces the number of components and helps simplify assembly and mounting.

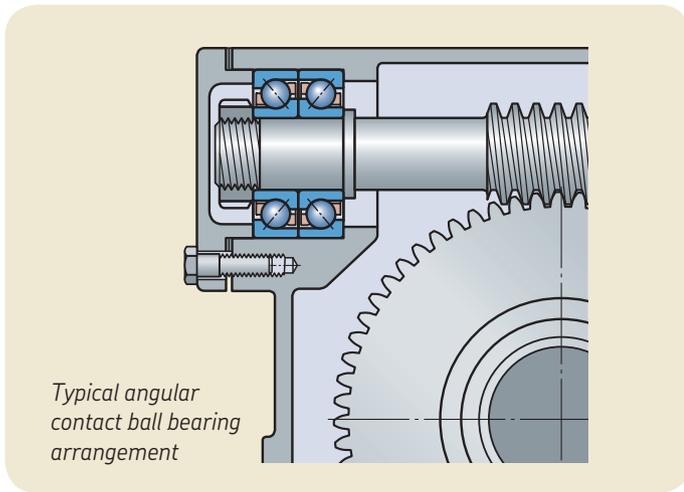
- **Higher reliability of rotating parts**
- **Extended bearing service life**
- **Virtually maintenance-free**
- **Reduced noise and vibration levels**
- **Fewer components for simplified assembly**

## SKF's hub bearing unit helps OEM keep contaminants out

*A major elevator drive machine manufacturer needed to eliminate contaminant ingress on the primary shaft bearing of its worm gear traction machine. Fine metallic particles in the gear mesh lubricant were entering the bearing and limiting service life. The hub bearing unit solved the problem, protecting the bearing against external contamination while accommodating the heavy axial load caused by the gear meshing.*



# SKF angular contact ball bearings



## A worm gear bearing unit alternative

Designed to handle combined radial and axial loads, SKF angular contact ball bearings offer a cost-effective, virtually maintenance-free solution for worm gear applications. Sealed and lubricated for life, SKF angular contact ball bearings also feature preset operational clearance for extended bearing service life.

- **Extended bearing service life**
- **Virtually maintenance-free**
- **Reduced noise and vibration levels**
- **Easy to mount**

## Angular contact bearings optimize primary shaft

*Looking to optimize the bearing arrangement on the primary shaft of a main geared traction machine, a European elevator manufacturer turned to SKF for help. The OEM needed a bearing robust enough to handle high radial and axial loads with limited vibration and noise. The solution? SKF double row angular contact ball bearings, which feature a preset clearance that cuts noise and vibration while extending bearing life.*

# SKF radial shaft seals



## SKF radial shaft seals protect open bearings

*An elevator manufacturer based in Europe needed to guard the open bearings in its geared traction machines against contamination while retaining the lubricant. At SKF's suggestion, the company implemented the SKF radial shaft seal solution, which combines proven sealing performance and good oil compatibility.*

## Robust protection for open bearing arrangements

SKF radial shaft seals HMS5 and HMSA10 feature a rubber-covered outside diameter for optimized sealing ability in the housing. Designed to handle considerable surface roughness and thermal expansion, the seals are specifically suitable in open bearing arrangements for geared traction machines.

- **Robust sealing performance**
- **Excellent pumping ability**
- **Outstanding lubricant compatibility**
- **Good wear resistance**



Pulleys and sheaves



# Pulleys and sheaves

## Designs and roping ratios

Driven by electric motors in both gearless and geared designs, elevator pulleys and sheaves are the rolling pivot point between the elevator car and its counterweight. Linked together by traction rope, elevator cars and counterweights rise and fall as the motor turns the sheave in one direction or the other, moving the rope along with it.

