Bearing Solutions and Services for Thermal Power Plants

SCHAEFFLER

The perfect solution for every bearing position

As one of the world's largest rolling bearing manufacturers, Schaeffler is a partner for all leading manufacturers and power plant operators. Our bearing solutions and services increase the operational reliability and performance capacity of machinery and processes. Expert technical consultation and an extensive distribution network around the world help us make a contribution to reducing overall costs.

Quality, technology, innovation

The Schaeffler Group is a leading integrated global supplier to the automotive and industrial sectors. The company stands for top quality, outstanding technology, and strong innovative ability. Its precision components and systems for engines, transmissions, and chassis applications as well as rolling and plain bearing solutions for a wide range of industrial applications make the Schaeffler Group a key contributor to "mobility for tomorrow."

The Industrial division supplies components and systems for around 60 different industrial sectors via its worldwide organization with market proximity and its application support service. The range includes miniature bearings only a few millimeters wide through to large-size bearings with an outside diameter of several meters.

In close collaboration with power plant operators, we have developed an extensive product range. INA and FAG standard bearings and numerous customer-specific special solutions have proven effective under the most extreme operating conditions – even in locations in coal-fired power plants where bearings are typically used, such as in beater wheel mills, tube and bowl mills, and air preheaters.

www.schaeffler.de/en

Everything from one source: From X-life to service

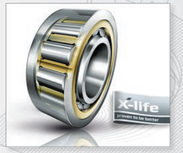
Economical systems in thermal power plants require reliable components. Schaeffler has the ideal solution for every bearing position – from consulting through to the product and maintenance services. It has been proven that X-life products can, for example, increase the overall cost-effectiveness of your systems. X-life is the seal of quality for particularly high-performance products from the INA and FAG brands that are characterized by longer rating and operating lives as a result of higher dynamic load ratings than the previous standard

FAG tapered roller bearings

Single-row FAG tapered roller bearings can support high radial loads, axial loads on one side, and combined loads. They have a broad range of speeds. When combined, they balance loads favorably thanks to their effective bearing spacing and ensure precise and rigid shaft guidance. Tapered roller bearings can be adjusted and dismantled, which makes mounting easy.

FAG cylindrical roller bearings

Conventional cylindrical roller bearings have a very high radial load carrying capacity and are extremely rigid. They can be fitted and dismantled easily. Used as a locating or semi-locating bearing, a bearing with torus-shaped rollers that was specifically developed for this purpose is also suited to accommodate axial forces. Multi-row cylindrical roller bearings with a solid brass cage are characterized by high accuracy, a high radial load carrying capacity and a long operating life.



FAG spherical roller bearings

Spherical roller bearings are self-retaining double-row units. They compensate shaft deflections and misalignments. All relevant sizes are available in X-life design – in certain applications, a smaller design of bearing arrangement can therefore be used if necessary. Sealed FAG spherical roller bearings are also available and have the same load carrying capacity as their counterparts without seals thanks to their innovative design.

Split FAG spherical roller bearings

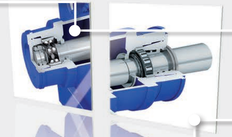
Split spherical roller bearings can be installed directly instead of conventional bearings with corresponding adapter sleeves – the dimensions are identical. Replacing a standard bearing with a split bearing considerably reduces downtimes during bearing replacements and installation costs. In the long run, this type of bearing is a cost saver, as upcoming bearing replacements can be carried out quicker.

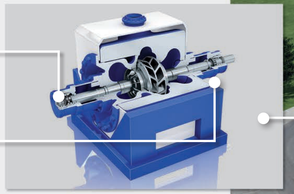
COAL MILLS

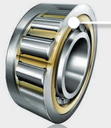
In vertical roller mills, clamping, tilting, and axial loads that act on the grinding roll, produce high radial and axial loads. These loads can be supported by a cylindrical roller bearing combined with a spherical roller bearing, or a tapered roller bearing unit in X-arrangement.

The tapered roller bearing unit is delivered by Schaeffler ready to fit. The outer spacer is machined accordingly so that the bearing unit has the correct axial internal clearance.

