

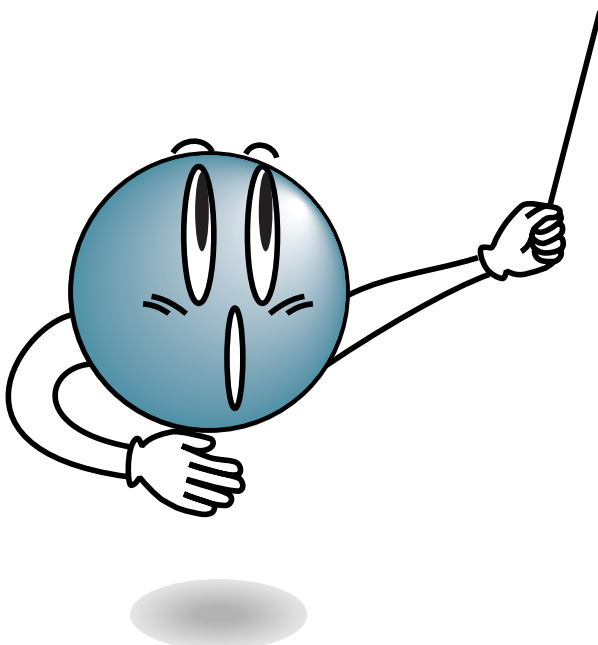
For New Technology Network



NTN corporation

Bearing Handling

Bearings are high precision parts. Improper handling will lead to premature bearing failure and machine malfunctions. Care should be taken in the handling of bearings. They should be assembled in a clean working environment to ensure that no contaminants infiltrate the bearing and they should be protected from sharp impacts. What follows is an explanation of proper bearing handling procedures.

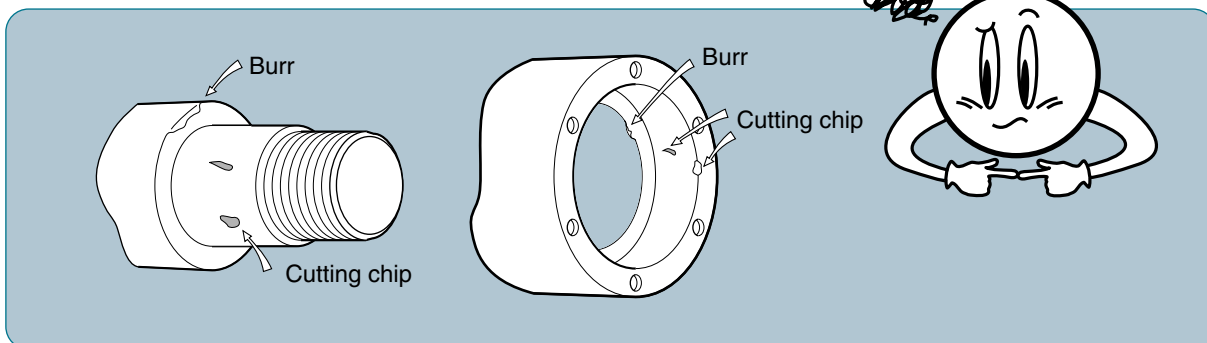


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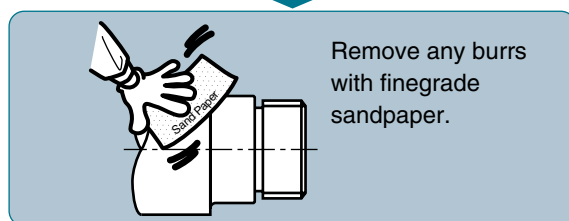
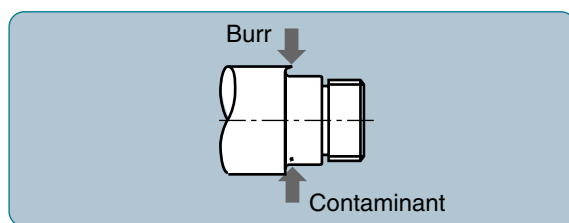
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1.1 Bearing Mounting Surfaces

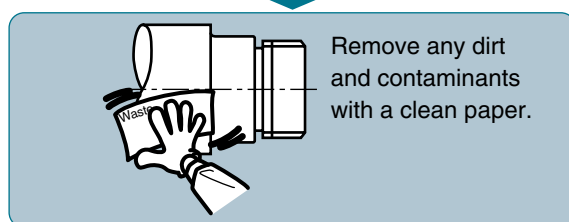
Any burrs, cutting chips, rust or dirt should first be removed from the bearing mounting surfaces. Installation can then be simplified if the clean surfaces are lubricated with spindle oil.