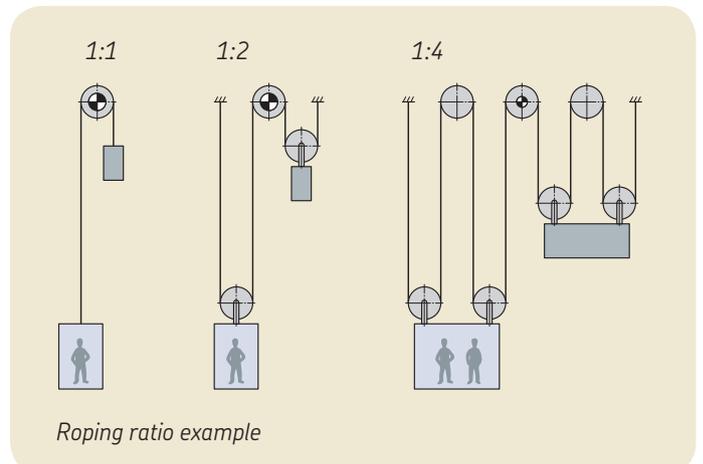
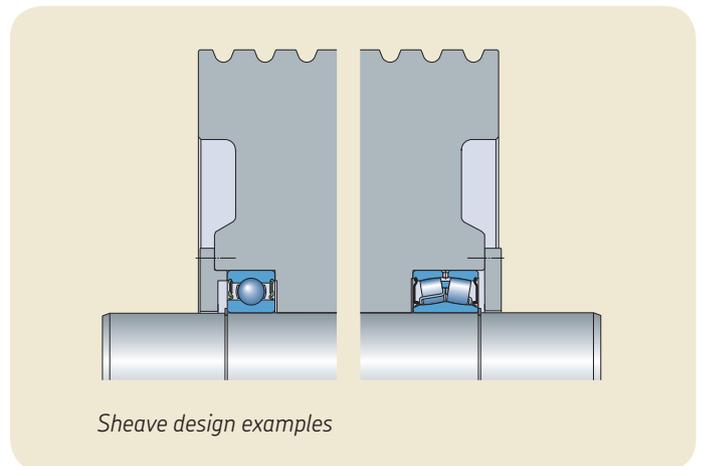
Weighing about the same as a car filled to 40% capacity, the counterweight provides a balance that helps to conserve energy. Essentially, the motor only needs to produce enough torque to get the sheave moving – the weight on the other side then does most of the work. Depending on the elevator application and load, a different number of pulleys can also be used to create roping ratios of 1:1, 1:2, or 1:4.



## Handle your requirements with SKF

Whatever the roping ratio or loads involved, SKF bearing solutions can increase pulley and sheave lifecycles while reducing maintenance. Sealed, relubrication-free units like SKF deep groove ball bearings with Solid Oil can eliminate dangerous grease leaks, while SKF spherical roller bearings can handle the heaviest loads.

In use in elevator installations worldwide, these and other SKF bearing solutions are helping building managers spend less on operating costs, and helping maintenance workers spend less time in elevator shafts.



# SKF deep groove ball bearings with Solid Oil



## No more relubrication or risk of grease leakage

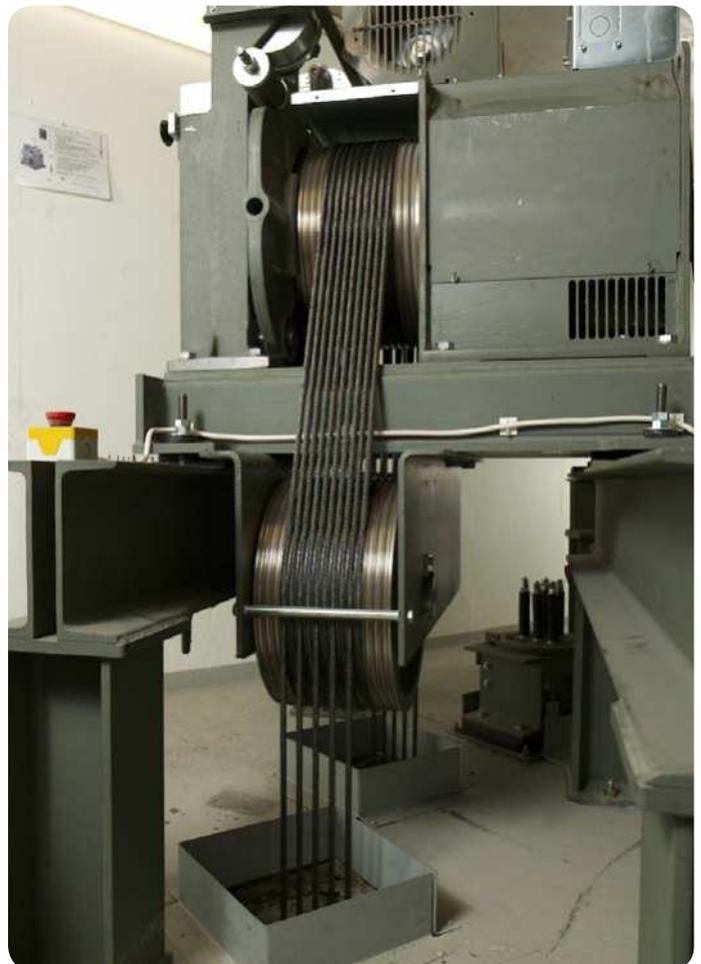
For diverter wheel pulley assemblies, the prospect of leaking bearing grease presents risks to elevator safety and operating costs. For the maintenance workers who have to relubricate pulley bearings, simply entering the shaft to access the wheel assemblies can be difficult. SKF bearings with Solid Oil offer an outstanding solution to both challenges.

