Bearing Supports and Components for Hydraulic Drives and Fluid Pumps
INA’s road to success began in 1949 when Dr. Georg Schaeffler developed the needle roller and cage assembly – an ingenious idea that helped needle roller bearing achieve a breakthrough in industry. FAG was made famous by Friedrich Fischer and the invention of the ball grinding mill in 1883 and he is considered the pioneer of the rolling bearing industry.

Today, both brands are united in Schaeffler Group Industrial. A product portfolio of over 40,000 catalog products ensures that the company is one of the world’s leading rolling bearing manufacturers. Joint sector management covers applications in around 60 industrial sectors.

Our comprehensive range of INA and FAG products for hydraulic systems and fluid pumps is consolidated in the Fluid Technology sector. Bearings and components for these demanding applications must be extremely reliable and efficient. The Fluid Technology sector primarily meets these requirements by developing customized solutions, or, in some cases, by using sophisticated standard components.

Fluid Technology – Your strong partner for hydraulic systems and pumps

- Expert support
- Complete bearing product range
- Improved efficiency through tighter tolerances
- Extended service life
- X-life premium products
- Certified quality to ISO/TS 16949:2002
- Optimized bearing, seal and material combinations
- BEARINX® calculation program for the best possible product selection
- State-of-the-art manufacturing facilities for volume-produced, high-precision fineblanked parts, pistons, valves and other products
- Good availability
- Services for all rolling bearing products and applications
Our Product Range

- Needle roller bearings
- Plain bearings and spherical plain bearings
- Fineblanked parts
- Roller bearings
- Inner rings
- Locknuts
- Ball bearings
- Steel seals
- Pistons and valves
High-torque motors – ideal for operations requiring high torques, involving hard stops and abrupt reverse motions. Classic applications include machines and equipment, agricultural machinery, crushers, feed devices, rolling mills, paper machines and transport facilities for bulk material. Extremely high torques (e.g. 1,400,000 Nm) are achieved under rough operating conditions. High-torque motors replace conventional gearboxes and motors and typically offer low startup friction and stick-slip free motion at low speeds. The high-quality cylindrical roller bearings, inner rings ground without spiral marks, high-precision locknuts and other components made by INA also contribute to the functional reliability of these strong motors.

Typical for INA bearings and components

- Cylindrical roller bearings provide smooth operation with high static and dynamic radial load capacity.
- Steel seals are characterized by low leakage and small press-on force. The sealing force is precisely determined to ensure efficient seals and minimal friction.
- Optimally adjusted, low-wear components, such as rolling elements with special coating, are used in high-torque motors.
Bent axis pumps are ready-to-mount functional units used in hydraulic systems to generate pressure. The stroke motion of the axially oscillating pistons is generated by the main output axis that is bent towards the rotor axis. Besides bearings, INA manufactures geometrically accurate steel seals with split butt joints in designs with centered or eccentric crowned outer diameter as well as with other contours. Our product range also includes high-precision control disks and other fineblanked parts with consistently accurate contours and smooth, perpendicular cutting surfaces that can also be produced from metal composites.

INA series DRG steel seals with excellent surface quality
- Low press-on force, minimal leakage
- Low-wear, high resistance against abrasion
- Oil and temperature resistant
- Application-specific designs
Hydraulics in Construction Machinery

Hydraulics is regarded as an indispensable source of power for earth moving equipment and transports. Hydraulic cylinders with maintenance-free spherical plain bearings made by ELGES are coated with Elgoglide®, eliminating the need for lubrication. Our low-friction dry plain bearings with high load-supporting capacity are particularly suitable for oscillating motion with heavy loads. The stable, moisture-resistant connection between the sliding layer and the support body has been a successful solution for many years now. The sliding material does not swell, does not fuse with metal and is largely chemically resistant.

Axial piston pumps in swash plate design
The inclined drive pulley and the swash plate are firmly attached to the drive shaft while the cylinder block is stationary. The thrust bearings transmit the high forces from the pistons that act in the direction of the stroke. Out of balance and radial forces are supported by stable, speed-optimized cylindrical roller bearings. Favorable bearing technology through
• Smooth and low-friction operation even with extremely high loads
• Good static and dynamic load ratings

Axial piston pumps with adjustable cradle
INA bearings provide support for the precise operation of excavators or road construction equipment with highly accurate positioning and constantly changing strength ratios. Full-complement or nearly full-complement cylindrical roller bearings allow precise settings for the flow rate, even at high pressures. Components such as bearing segments, pressure pads and steel seals are also preferred choices. Ground inner rings without spiral marks and with extremely wear-resistant ceramic coating minimize leakage and abrasion.