PUMPS



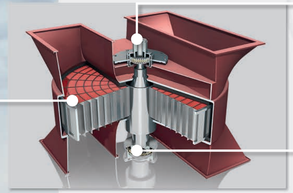




Pumps in power plants are essential components that ensure water circuits function. Boiler feed pumps, cooling water pumps, condensate pumps and circulation pumps, for example, can be found in all the important main processes. There are various solutions for bearing support designs in pumps. Thanks to our extensive product range, Schaeffler can configure any type of bearing design. The rolling bearings that are normally used in pumps range from standard deep groove ball bearings, and cylindrical and tapered rolling bearings through to rolling bearings with an angular adjustment facility, and sealed angular contact ball bearings. With temperature-resistant sheet steel cages and low-friction HRS seals, X-life designs are particularly robust, low-maintenance, and durable.

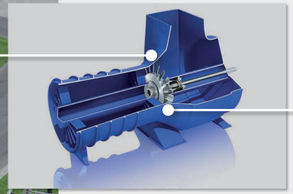
THE PERFECT SOLUTION FOR EVERY REQUIREMENT

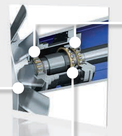
AIR PREHEATERS

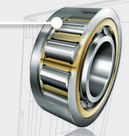


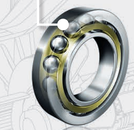
Radial and axial spherical roller bearings in air preheaters are most commonly used in the mixed friction range – this is due to high weight forces in combination with low speeds. **Horizontally aligned air preheaters** are usually supported by two spherical roller bearings, which are installed in individual plummer block housings (locating/non-locating bearing housings). **Vertically aligned air preheaters** are guided at the top by a radial spherical roller bearing. An axial spherical roller bearing at the bottom supports the loads and is used as a semi-locating bearing. FAG low-friction spherical roller bearings are best suited to meet such requirements. High static load ratings, high-quality internal geometry and functional surfaces ensure a long operating life especially in axial spherical roller bearings. The solid brass cage design adds another advantage when it comes to the shaft locating washer raceway inspection.

FANS









Bearing supports in fans operate under extremely harsh conditions including hot or flue gases, particle contamination, and high pressure operation. Schaeffler's solution to these challenging conditions comes for instance in the form of various plummer FAG block housing units with corresponding seals and connection facilities for lubrication supply and rolling bearing monitoring.

FAG 222/223 series spherical roller bearings are available in X-life quality for bearing supports in fans. Moreover, we offer large angular contact ball bearings, cylindrical roller bearings, as well as axial deep groove ball bearings for blade adjustment in axial fans for this application.

FAG bearing housings

FAG housings and the corresponding bearings form a bearing unit and are available in gray iron, spheroidal graphite cast iron, or cast steel. Different sealing systems can be added. Bores for monitoring or lubrication systems, for example, can be made at the marked positions.

FAG axial spherical roller bearing

Axial spherical roller bearings are single-row roller bearings with an angular adjustment facility. The bearings can be dismantled and have a very high axial load carrying capacity at relatively high speeds. The FAG brand offers the most extensive and most versatile product range of this series on the market.

FAG deep groove ball bearings

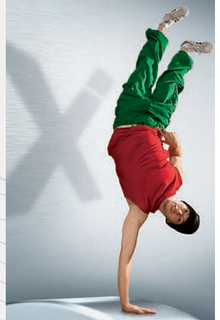
Deep groove ball bearings are versatile, self-retaining bearings. These bearings with their simple design, high resistance and low-maintenance, are available in single-row and double-row designs, as well as sealed and unsealed. Thanks to their low frictional torque, deep groove ball bearings can be used for high speeds.

INA plain bearings

Schaeffler produces and distributes a variety of high-quality plain bearings under the INA brand. These include the well-established range of INA spherical plain bearings as well as plain bushes with ELGOTEX or ELGOGLIDE high-performance sliding layers, and metal polymer composite plain bearings.

FAG angular contact ball bearings

Angular contact ball bearings are available in many different types, designs, and dimensions. Single and double-row bearings are most commonly used. While single-row angular contact ball bearings support axial loads only in one direction, double-row angular contact ball bearings can support loads in all directions. With the different cage and sealing options, X-life designs are extremely robust, low-maintenance, and have a long operating life.



X-life: Lasts longer.

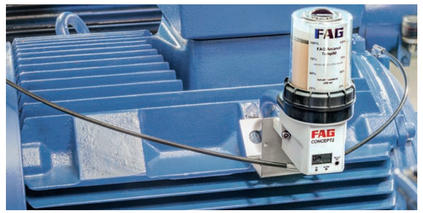
Higher dynamic load ratings: the key advantage of Schaeffler rolling bearings and linear products bearing the X-life seal of quality. For product designs that deliver higher performance and machines that operate more cost-effectively, we invite you to choose from our extensive range of X-life products.