Inside SKF bearings with Solid Oil, the rolling elements and cage are both encapsulated in a polymer matrix saturated with lubricating oil. The polymer completely fills the internal space. Using the cage as a reinforcement element, the polymer rotates with the cage. As it does, oil is released, providing proper lubrication for the rolling elements and raceways during operation.

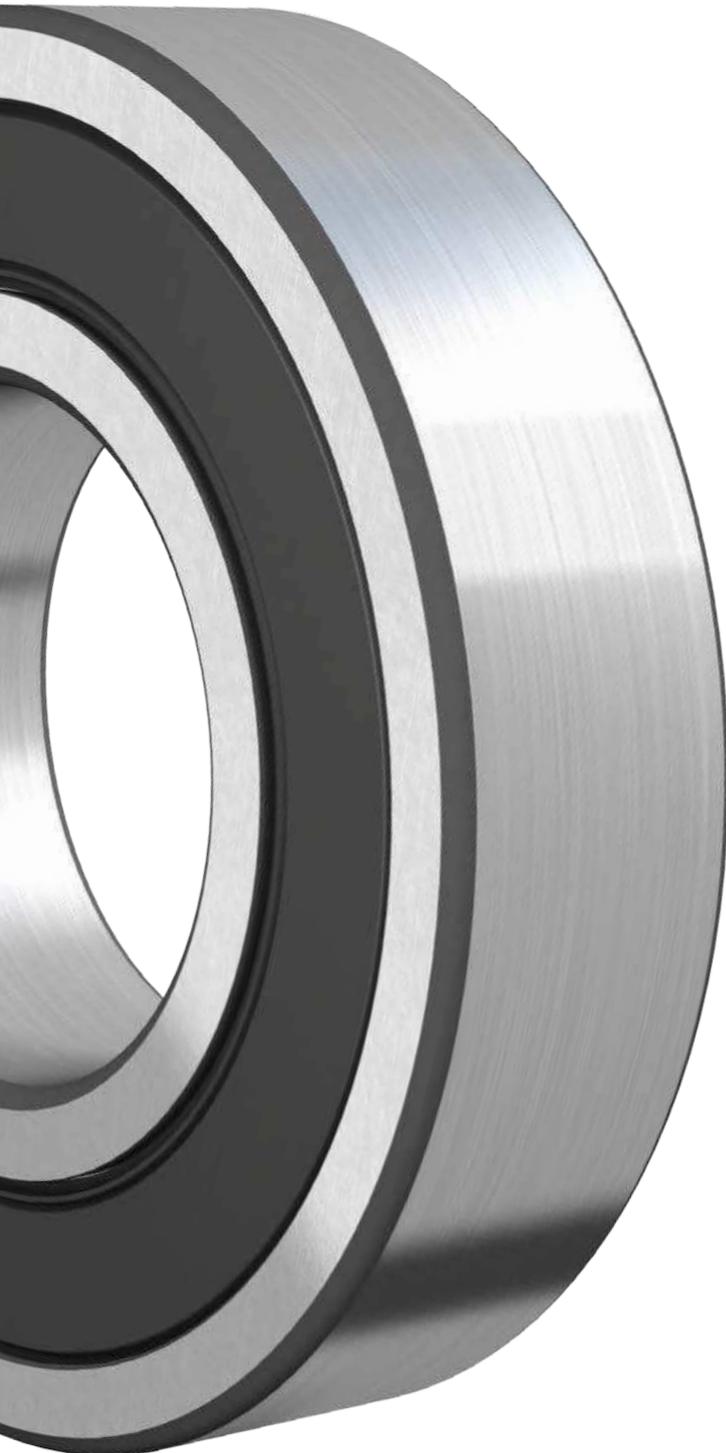
- Lubricated for life
- Eliminates risk of grease leakage
- Reduces maintenance
- Keeps contaminants out
- Extends bearing service life