• Maintenance free and environmentally friendly
• Small dimensions, high performance
• Easy to install, little space required
• Individual design based on customer requirements

Thrust roller bearing
Inner ring with low-wear ceramic coating
Gear Pumps

Hydrostatic gearboxes
These gearboxes transfer continuously variable driving force in quads, riding lawnmowers, tractors and all-terrain vehicles. In addition to rolling bearings and plain bearings, INA precision parts such as hollow pistons, valves and fineblanked parts ensure reliable operation.

INA components are
• Made from heat-treated rolling bearing steel
• Cost-efficient
• Low-mass
• Wear-resistant

Gear pumps are used in almost all industrial sectors – they are inconspicuous and effective. These pumps supply coolants, transport foods, keep hydraulic systems in motion and are also used in mobile equipment, agricultural machinery and municipal vehicles. Permaglide® plain bearings or high-quality needle roller bearings ensure that gears move with hardly any losses. The supply medium is generally used as a lubricant for the bearings. For the supply of fluids with little lubrication effects, needle roller bearings are increasingly used instead of plain bearings in order to achieve the longest service life possible for the gear pump. In addition, higher speeds can be achieved with decreasing heat generation.

Permaglide® is a registered trademark and a product of KS Gleitlager GmbH, St. Leon-Rot
Pumping and Disposal

Fluid Pumps, Valves and Butterfly Valves

The Fluid Technology group offers efficient rolling and plain bearings for all pumps: those used to supply drinking water, water for firefighting or hot water or cooling water, to supply aggressive and abrasive media and to dispose of wastewater as well as high-viscosity materials. They ensure smooth operation over a long period of time. The pump speed and load determine whether ball bearings, cylindrical roller bearings, radial spherical roller bearings or plain bearings are installed. INA rolling and plain bearings help ensure that valves and butterfly valves work reliably even after long downtimes, both manually and when a drive is used.
Various pump designs and the wide range of applications in fluid technology require a large number of bearing types, designs, cage variants and seals. A team of experts makes sure that you receive a custom-made solution for any application you can think of. For instance, we may use X-life bearings that satisfy even the highest requirements.

Quality has a name: X-life

X-life stands for premium products made by INA and FAG. Products with an optimal service life that goes far beyond known indicators. All of the parameters that are necessary for trouble-free operation and processes and that make investment decisions easier have been taken into account and put into practice:

- Optimized product characteristics, low-noise and easy-maintenance solutions with high load-supporting capacity meet and often exceed requirements
- Improved price-performance ratio, faster payback through minimized downtimes and increased productivity
- Training programs, the basic requirement for error-free mounting and dismantling and meeting correct maintenance intervals all the way down to selecting and using the appropriate lubricant
Selection and Calculation

**medias® professional**

Our electronic support and selection system medias® professional provides information on more than 40,000 standard products for approximately 60 industrial sectors. For INA and FAG bearings, medias® professional enables the calculation of the modified rating life to DIN/ISO 281.

In addition, a comprehensive database simplifies the selection of adequate lubricants. In just a few mouseclicks, you can access the Schaeffler Group Industrial division’s entire range of products and services. An expanded tutorial provides step-by-step navigation and guides you quickly through the program.

- Detailed product information
- Comprehensive design and safety tips
- Details on bearing design
- Representative mounting examples
- CAD downloads
- Tables with accuracies, tolerances and bearing clearance
- Bearing seals

If required, type sheets can be prepared online and printed. Just ask for our CD-Rom or go to http://medias.ina.com.

**BEARINX®**

BEARINX® can be used to perform detailed analyses of rolling bearings – including individual rolling contacts. Rolling bearing loads in complex machine systems can be calculated, represented and documented by taking a large number of ambient conditions into account. The same applies for natural frequencies, natural vibration forms, critical speeds and out-of-balance responses for shaft systems.
FAG Industrial Services (FIS) has a wide range of products and services for rolling bearings. Our goal is to reduce maintenance costs and simultaneously increase machine availability for the customer. FIS offers products, services and training for machine diagnosis, mounting/repairs, lubrication, alignment and maintenance management.

Please contact us if you are interested in receiving any of the following publications:

- Rolling Bearings (Catalog HR 1)
- Technical publications excerpt (Publication TYP)
- FAG radial spherical roller bearings E1 – Increased efficiency and operational reliability with X-life (Publ. WL 43170/2 DA)
- Seals (TPI 128)
- Spherical plain bearings, bushings, rod ends (Catalog 238)
- Permaglide® plain bearings (Catalog 706)
- Steel seals, series DRG (TPI 16)
- Axial swash plate ball bearings (TPI 92)
- Fineblanking and system technology (Brochure PFS)
Every care has been taken to ensure the correctness of the information contained in this publication but no liability can be accepted for any errors or omissions. We reserve the right to make technical changes.

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