

# Advantages of Bearing Materials

[Bearing materials](#) are used in all types of mechanical devices such as electric motors, generators, pumps and fans. The main purpose of bearings is to reduce friction, wear and corrosion. They are also used to provide support for rotating parts and to maintain alignment.

The following are some advantages of bearing materials:

## High hardness

High hardness is beneficial to bearings in two ways. First, the higher the hardness of the material, the more wear resistant it is. It is more difficult for an abrasive material to rub away at the surface of a harder bearing. Second, high hardness allows for greater precision machining of a bearing's internal raceways, which helps maintain its concentricity.

This is particularly important in applications where tight tolerances are required. For example, in automotive engine crankshafts or connecting rods that need to be machined precisely for fitment into other parts of the engine block or cylinder head, high hardness will yield a part with fewer errors and better roundness than one that was manufactured from a lower hardness steel.

## High bearing capacity

High bearing capacity is a desirable feature in any material used for bearings and bearings components, because it allows the bearing to carry a high load without failure. The design of the bearing must also take into account the maximum allowable stress that can be applied to each part of the bearing, in order for it to remain operational for its intended life.

In general terms, high tensile strength means that a material will break under a high load before it bends or deforms significantly. This is useful for bearings because it means the load will be distributed evenly across the surfaces of the bearing and will not cause distortion or localised high stress points which could lead to failure.

High compressive strength means that a material can withstand compressive loads without buckling or crushing. A material with high compressive strength will maintain its original shape under compressive loads, which again helps with keeping distortion in check during operation as well as ensuring that localised deformation does not occur at one point on the outer ring surface - this would result in an imbalance between inner and outer ring contact areas, which could lead to premature failure of the bearing system.

## Low friction

Low friction is the most obvious advantage of bearing materials. Friction is a force that resists motion, and it can be seen in many ways. It can be felt when you rub your hands together, as well as when you try to push something along a surface. High friction occurs when there is a lot

of contact between two surfaces. Low friction occurs when there is only a small amount of contact between surfaces.

A good example of low friction is found in bearings made from magnetic materials such as iron or cobalt alloys. These materials have much lower friction than steel or aluminum alloys, which are used in most bearings today. This allows them to spin at high speeds and transmit large amounts of power with very little wear on their surfaces.

## **Corrosion resistant**

Corrosion resistance is a property of a material that does not allow it to corrode or oxidize. In other words, the material will not be affected by the environment in which it is placed. Plastic has this property, and so does metal. When metal corrodes, it loses its original color and structure, becoming rusty or dull-colored after exposure to water or air.

The main advantage of bearing materials with corrosion resistance is that they can be used without fear of having them destroyed by the environment in which they are placed. This saves money on maintenance costs and prevents unnecessary repairs due to wear and tear caused by corrosion over time.

Another advantage of using bearings with this property is that they will last longer than those made from normal metals like steel, copper or aluminum that are not resistant to corrosion.

A disadvantage of using bearings with this property is that they tend to be more expensive than ordinary bearings because of their increased durability and resistance to damage caused by moisture or other elements such as air pollution or salty air from the sea.

## **Fatigue resistance**

Fatigue resistance is a property of a material that resists the formation of cracks during repeated loading.

Fatigue failure occurs when a material is subjected to repeated loads which are below the yield stress. The applied load causes micro-cracks in the material which grow slowly until they reach a critical size at which point they suddenly propagate across the material and cause failure.

The fatigue resistance of a material depends on several factors:

The properties of the material itself. These include its level of ductility (which affects how much force it can withstand before cracking), its elastic modulus (which affects how quickly it deforms under load), and its hardness (which affects how easily it can be damaged).

The frequency and amplitude of loading cycles, which determine how many cycles occur before fatigue failure occurs.

The temperature at which loading takes place, since high temperatures increase both cycling frequency and amplitude while also reducing ductility and increasing hardness.

## **Adapt to harsh environments**

Bearings are used in almost all applications, from the most basic to the most advanced. Bearings are engineered to withstand harsh environments and provide a service life that is measured in decades.

Bearing materials such as chrome steel and stainless steel have a very high resistance to corrosion and oxidation. Chrome steel is often used in marine applications where it needs to withstand salt spray and chloride ions. Chrome steel also has good resistance to stress corrosion cracking (SCC) caused by intergranular corrosion. This provides a long service life under harsh conditions.

Stainless steel bearings have slightly lower corrosion resistance compared with chrome steel but do not suffer from SCC. They are suitable for applications where they will be exposed to acids or salts but not at levels that would cause problems for chrome steel bearings.

Bearing materials are very important for the successful operation of any mobile applications. They are wear resistant to prolong the service life of your vehicle, allowing you to use them in all tough conditions and environments. Their quality, performance and strength prevents vibrations, reduces noise and improves the overall performance of the machine in general.