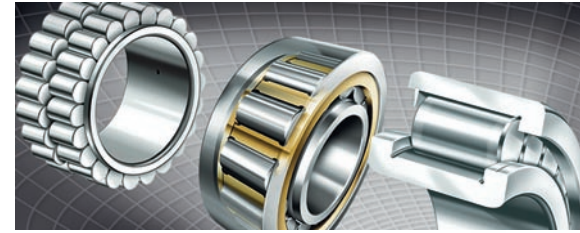


Cylindrical roller bearings for ...



- Shaft mounted gearboxes
- Planetary gearboxes (planet gears)
- Gearboxes for robots
- Cylindrical gear units
- Rolling mill gearboxes
- Winch gearboxes

Tapered roller bearings for ...



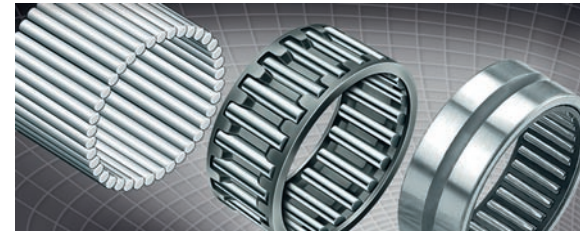
- Final drive units
- Tapered cylindrical gear units (pinion shafts/ring gear shafts)
- Wheel drives
- Indexing gear units

Spherical roller bearings for ...



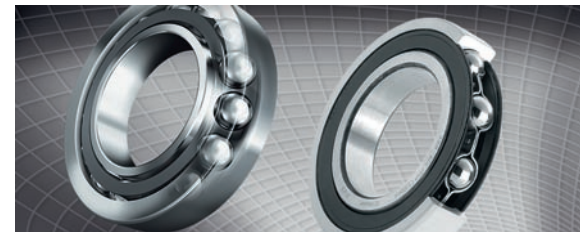
- Marine gearboxes
- Cylindrical gear units (intermediate/output shaft)
- Rolling mill gearboxes

Needle roller bearings for ...



- High-precision gearboxes
- Planetary gearboxes (planet gears)
- Manual gearboxes

Ball bearings for ...



- Geared motors
- Tapered cylindrical gear units
- Worm gearboxes
- Cylindrical gear units (input shaft, coupling)

Axial bearings for ...



- Extruder gearboxes
- Marine gearboxes
- Mill gearboxes



Expertise for Bearing Supports in Industrial Gearboxes

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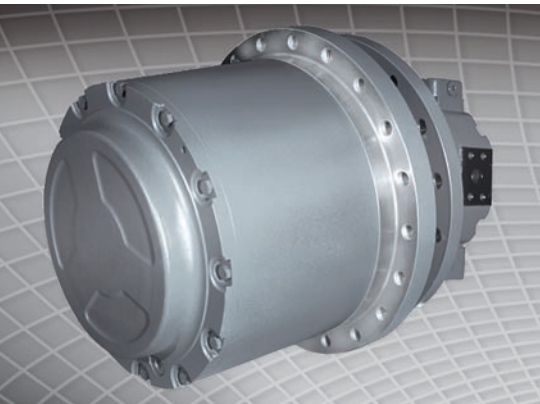
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Reliable and durable

Applications



Flender gear units used as tube-mill drives – a proven area of application for the INA and FAG rolling bearings with their high load capacity (Photo: Flender)



Travel drive of crawler type and wheeled vehicles with multi-stage planet gearboxes (Graphic: Bosch-Rexroth)

Industrial gearboxes are becoming smaller, their performance however, is increasing all the time. The high performance density is a real challenge for the rolling bearings involved. They must be reliable and durable, compact and have high load ratings. Low friction values, quiet running as well as simple and safe installation are also required.

This means premium quality is needed! For example, X-life bearings from the INA and FAG brands. Here are three applications to show you how our bearings master the challenges posed by modern industrial gearboxes.

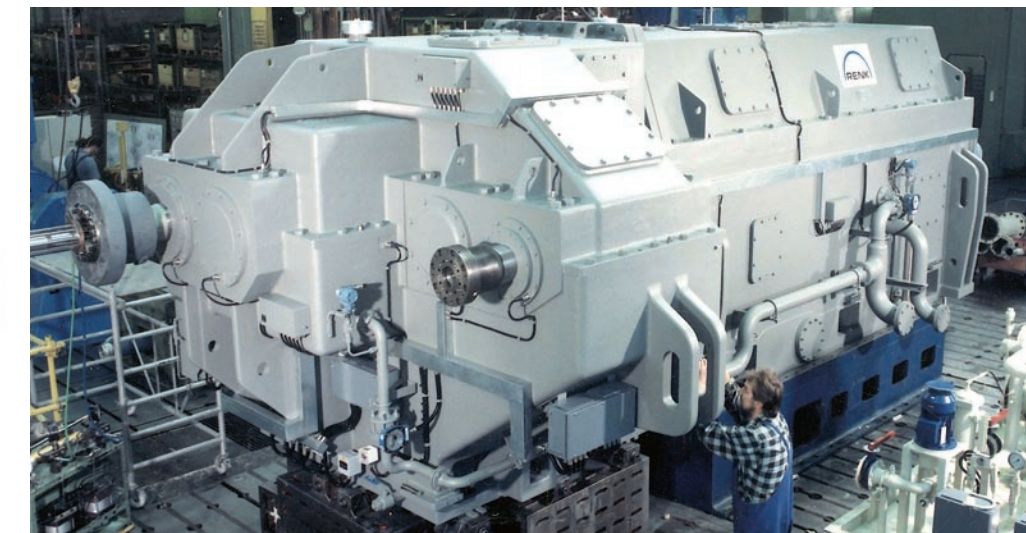
Example 1: Gear units
from A. Friedr. Flender AG have been operating reliably for many years with large tapered roller and spherical roller bearings with high load ratings on the input and output side. The intermediate shafts are

