Super-precision bearings

SKF mobile apps

SKF mobile apps are available from both Apple App Store and Google Play. These apps provide useful information and allow you to make critical calculations, providing SKF Knowledge Engineering at your fingertips.

Apple AppStore

Google Play

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This is SKF

From one simple but inspired solution to a misalignment problem in a textile mill in Sweden, and fifteen employees in 1907, SKF has grown to become a global industrial knowledge leader. Over the years, we have built on our expertise in bearings, extending it to seals, mechatronics, services and lubrication systems. Our knowledge network includes 46 000 employees, 15 000 distributor partners, offices in more than 130 countries, and a growing number of SKF Solution Factory sites around the world.

Research and development

We have hands-on experience in over forty industries based on our employees' knowledge of real life conditions. In addition, our world-leading experts and university partners pioneer advanced theoretical research and development in areas including tribology, condition monitoring, asset management and bearing life theory. Our ongoing commitment to research and development helps us keep our customers at the forefront of their industries.

SKF Solution Factory makes SKF knowledge and manufacturing expertise available locally to provide unique solutions and services to our customers.

Meeting the toughest challenges

Our network of knowledge and experience, along with our understanding of how our core technologies can be combined, helps us create innovative solutions that meet the toughest of challenges. We work closely with our customers throughout the asset life cycle, helping them to profitably and responsibly grow their businesses.

Working for a sustainable future

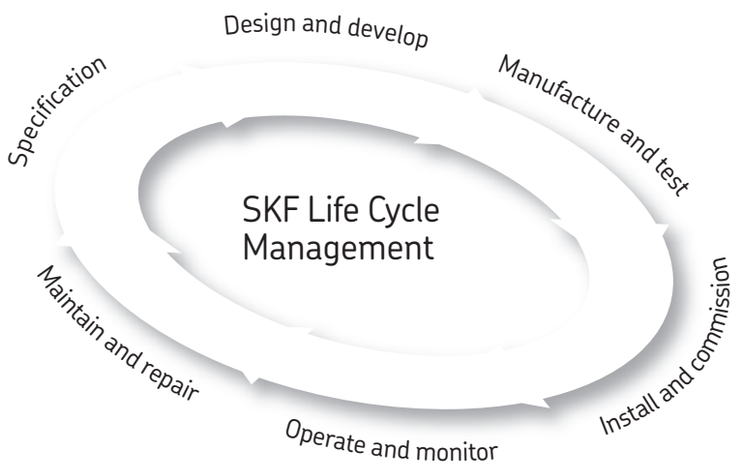
Since 2005, SKF has worked to reduce the negative environmental impact from our operations and those of our suppliers. Our continuing technology development resulted in the introduction of the SKF BeyondZero portfolio of products and services which improve efficiency and reduce energy losses, as well as enable new technologies harnessing wind, solar and ocean power. This combined approach helps reduce the environmental impact both in our operations and our customers' operations.

Working with SKF IT and logistics systems and application experts, SKF Authorized Distributors deliver a valuable mix of product and application knowledge to customers worldwide.

SKF – the knowledge engineering company

Our knowledge – your success

SKF Life Cycle Management is how we combine our technology platforms and advanced services, and apply them at each stage of the asset life cycle, to help our customers to be more successful, sustainable and profitable.



Working closely with you

Our objective is to help our customers improve productivity, minimize maintenance, achieve higher energy and resource efficiency, and optimize designs for long service life and reliability.

Innovative solutions

Whether the application is linear or rotary or a combination, SKF engineers can work with you at each stage of the asset life cycle to improve machine performance by looking at the entire application. This approach doesn't just focus on individual components like bearings or seals. It looks at the whole application to see how each component interacts with each other.

Design optimization and verification

SKF can work with you to optimize current or new designs with proprietary 3-D modelling software that can also be used as a virtual test rig to confirm the integrity of the design.

Bearings
SKF is the world leader in the design, development and manufacture of high performance rolling bearings, plain bearings, bearing units and housings.

Machinery maintenance
Condition monitoring technologies and maintenance services from SKF can help minimize unplanned down-time, improve operational efficiency and reduce main-tenance costs.

Sealing solutions
SKF offers standard seals and custom engineered seal-ing solutions to increase uptime, improve machine reli-ability, reduce friction and power losses, and extend lubricant life.

Mechatronics
SKF fly-by-wire systems for aircraft and drive-by-wire systems for off-road, agricultural and forklift applica-tions replace heavy, grease or oil consuming mechanical and hydraulic systems.