## Solid Oil eliminates diverter wheel relubrication

*An Asian elevator manufacturer needed a way to avoid initial and periodic relubrication in its diverter wheel bearings. SKF bearing specialists suggested mounting sealed, lubricated-for-life SKF deep groove ball bearings with Solid Oil in the diverter wheels. Doing so allowed the OEM to develop a lubrication-free diverter wheel assembly – one that will reduce maintenance demands and extend bearing service for years to come.*



# SKF Explorer sealed deep groove ball bearings



## Extended service life and reduced maintenance

Outer ring rotation is not a challenge anymore for lubrication thanks to efficient sealing and optimized grease filling. Risk of grease leakage and its consequence on safety and service is then minimal.

The ball bearings feature an optimized surface finish that maximizes lubricant effectiveness, allowing the bearing to run cooler and extend grease life, even with frequent standstill periods. Increased precision on bearing outer diameter ensures an excellent fit in the application. It prevents that early apparition of mechanical looseness in the system and contributes to extended service life.

Along with optimized cage geometry, the upgraded ball quality enables a quieter, smoother running bearing that helps control potential noise and vibration.

Certified by two independent certification bodies – Det Norske Veritas and Germanischer Lloyd – SKF Explorer deep groove ball bearings deliver higher load carrying capacity and longer service life. It could also enable lighter designs, thanks to the possibility of downsizing the bearing selection.

- **Longer service life**
- **Excellent protection against grease leakage and pollution**
- **Low noise and vibration**
- **High dimensional precision to prevent mechanical wear**
- **High load carrying capacity for lighter designs**
- **Virtually maintenance-free**

# SKF Explorer sealed spherical roller bearings

## Engineered for robust performance and functionality

Combining cutting edge design and materials, the SKF Explorer sealed spherical roller bearings address several pulley performance requirements.

The bearing's optimized internal geometry can handle very high radial and axial loads, while its self-aligning capabilities can accommodate misalignment. Bearing rings feature a low-oxygen steel that results in high surface hardness that further supports robust performance.

SKF Explorer sealed spherical roller bearings also offer high running accuracy and excellent control of roller skewing, both of which help minimize noise, vibration and friction levels. Lower friction means lower energy use vs. conventional bearings.

## Designed to run maintenance-free for 20 years

The bearings are supplied grease-lubricated with integrated seals, making them virtually maintenance-free. Along with their optimized steel material and patented heat treatment, SKF Explorer sealed spherical roller bearings can deliver robust, reliable performance for the life of an elevator's pulleys and sheaves – up to 20 years or more, depending on operating conditions.

- **High load carrying capacity**
- **Low noise and vibration levels**
- **Enables more compact designs**
- **Virtually maintenance-free**
- **No relubrication required**



Maintenance solutions and services



# Maintenance solutions and services

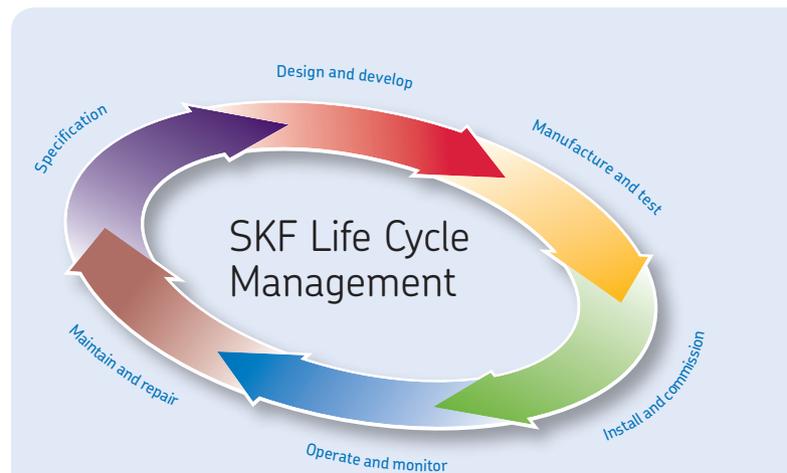
## Going up: demand for support services

