

# The 6 Different Types Of Bearings

A bearing is a machine element that constrains relative motion to only the desired motion, and reduces friction between moving parts. Most bearings provide constrained motion in at least one direction, although some are designed to provide freedom of movement in two directions. The main types of bearings are:

## Ball bearings

Ball bearings are among the most common types of rolling bearings and are often used to support large radial loads and high speeds. They can be made of different materials, such as steel, stainless steel, chrome steel, aluminum or ceramic.

A ball bearing consists of two or more balls. The balls roll between races that are machined into the ends of the shafts or around circular depressions on the inside diameter (ID) of the housing. The races are made from hardened steel and are coated with a hard surface such as PTFE (polytetrafluoroethylene) to reduce friction and wear between them and their housings. They also have lubricant applied to them so they will move freely when they rotate.

The outer race diameter determines the size of a bearing, while its inner diameter determines how far apart they can be placed on a shaft before they interfere with each other. Most small bearings have an inner diameter between one-eighth inch (3mm) and three-sixteenths inch (5mm). Larger bearings can have diameters up to about one inch (25mm).

## Roller bearings

Roller bearings are used in a wide variety of applications. Their design allows them to accommodate high radial loads, which is why they are often used in car engines and transmissions. They can also be found in the construction of wind turbines and the aerospace industry.

Roller bearings consist of a ring-shaped roller that is pressed onto a cylindrical raceway within the bearing housing. The bearing housing itself consists of two rings that sandwich the inner ring with its roller and outer ring with its raceway. These rings are usually made out of metal, but some roller bearings use a ceramic material instead. The two rings are held together by means of internal seals or external seals around the outer ring.

The inner ring contains an inner race with several grooves down its surface. These grooves are called raceways or raceways and they allow space for oil to flow between the two rings inside the housing. The oil fills up this space, forming what's called an oil film around each raceway groove on both sides of the inner race. This helps prevent friction between metal surfaces within each bearing and reduces wear over time due to repeated use or pressure changes on either side of the inner race itself.

## Plain bearings

Plain bearings are the simplest type of bearing. In plain bearings, there are no rolling elements, so they have a lower load capacity and higher friction than other types of bearings. However, they are inexpensive and easy to maintain.

Plain bearings can be made with steel balls or roller balls. They are commonly used in automotive engines and industrial equipment, where low-speed operation is common.

The main difference between plain bearings and ball bearings is that plain bearings do not need lubrication because they don't use rolling elements. This makes them less expensive than other types of bearings but also increases friction and limits their load capacity.

## Thrust bearings

Thrust bearings are a type of sliding bearing. Thrust bearings are usually found in engines and transmissions. They help to reduce friction and wear on the shafts of an engine or transmission.

Thrust bearings are made from one or more thin layers of metal (usually steel) sandwiched between two rings. These rings are called rolling elements, because they roll along the surface of the shaft. The rolling elements are connected to the inner ring by torsional springs, which allow them to move freely in any direction.

Thrust bearings have many advantages over other types of bearings. They require less maintenance than other types of bearings, because they do not use oil as a lubricant. Their relative simplicity makes them easy to manufacture, which keeps costs down. They also run quietly due to their lack of moving parts and reduced friction with no load on them whatsoever (i.e., when there is no pressure on the thrust surface).

The main disadvantage of thrust bearings is that they are not very efficient at transmitting torque — they have high friction losses and produce heat while operating.

## Fluid bearings

The operation of a fluid bearing relies on the properties of the fluid to create an extremely low friction environment. The lubrication film reduces the mechanical friction between the rolling elements and raceways.

A fluid bearing is a device for supporting a rotating shaft or other element within close tolerances and with low frictional losses. A typical application might be a rotary pump or compressor, which requires low friction and zero backlash to function properly.

In a fluid bearing, oil flows around the shaft and raceway in such a way that it will always fill in any voids or gaps between them, providing a continuous lubricating layer over nearly all

surfaces of contact. This eliminates almost all internal friction between shaft and raceway, so that there is negligible resistance to movement when power is applied to turn them at high speeds.

Fluid bearings are used extensively in all forms of machinery where there are high rotational speeds and/or large loads involved, since they can provide very smooth rotation with little vibration or noise. They find their primary use in applications such as pumps and compressors where high temperatures may occur along with spinning speeds of several hundred revolutions per minute (RPM).

## **Deep groove ball bearings**

Deep groove ball bearings are designed to operate in the same applications as regular bearings, with the exception of extremely harsh applications. Deep groove ball bearings have a spherical raceway in both the inner and outer rings.

Deep groove ball bearings are typically found in high-speed and low-load applications. They can also be used where only one side of the bearing is loaded (unbalanced loads). This type of bearing has a deep raceway that helps decrease friction and increase accuracy.

Deep Groove Ball Bearings are designed for radial load carrying capacity, and they should not be used in applications where axial loads will impose significant loads on them. They are also not suggested for use in high-vibration environments or applications that require very precise positioning of shafts or other moving parts.

There is a huge variety of bearings, each one with a specific use.