● Preparation Procedure



Remove any burrs with finegrade sandpaper.

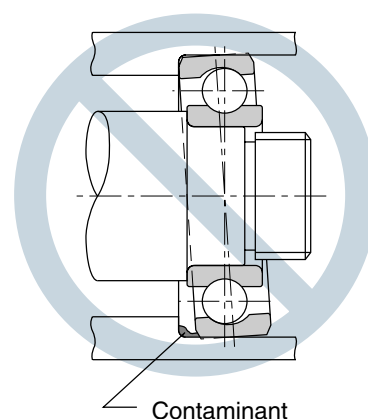
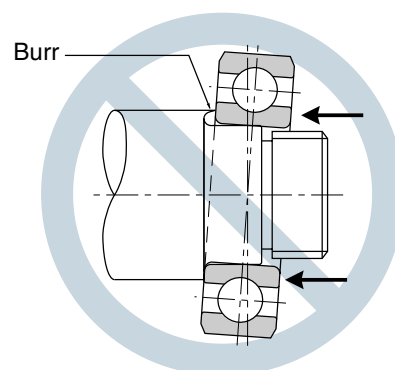


Remove any dirt and contaminants with a clean paper.



Apply light coating oil.

Burrs, dirt, and other contaminants that infiltrate the bearing before and during mounting will cause noise and vibration during subsequent operation.



1.2 Mounting Equipment

Ensure that all pressing blocks, driving plates, hammers and other mounting devices are clean, free of burrs, and of the correct size.

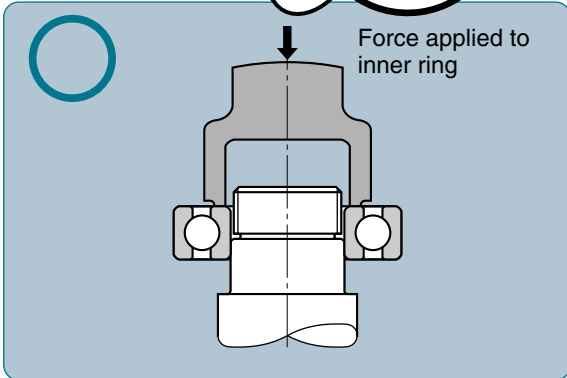
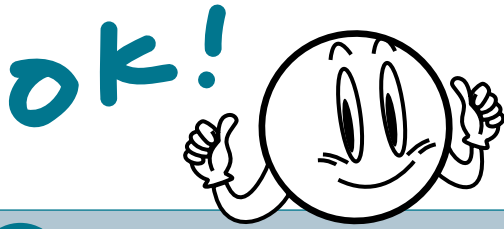
1.3 Do not Unwrap Bearings until just prior to Mounting

1.4 Do not make any modifications to the products

Bearings are manufactured to very tight tolerances in order to meet extremely high accuracy requirements. Therefore, it is imperative to take special precautions with regard to their handling.

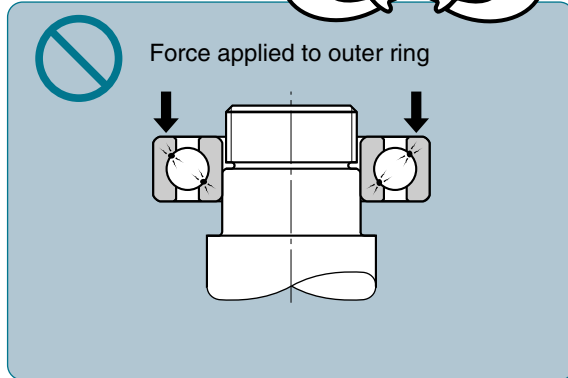
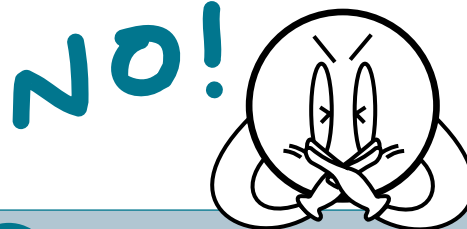
2.1 Mounting Procedures and Examples of Damage