With more than 10 million elevators units installed worldwide, demand for elevator maintenance and modernization services is on the rise. In Western Europe, more than two-thirds of elevators are 20+ years old, and services account for 60% of the market.

Effective elevator maintenance has always been challenging, given hard-to-access shafts, manual lubrication requirements, and other risks to worker safety. Today, it's even more difficult, as operators look for ways to reduce unplanned downtime and increase availability. Unfortunately, many facilities still rely on preventive, time-based maintenance approaches that aren't up to the task and are costly to the maintenance company.

## Next-level maintenance and lubrication from SKF

SKF offers a mix of automatic lubrication solutions and condition-based monitoring technologies that can take elevator maintenance to a higher level. Our maintenance solutions and services are at work in some of the world's biggest buildings and busiest transit systems, helping to optimize equipment life, improve reliability and safety, and reduce maintenance demands and costs.



## SKF Life Cycle Management

### Maximizing productivity and reducing total cost of ownership

SKF Life Cycle Management is a proven approach for maximizing productivity while minimizing total cost of ownership (TCO) for machinery over every stage, from specification and design to operation and maintenance. SKF draws on 100+ years of bearing innovation, application experience, and expertise in a wide range of technical areas to help elevator OEMs and aftermarket customers:

- Optimize designs
- Reduce time to market and development costs
- Improve energy and resource efficiency
- Increase reliability
- Extend machinery service life
- Improve productivity
- Improve safety
- Minimize maintenance
- Reduce total cost of ownership (TCO)

# Condition monitoring solutions for elevators and escalators



## Moving away from time-based maintenance

For elevator and escalator operators, achieving effective maintenance is difficult at best. Harsh operating challenges, rising maintenance costs and limited available work hours combine to make optimized maintenance a bottom-line goal – one that's impossible to achieve with time-based maintenance techniques.

SKF predictive and condition-based maintenance tool and technologies can help. By supporting planned interventions and optimization of elevator maintenance operations, SKF can help facilities improve maintenance performance, decrease asset downtime, improve asset knowledge, predict and prevent failures, and more.

## A combination of three services

Flexible and adaptable to specific customer needs, SKF condition monitoring usually involves a combination of three services that can also be provided individually, i.e. assessment and mapping; asset monitoring hardware/software and data collection; data analysis, verification and improvement. Typical applications for SKF condition monitoring tools and technologies include:

- Elevator motors and gearbox
- Elevator rope guide sheaves and diverting pulleys
- Counterweight position
- Escalator motor and gearbox
- Escalator top/bottom shaft bearing
- Escalator step chain elongation

# SKF MetroCon

## A complete, cost-effective condition monitoring solution

When transit elevators and escalators stop, so does the flow of people. And no flow of people means fines for lost customer hours, in addition to repair and maintenance costs. Developed for heavy-duty people-moving assets, SKF MetroCon can help transit operators minimize these costs and move from reactive maintenance practices to more predictive methods.

## Drive uptime and improve flow of people

SKF MetroCon can help operators optimize auxiliary equipment maintenance, predict and prevent failures, and calculate the most cost-effective times to replace or refurbish equipment.