Lubrication solutions
From specialized lubricants to state-of-the-art lubrication systems and lubrication management services, lubrication solutions from SKF can help to reduce lubrication related downtime and lubricant consumption.

Actuation and motion control
With a wide assortment of products – from actuators and ball screws to profile rail guides – SKF can work with you to solve your most pressing linear system challenges.

Unit conversions

Unit conversions

Quantity	Unit	Conversion			
Length	inch	1 mm	0.03937 in.	1 in.	25,40 mm
	foot	1 m	3.281 ft.	1 ft.	0,3048 m
	yard	1 m	1.094 yd.	1 yd.	0,9144 m
	mile	1 km	0.6214 mi.	1 mi.	1,609 km
Area	square inch	1 mm^2	0.00155 sq-in	1 sq-in	645,16 mm^2
	square foot	1 m^2	10.76 sq-ft	1 sq-ft	0,0929 m^2
Volume	cubic inch	1 cm^3	0.061 cu-in	1 cu-in	16,387 cm^3
	cubic foot	1 m^3	35 cu-ft	1 cu-ft	0,02832 m^3
	imperial gallon	1 l	0.22 gallon	1 gallon	4,5461 l
	US gallon	1 l	0.2642 US gallon	1 US gallon	3,7854 l
Speed, velocity	foot per second	1 m/s	3.28 ft/s	1 ft/s	0,30480 m/s
	mile per hour	1 km/h	0.6214 mph	1 mph	1,609 km/h
Mass	ounce	1 g	0.03527 oz.	1 oz.	28,350 g
	pound	1 kg	2.205 lb.	1 lb.	0,45359 kg
	short ton	1 tonne	1.1023 short ton	1 short ton	0,90719 tonne
	long ton	1 tonne	0.9842 long ton	1 long ton	1,0161 tonne
Density	pound per cubic inch	1 g/cm^3	0.0361 lb/cu-in	1 lb/cu-in	27,680 g/cm^3
Force	pound-force	1 N	0.225 lbf.	1 lbf.	4,4482 N
Pressure, stress	pounds per square inch	1 MPa	145 psi	1 psi	$6{,}8948 \times 10^3$ Pa
		1 N/mm^2	145 psi		
		1 bar	14.5 psi	1 psi	0,068948 bar
Moment	pound-force inch	1 Nm	8.85 lbf-in	1 lbf-in	0,113 Nm
Power	foot-pound per second	1 W	0.7376 ft-lbf/s	1 ft-lbf/s	1,3558 W
	horsepower	1 kW	1.36 hp	1 hp	0,736 kW
Temperature	degree	Celsius	$t_C = 0.555\ (t_F - 32)$	Fahrenheit	$t_F = 1{,}8\ t_C + 32$

Foreword

This catalogue contains the standard assortment of SKF super-precision bearings typically used in machine tool applications. To provide the highest levels of quality and customer service, these products are available worldwide through SKF sales channels. For information about lead times and deliveries, contact your local SKF representative or SKF Authorized Distributor.

The data in this catalogue reflect SKF's state-of-the-art technology and production capabilities as of 2013. The data contained within may differ from that shown in earlier catalogues because of redesign, technological developments, or revised calculation methods. SKF reserves the right to continually improve its products with respect to materials, design and manufacturing methods, some of which are driven by technological developments.

Getting started

This catalogue is divided into nine main chapters, marked with numbered blue tabs in the right margin:

- Chapter 1 provides design and application recommendations.
- Chapters 2 to 6 describe the various bearing types. Each chapter contains descriptions of the products, and product tables listing data for selecting a bearing and designing the bearing arrangement.
- Chapter 7 contains information about precision lock nuts.
- Chapter 8 presents special gauges.
- Chapter 9 contains indexes to quickly retrieve information about a specific product or topic.

The latest developments

Compared to the previous catalogue, nearly each and every bearing has been redesigned to meet increasing application requirements. Many sizes and variants have been added to the assortment. The main content updates include:

More angular contact ball bearing sizes

Angular contact ball bearings in the 18 dimension series are included for the first time. In the other dimension series, several sizes have been added to both ends of the size range. The number of sealed bearings is about three times the number in the previous catalogue and also the number of hybrid bearings has been increased.

New super-precision angular contact ball bearings in the 18 dimension series

Foreword

More angular contact ball bearing variants

Angular contact ball bearings offer more choice:

- variants for direct oil-air lubrication
- greater variety in preload classes
- bearings with ceramic balls and rings made of NitroMax steel

Bearings with ceramic balls and rings made of NitroMax steel

New series of double direction angular contact thrust ball bearings

The previous bearing series 2344(00) has been replaced by the new BTW series. Bearings in the BTW series accommodate higher speeds with less friction, have a lower weight and are easier to mount.