a preferred area of use for our cylindrical roller bearings.

Example 2: Planet gearboxes
in the travel drives of mobile devices (e.g. Bosch-Rexroth) contain compact cylindrical roller bearings with or without outer rings, single or double row, with or without coatings – depending on their application in the planet gears. Tapered roller bearing pairs and also double row angular contact ball bearings have proven themselves as robust main bearing supports.

Example 3: Extruder gearboxes
made by Renk AG have been providing high performance for many years with INA and FAG bearings. Ball bearings and cylindrical roller bearings are used in the gearbox shafts of gearboxes with power ratings of up to 27,000 kW and tandem bearings are used for supporting the extremely high axial loads on the worm shafts.

Extruder gearbox for the plastics industry – fitted for decades with reliable INA tandem bearings (multiple row axial cylindrical roller bearings) (Photo: Renk)



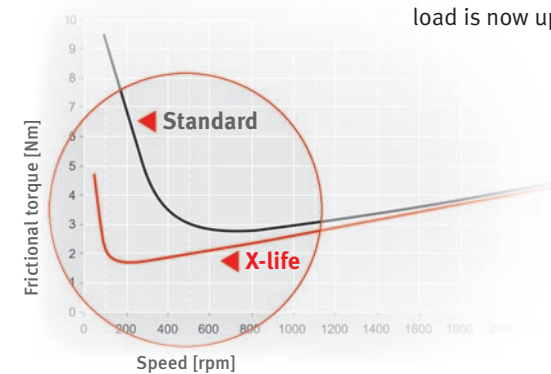
High load carrying capacity and compact

Designs



Tapered Roller Bearings T7FC

Single row tapered roller bearings T7FC are capable of supporting high radial loads as well as axial loads in one direction due to their large contact angle. Two bearings in O or X arrangement can support radial forces and moments as well as axial forces from both directions. The decisive advantage of X-life for this series is the increase in the dynamic load rating by up to 20% compared with previous designs, which results in an increase in the basic rating life of around 70%. As a result, the user can benefit from downsizing to a more economical bearing support.



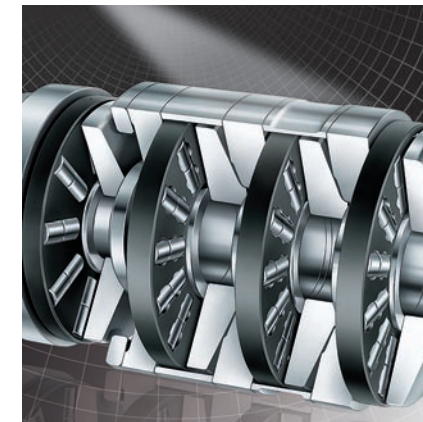
Reduction in frictional torque due to improved surface topography in X-life tapered roller bearings



Cylindrical Roller Bearings

Full complement cylindrical roller bearings consist of machined outer and inner rings and rib-guided cylindrical rollers. Since they have the maximum possible number of rolling elements, these bearings have extremely high radial load carrying capacity and high rigidity and are suitable for particularly compact designs. When used as semi-locating bearings or locating bearings, they can also support axial loads.

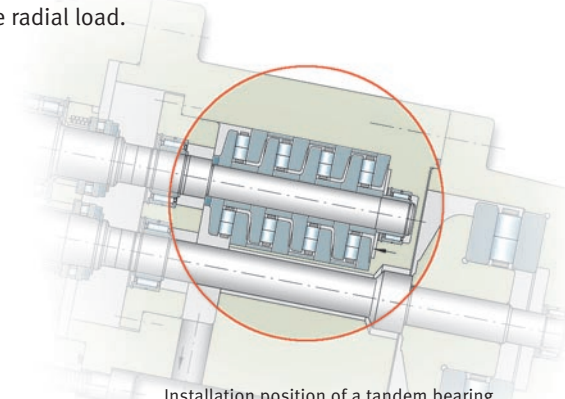
We have significantly improved the contact geometry between the roller end faces and ribs in the X-life design. This means the maximum permissible axial load is now up to 60% of the radial load.



Tandem Bearings

Extremely high axial loads in the smallest radial design envelope, long operating life, low friction – a clear case for tandem bearings.