- **Reduced lost customer hours**
- **Reduced unplanned downtime**
- **Improved reliability**
- **Improved maintenance planning**
- **Increased safety**
- **Extended equipment life cycles**



## SKF MetroCon helps London Underground cut maintenance and energy consumption

*The SKF MetroCon condition monitoring system is helping London Underground Limited (LUL) increase the uptime, reliability and safety of its critical escalators and elevators. The system has already allowed LUL to reduce maintenance and inspection activities by 40%, while cutting power use by 15%. SKF MetroCon has also helped LUL to reduce lost customer hours and unplanned downtime while improving equipment reliability.*

# SKF SYSTEM 24

## Single-point automatic lubricators

Single-point lubricators automatically deliver the correct amount of grease to single lubrication points over a set time period. Suitable for both existing elevators and new units, SKF single-point lubricators are available in three series:

### SKF SYSTEM 24 LAGD series

LAGD is a gas driven single-point lubricator. It is suitable for direct mounting in dangerous environments with a limited available space. This disposable lubricator with a pressure of 5 bars and operating temperature of 20 °C to 60 °C is a cost-effective solution to customers who are looking to improve their manual lubrication practices. LAGD has 60 and 125 ml reservoir capacity and a discharge rate of up to 12 months.

### SKF SYSTEM 24 TLSD series

TLSD is an electro-mechanically driven, temperature independent single-point lubricator suitable for direct and remote mounting. This lubricator operates with a continuous pressure of 5 bars and has an operating temperature range of 10 °C to 50 °C. TLSD can be set to operate in up to 12-month settings and its cartridges are available in 125 and 250 ml sizes. (Not for sale/use/offer in France, Germany and USA)

- **Eliminate manual lubrication**
- **Reduced lubricant quantities and costs**
- **Less vibration and noise**
- **Improved guide rail life with less wear**



## SKF grease solutions



## SKF Grease Guns



### The right bearing lubricant for any elevator application

The interaction between lubricants and bearing steel strongly influences bearing performance and life. By applying our deep expertise in tribology – the study of friction, lubrication and wear – SKF can help you identify the optimum grease for any elevator application.

For example, SKF LGEP 2 bearing grease offers a proven solution for most elevator applications. This mineral oil-based, lithium soap-thickened grease features extreme pressure additives for high mechanical stability. For high-load, high-temperature applications, SKF LGHB 2 may offer a better solution, while high viscosity SKF LGEM 2 may be more suitable for more slowly rotating bearings.

Whatever your application requires, SKF can help you find the right lubricant to prolong bearing service life by reducing friction and wear.

### Easier grease filling and dispensing

Suitable for use with a range of manually lubricated elevator applications, SKF Grease Guns are delivered with a 175 mm (6.9 in.) long extension pipe with hydraulic gripping nozzle. A flexible 500 mm (19.7 in.) long pressure hose with hydraulic gripping nozzle is available as an accessory.

- Available for use with cartridges and loose grease
- Knurled body for firm and safe grip
- Special piston design for smooth emptying of cartridges

## SKF Thermal Cameras



### Detect hot spots before they cause trouble

SKF Thermal Cameras allow maintenance technicians to visualize troublesome hot spots quickly and easily. The cameras capture both digital and fully radiometric thermal images, allowing the scene to be easily interpreted and analyzed. Images stored on the camera can easily and quickly be transferred to a PC, for further analysis or report-writing using the powerful software provided.

SKF Thermal Cameras are available with either a standard thermal resolution of 160x120, or with a high thermal resolution of 380x280.

- Measure and diagnose hot spots safely and quickly
- Help prevent costly machine failures
- Simplify maintenance

## SKF Machine Condition Advisor



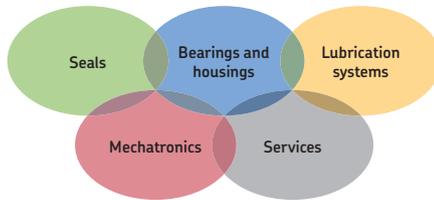
### A powerful handheld monitoring tool

Abnormal vibrations are often the first indication of a potential machine failure. By measuring vibration signals and temperature at the same time, the SKF Machine Condition Advisor offers a powerful, user-friendly way to indicate machine health or bearing damage.

While small enough to fit in your pocket, this rugged tool delivers big signal processing capabilities, allowing you to quickly and accurately assess the condition of a range of elevator rotating equipment, including traction machines, escalator top shaft bearings, equipment commissioning, and other applications.

- Prevent costly failures
- Simplify maintenance
- Measure
  - Velocity
  - Enveloped acceleration
  - Infrared temperature





### 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.

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PUB 53/P2 14097 EN · October 2013

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