BTW series bearings replace the former 2344(00) series

Axial-radial cylindrical roller bearings

Axial-radial cylindrical roller bearings have been added to the catalogue. These bearings are commonly used to support rotary tables, indexing heads and multi-spindle heads on machining centres.

Axial-radial cylindrical roller bearings

Bearings with PEEK cages

Cages made of reinforced PEEK enable bearings to accommodate higher speeds and run more quietly. Many more angular contact ball bearings and cylindrical roller bearings are available with cages made of this material.

PEEK cages enable higher speeds and quieter running

How to use this catalogue

The catalogue is designed so that specific information can be found quickly. At the front of the catalogue there is the full table of contents. At the back, there is a product index and a full text index. Each chapter is clearly marked by a printed tab with the chapter number.

Identify products

Product designations for SKF super-precision bearings typically contain information about the bearing and additional features. To specify an SKF bearing or to find more information about it, there are three options:

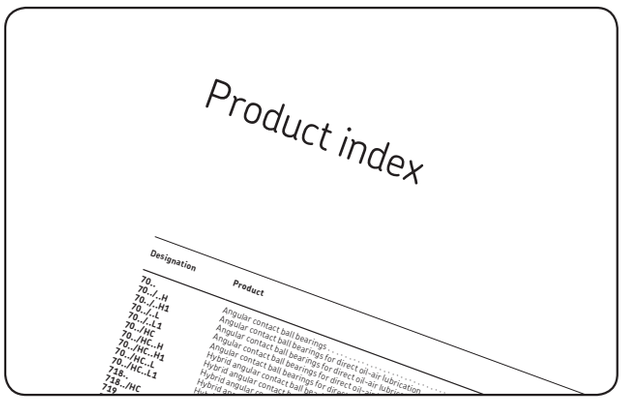
- Product index
  The product index at the end of the catalogue lists series designations, relates them to the bearing type and guides the reader to the relevant product chapter and product table.

- Designation charts
  Product designations in each product chapter are located on the pages preceding the product tables. These charts identify commonly used designation prefixes and suffixes.

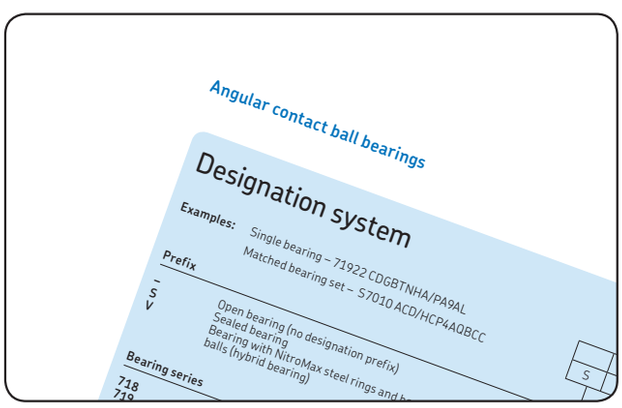
- Text index
  The text index at the end of the catalogue contains designation suffixes in alphabetical order. They are printed bold for quick browsing.

Units of measurement

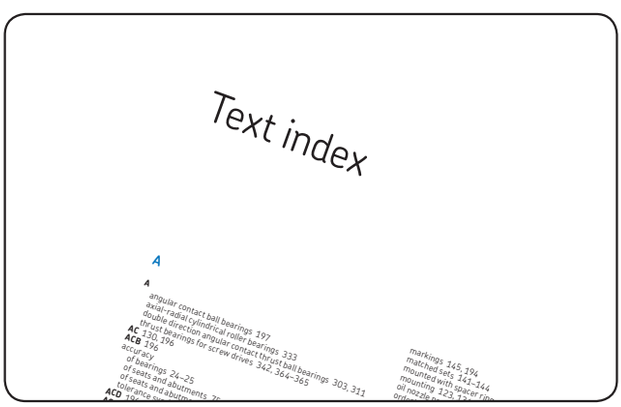
This catalogue is for global use. Therefore, the units of measurement are in accordance with ISO 80000-1. Unit conversions can be made using the conversion table (→ **page 10**). For easier use, temperature values are provided in both, °C and °F. Temperature values are typically rounded. Therefore, the two values do not always match exactly when using the conversion formula.



