

1. Bearing materials

1.1 Raceway and rolling element materials

1.1.1 High/mid carbon alloy steel

In general, steel varieties which can be hardened not just on the surface but also deep hardened by the so-called "through hardening method" are used for the raceways and rolling elements of bearings. Foremost among these is high carbon chromium bearing steel, which is widely used.

1.1.2 Mid-carbon chromium steel

Mid-carbon chromium steel incorporating silicone and manganese, which gives it hardening properties comparable to high carbon chromium steel.

1.2 Cage materials

Bearing cage materials must have the strength to withstand rotational vibrations and shock loads. These materials must also have a low friction coefficient, be light weight, and be able to withstand bearing operation temperatures.

1.2.1 Pressed cages

For small and medium sized bearings, pressed cages of cold or hot rolled steel with a low carbon content of approx. 0.1% are used. However, depending on the application, austenitic stainless steel is also used.

1.2.2 Plastic cages

Injection molded plastic cages are now widely used: most are made from fiber glass reinforced heat resistant polyamide resin. Plastic cages are light weight, corrosion resistant and have excellent dampening and sliding properties. Heat resistant polyamide resins now enable the production of cages that perform well in applications ranging between -40°C - 120°C . However, they are not recommended for use at temperatures exceeding 120°C .

2. External bearing sealing devices

External seals have two main functions: to prevent lubricating oil from leaking out and, to prevent dust, water, and other contaminants from entering the bearing. When selecting a seal, the following factors need to be taken into consideration: the type of lubricant (oil or grease), seal peripheral speed, shaft fitting errors, space limitations, seal friction and resultant heat increase, and cost.

Sealing devices for rolling bearings fall into two main classifications:
non-contact seals and contact seals.

2.1 Non-contact seals:

Non-contact seals utilize a small clearance between the shaft and the housing cover. Therefore friction is negligible, making them suitable for high speed applications. In order to improve sealing capability, clearance spaces are often filled with lubricant.

2.2 Contact seals:

Contact seals accomplish their sealing action through the contact pressure of a resilient seal (the lip is often made of synthetic rubber) the sealing surface. Contact seals are generally far superior to noncontact seals in sealing efficiency, although their friction torque and temperature rise coefficients are higher. Furthermore, because the portion of a contact seal rotates while in contact with the shaft, the allowable seal peripheral speed varies depending on seal type.