Tandem bearings consist of several axial cylindrical roller and cage assemblies arranged in series. These bearings are mainly volume produced products. A system of rings and washers matched to each other ensures that all stages of the tandem bearing are subjected to uniform load at all times. The rings and washers are made from hardened steel.



Installation position of a tandem bearing

Low-friction and high security

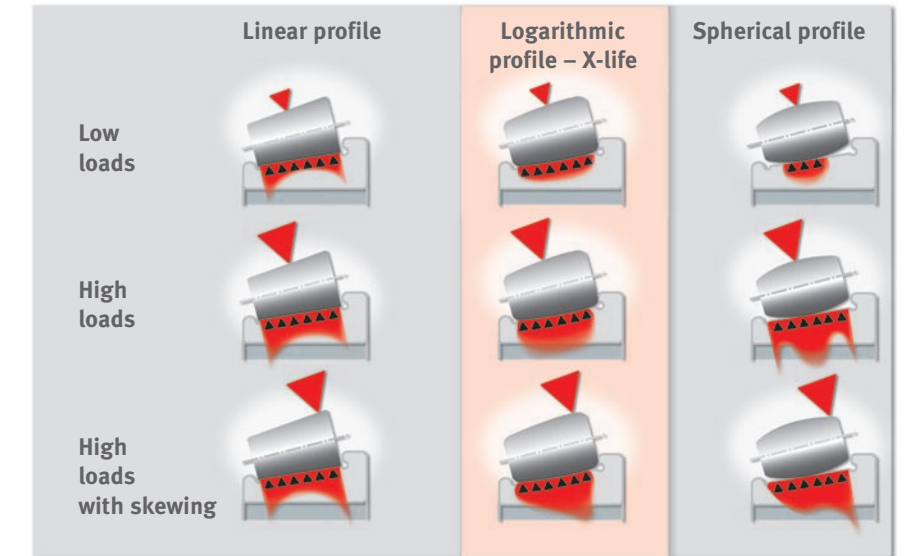
Characteristics

The characteristics of rolling bearings in the INA and FAG brands offer customers significant advantages. Below, you will find three examples.

Low-friction

FAG tapered roller bearings in X-life quality have optimized surfaces. The low surface roughness of the rings and rollers means that an elasto-hydrodynamic lubricant film is formed even at very low speeds. In conjunction with the high dimensional and running accuracy, the improved surface topography considerably reduces the development of friction and heat.

A logarithmic profile was developed for the raceways and the outside surface of the rollers, which compensates stress peaks under high loads and any possible skewing. In addition, the improved contact geometry of the inner ring ribs and the roller end faces reduces friction and prevents heat generation.



Improved geometry of the raceways and the outside surface of the rollers in X-life tapered roller bearings

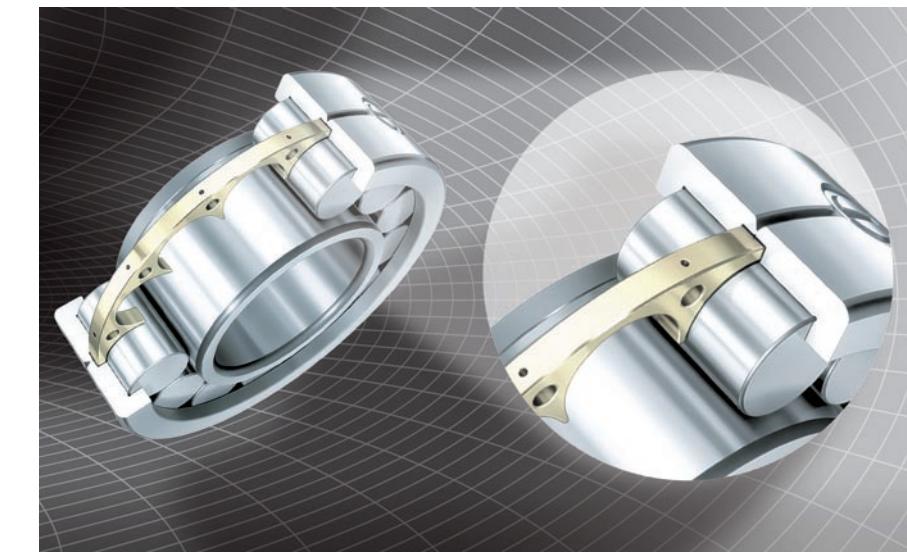
High-speed

INA cylindrical roller bearings of series LSL have a machined externally-guided brass disc cage. These bearings can achieve very high speeds – while maintaining a very low frictional torque.

High security

X-life spherical roller bearings E1 from the FAG brand represent 90 years of experience in rolling bearings as well as the latest findings in kinematics, materials and manufacturing processes. For the user, this means more security, more cost-efficiency, improved performance or even downsizing.

The premium quality of these spherical roller bearings comes to the fore particularly in gearboxes. Advantages such as high radial and axial load carrying capacity, an angular adjustment facility up to 2° as well as thermal stability up to 200°C are especially beneficial here.



For very high speeds and a wide variety of operating conditions: Cylindrical roller bearings series LSL