- X times longer service life
- X times greater load-carrying capacity
- X times more efficient use of space

www.schaeffler.com/X-life

Schaeffler service: How can we help you?

Reduces unplanned downtimes: Online condition monitoring with FAG SmartCheck



Automatic relubrication: FAG CONCEPT2 relubrication device on an electric motor

A high level of system availability is a decisive factor for the cost-effectiveness of power plants. Schaeffler provides a comprehensive range of customer-specific services to power plant operators:

- Mounting and dismounting of rolling bearings
- Reconditioning of rolling bearings
- Rolling bearing lubrication and selecting lubricants
- Condition monitoring of rotating components

Condition monitoring – how to avoid unplanned downtimes

We offer services and systems for condition monitoring worldwide. Depending on your requirements, our experts do not only use vibration measurement methods to conduct tests, but also methods for force or torque measurements, multi channel systems for modal analyses, thermographic cameras and endoscopes.

Lubrication – a decisive factor for bearing performance and operating life

Incorrect lubrication is the most common reason for roller bearing failures. By greasing the bearings with Arcanol products, which have been tested in practice and by in-house laboratories, we lay the foundation for our bearings to ensure that they have a long operating life and low maintanance

Arcanol product range also types of grease that are suitable and have a particularly good patibility. We offer customizable matic grease relubrication.

Bearing mounting par excellence

Correctly mounting bearings – a prerequisite for precision and performance

Using the correct tools for mounting and dismounting rolling bearings is a major prerequisite for ensuring a long bearing operating life. Schaeffler provides you with support by means of professional mounting and dismounting tools, and mounting training courses. We also offer to do the mounting for you. A team of Schaeffler experts that has undergone specific training will assist you right on site.

Mounting services in detail

- Mounting and dismounting rolling bearings of all kinds
- Acceptance inspection of the counterparts (shafts and housings)
- Maintenance and inspection of bearing supports
- Support in determining causes for bearing failures
- Assisting and instructing our customers' staff when rolling bearings are installed by the customer
- Using modern mounting tools, for example heating with medium frequency generators in combination with fixed or flexible inductors

Savings tip: A practical example

It is especially shorter downtimes that have a cost-reducing effect when installing split spherical roller bearings. In this specific case, a globally operating company installed a split FAG spherical roller bearing for the first time. Downtimes for replacing conventional standard bearings could now be reduced from 22 hours to 3 hours. The overall costs for replacing the bearing were therefore reduced by approximately 80 percent (saving: 151,000 euros).

Roller bearing reconditioning – a cost-effective alternative to new products

Schaeffler reconditions rolling bearings irrespective of the manufacturer and without confining itself to its own product portfolio. Reconditioning is carried out in the same manner worldwide – identical processes and guidelines are applied. When it comes to Schaeffler brand bearings, we work according to the original drawings. We exclusively use original components and replacement parts for all bearings. Thanks to our extensive expertise in rolling bearings, the reconditioning standard is of high quality, restoring each reconditioned bearing to its original condition.

The FAG HEATER5000 allows for work pieces weighing up to 5,000 kg to be heated quickly and in a cost-effective manner.

Professional mounting is a must: In statistical terms, 6 % of all bearing failures occur due to inappropriate mounting

In mint condition: Rolling bearings before and after reconditioning

Global expertise – local knowledge – optimum performance for the customer

Schaeffler, a strong partner to industry, has extensive expertise in over 60 sectors. In order to bundle this knowledge and make it available worldwide, our experts in the different sectors are connected via one network, the Global Technology Network. This is how we ensure that industry-related knowledge can be accessed from all over the world.

A key component of this concept is our Schaeffler Technology Centers. Highly qualified engineers ensure that technical expertise is available in the different regions.

Currently, there are already 27 local Schaeffler Technology Centers worldwide. They are frequently in contact with Schaeffler experts all over the world.

Our customers greatly benefit from this: Schaeffler's bundled expertise is made available by the local Schaeffler sales engineer who is constantly exchanging information with the network of experts. This way, you always receive the best possible solution from anywhere in the world.

www.global-technology-network.com

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