Innovation in Motion

Miba Hydrodynamic Bearings

We start where other bearings reach their limits

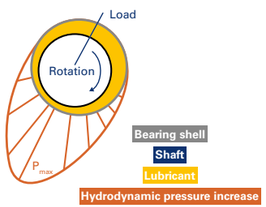
How a hydrodynamic bearing works

Hydrodynamic bearings do not contain roller elements and are based on sliding motion between the bearing and the shaft.
Other bearing systems may have mechanical components, such as balls or cylinders and races, where the relative motion of the races causes the rolling elements to roll.
These hydrodynamic bearing systems consist of a rotating shaft and a stationary bearing shell in the housing, between which there is a thin layer of lubricant, usually oil or a viscous fluid.
The way the bearing works is based on the principle of hydrodynamics. As the shaft rotates, it pulls the lubricant with it, creating a pressure gradient. This pressure gradient creates a hydrodynamic lubrication zone between the shaft and the bearing housing. This reduces friction and wear to a minimum, which increases the service life and efficiency of the system.

To improve the performance of your systems

Maximizing the full potential of your systems is our top priority. By incorporating our bearings, we create new opportunities for our customers across various industries. We provide comprehensive support for our customers and their systems across a wide range of applications:

- Blowers
- Heat pumps
- Presses
- Jet engines
- Turbochargers
- Synchronous condensers
- Test rigs
- Roller drives
- Compressors
- Gearboxes
- Pumps
- Engines
- Electric motors
- Generators
- Expanders
- Turbines
- Mills



Choosing the right bearing depends on your requirements

To select the right bearing for your application, it is important to understand its specific requirements. The following factors are key considerations for making a good decision:

Space Requirements:
If space is limited or there are strict weight requirements in your application, a hydrodynamic bearing is the perfect solution. With wall thicknesses of just a few millimetres, these hydrodynamic bearings require less space than roller bearings. This leads to weight savings that streamline the overall system, increase power density, and reduce material costs.

Vibration Behavior:
In these hydrodynamic bearings, the lubricant film dampens vibrations, resulting in good vibration behaviour. This makes hydrodynamic bearings ideal for applications with dynamic loads.

Load Capacity:
Hydrodynamic bearings have a larger contact area compared to roller bearings, which leads to an even load distribution and helps them to withstand higher loads. The lubricating film in hydrodynamic bearings ensures effective separation between the bearing and the shaft. This makes them particularly suitable not only for high loads, but also for high speeds.

Noise Generation and Friction:
As there is a lubricating film between the bearing and the shaft instead of moving parts, there is no metallic contact, which means that these bearings operate almost silently. The lubricating film also minimises friction in hydrodynamic operation. Friction losses can be kept to a minimum by matching the lubricating oil (viscosity behaviour), speed range and bearing selection accordingly.

Maintenance and Service Life:
In hydrodynamic operation, there is no direct contact between the bearing surface and the shaft. The use of a suitable lubricant and observance of the operating limits adapted to the system and the hydrodynamic bearing will ensure wear-free operation of the bearings. To ensure their optimum performance in the long term, it is only necessary to check the lubricant regularly for contamination and quality. Apart from this, hydrodynamic bearings are extremely low-maintenance.

POWER GENERATION: WIND TURBINES

Hydrodynamic bearings are used in the main gearboxes of wind turbines, especially in planetary stages of higher power classes from 3 MW.
Hydrodynamic bearing technology, in which the tribologically effective bearing metal is located on the outer surface of the bushing, minimizes the installation space. This enables smaller planetary stages and reduces the overall weight.
This technology makes it possible to increase the input torque and achieve power classes of up to 20 MW, thereby reducing energy generation costs.

YOUR BENEFITS:

- High power density
- Overall weight reduction
- Increased input torque

- Reduced system cost
- Reduced power generation cost
- Low maintenance cost

POWER GENERATION: HYDROPOWER TURBINES

In hydropower plants, hydrodynamic bearings are often used in large turbines. These turbines rely on hydrodynamic bearings to efficiently cope with the enormous loads and long operating times. As hydropower plants often run continuously for years, the longevity and low maintenance of the hydrodynamic bearings is particularly important.

YOUR BENEFITS:

- Long service life
- Proven reliability
- Bearing designs up to 3.5m diameter

- Low maintenance cost
- Upgrade and redesign to increase system performance
- Flexible segment construction

AEROSPACE

In aircraft turbines, hydrodynamic bearings ensure the realization of special geared turbofans that allow for high efficiency, lower fuel consumption and lower emissions. The bearings are also used in aviation engines, where they impress with their robustness and performance.
They are used in other aerospace systems as well, especially where installation space, weight and reliability play a major role.

YOUR BENEFITS:

- Enabling next generation systems
- Reduced installation space
- Overall weight reduction

- ~15 % reduction in fuel consumption
- ~15 % CO_2 and NO_x reduction
- Reduced ground noise, enabling extended evening landings and take-offs

COMPRESSORS

Compressors are used in a wide range of industries, such as the oil or gas industry or for industrial heat pumps. The reliability and longevity of compressors depend heavily on the components used. Modern hydrodynamic bearings play a key role here. Hydrodynamic bearings in compressors have to withstand high loads and speeds. They must reliably reduce friction and keep maintenance costs low.