The product index makes finding information based on a bearing's designation easy



Designation chart to decode designations



Designation suffixes listed in the text index reduce search time

Other SKF products and services

SKF offers a wide range of products, services and solutions, not presented in this catalogue, but perhaps needed when using SKF super-precision bearings. For information about these products, contact SKF or visit skf.com. The offer includes:

Lubrication systems

SKF provides a range of automatic lubrication technologies, each offering a number of important advantages, from improved production and reduced total cost of ownership to a healthier, more environmentally friendly workplace. SKF can supply spindle lubrication systems that are suitable for most of the speed ranges and provides customized multi-point lubrication systems for linear guides, screw drives, bearings and auxiliary equipment as well as automated minimal quantity lubrication systems for machining processes that reduce environmental impact and create healthier work environments.

Lubrication system

Coolant pumps

SKF offers a full range of space-saving centrifugal and screw spindle pumps, each engineered to provide a reliable and efficient supply of cooling fluid in specific machine tool applications. Due to immersed installation, most of these pumps operate without seals, reducing maintenance and, ultimately, total cost of ownership. Available in numerous designs for various media, flow rates and operating pressures, these pumps can be provided with assorted standard drive options and electrical connection ratings.

Coolant pumps

Linear motion technologies

By combining competencies in linear motion, bearings, sealing solutions, lubricants and lubrication systems with best practices, SKF offers solutions for linear drive and for guiding systems, including profile rail guides, precision rail guides, dovetail slides, standard linear slides and linear ball bearings. All are designed for ease of maintenance and reliability.

Linear drives for many machine tool axes are equipped with ball screws or roller screws. SKF ball and roller screws provide a fast and precise linear movement, even under high load conditions.

Roller screws fitted on machine axes provide the unique advantages of rapid acceleration, high linear speed and high load carrying capability combined with high axial stiffness. Satellite roller screws, which do not have recirculation systems and which do not exhibit friction between rolling elements, provide higher accuracy when machine tool axes reverse direction. Roller screws are also available with the support bearings pre-assembled on a screw shaft – ready to bolt in place, speeding up and simplifying assembly and alignment procedures.

Linear motion technologies

Seals

Custom sealing solutions

Decades of experience manufacturing seals, combined with advanced materials expertise, has made SKF a leading supplier of standard and custom-engineered sealing solutions. These include integrated solutions consisting of seals and advanced engineered plastic parts, as well as moulded seals for higher volume orders and high-performance machined seals for hydraulic and pneumatic applications like press-cylinders, valves or clamping devices as well as for rotary applications like rotary distributors, joints or indexing tables.

Due to flexible production processes, customers can benefit from short delivery times and just-in-time deliveries for standard and custom seals. A wide variety of high performance sealing materials – including hydrolysis-resistant and/or self-lubricated polyurethanes, fluoro-carbon-rubbers and different PTFE-compounds – provides high wear resistance, long service-life and chemical compatibility with various machine tool fluids. In addition, SKF supports customers with on-site solution analysis and application engineering support.

Spindle condition monitoring

The monitoring of spindle health is crucial to avoiding machining process disturbances and unplanned production stops. SKF provides a complete family of condition monitoring tools and technologies, from hand-held data collectors and analyzers to online surveillance and protection systems that provide reliable insight into machine condition including bearing, imbalance and lubrication issues.

These systems improve operational efficiency and reduce costs by eliminating unplanned downtime and enabling machine tool operators to schedule maintenance based on condition rather than time schedules. The data logging system can be integrated with the machine's control system for aligned corrective actions. For example, the SKF Spindle Assessment Kit is a complete solution for reliable, simplified, onboard condition monitoring. The kit includes an SKF Microlog Advisor Pro, acceleration sensor, laser tachometer, dial gauge with stand, belt tension gauge and a software package. SKF assists in the set up of measuring points on your machine tool spindles and also offers a consulting service as part of a service agreement .

Spindle condition monitoring

Advanced calculation tools

SKF Spindle Simulator is an advanced simulation software program for the analysis of spindle applications. Based on the SKF Simulator platform and using the same advanced technology, it has been designed to be exceptionally user friendly.

The software is able to simulate the effects of user-defined speed and temperature distribution on bearing shaft and housing fits and preload. In addition, at each step of the spindle's duty cycle, it analyzes the effect of the external loads on the shaft and the bearings and delivers highly accurate information about the contact for each rolling element in each bearing.

This program supports the analysis of spindles and contains detailed and up-to-date models of SKF super-precision bearings.

SKF Spindle Simulator