YOUR BENEFITS:

- High loads of up to 160 MPa
- High speeds of up to 120 m/s
- Extremely resilient, even under shock loads

- Low repair and maintenance cost
- Reduced downtime
- Product differentiation

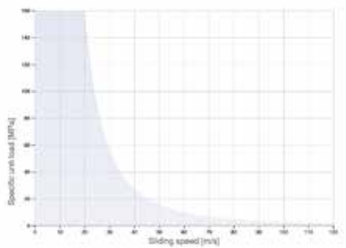
MIBA BEARING CALCULATOR:

The quick calculation for the right bearing selection

Find out in just a few clicks whether your system falls within the wide range of hydrodynamic bearing applications!
With the Miba Bearing Calculator, you can obtain an initial assessment of whether a hydrodynamic bearing including great advantages is suitable for your specific requirements in just a few minutes. The best thing about it? You don't need any expert knowledge - the tool guides you through the process step by step.

The bearing calculator is the first step and we accompany you through the entire development process:

- Idea and concept development
- Calculation and simulation
- Testing and validation
- Production and quality assurance
- After-sales service and optimization



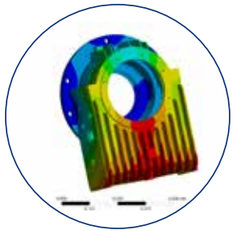
Try the calculator

Miba Service Portfolio is unique on the market

From designing, material choice and exceptional engineering, right through to service and repair – we stand for innovative problem solving skills.

CALCULATION & DESIGN

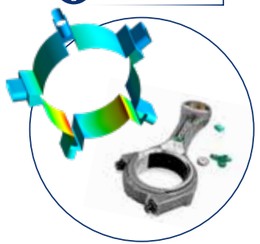
ANALYSIS & ENGINEERING



VALIDATION

MANUFACTURING

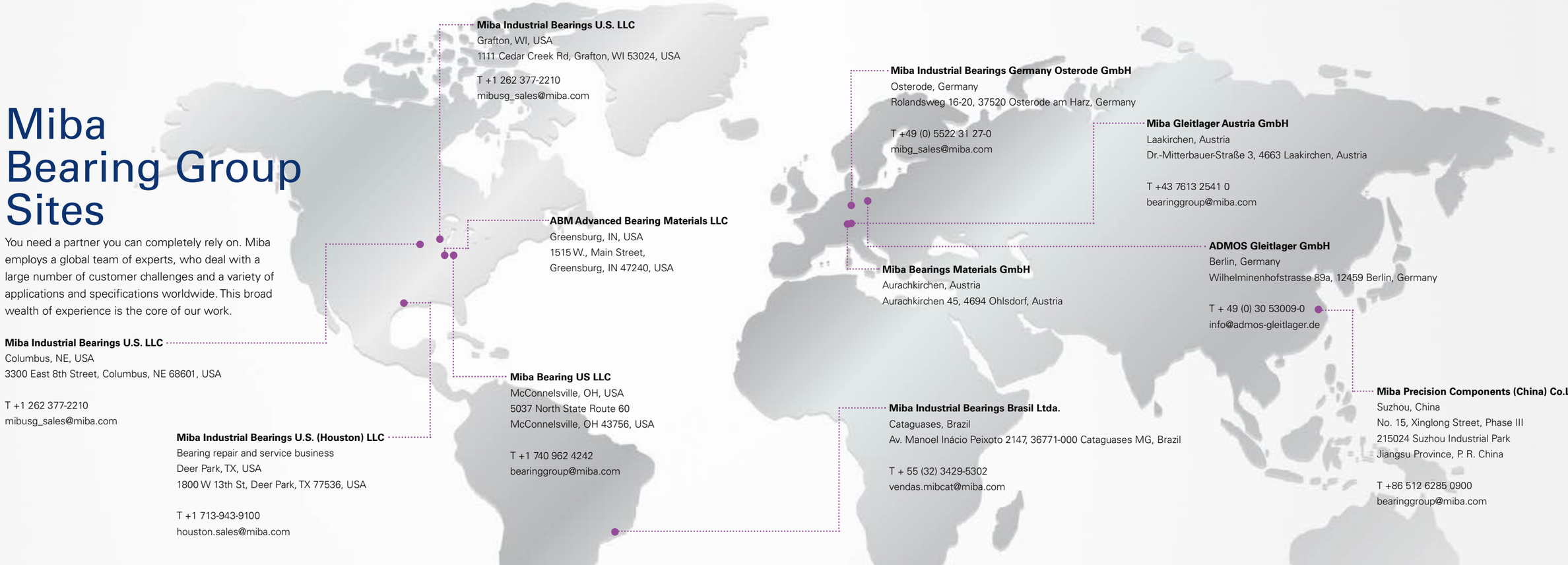
CONTINUOUS DEVELOPMENT



SERVICE, REPAIR & TRAINING

Miba Bearing Group Sites

You need a partner you can completely rely on. Miba employs a global team of experts, who deal with a large number of customer challenges and a variety of applications and specifications worldwide. This broad wealth of experience is the core of our work.



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