Pressing Surfaces

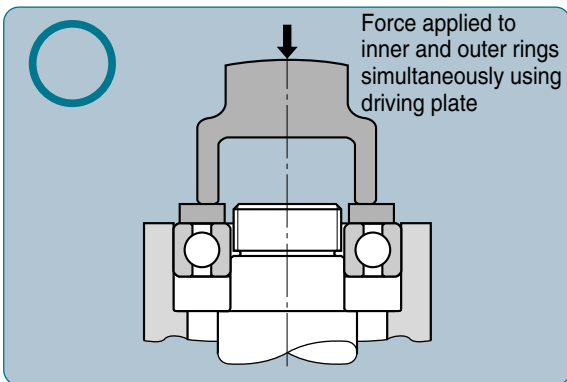
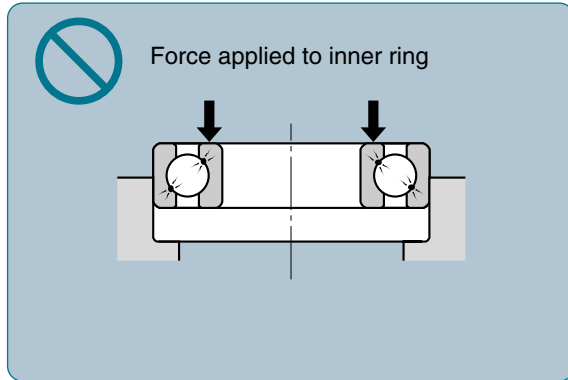
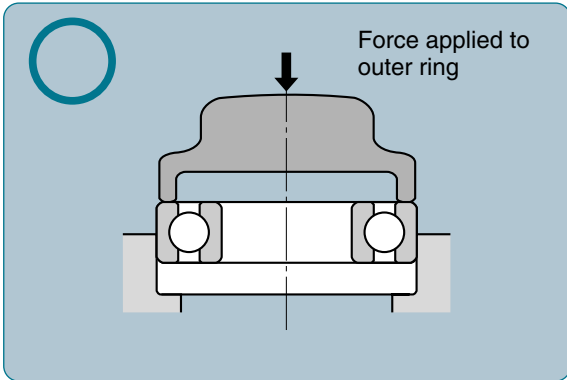


Mounting on Shaft

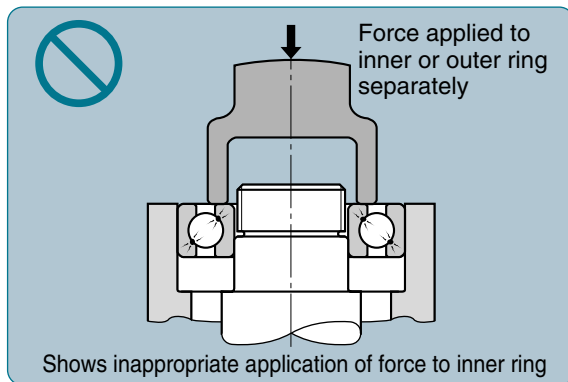
Surfaces with Zero pressing Load Tolerance



Mounting in Housing



Simultaneous Mounting on Shaft and in Housing



Furthermore, the maximum static load that bearings can withstand is shown in the NTN catalog as the bearing's "basic static load rating." This is the maximum amount of force which can be applied to the central contact area between rolling elements and raceway surfaces. If exceeded, total permanent deformation exceeding 1/10,000 of the bore diameter will result, and smooth bearing rotation will be impaired. This is the basis for establishing the basic static load ratings.

Damage Examples

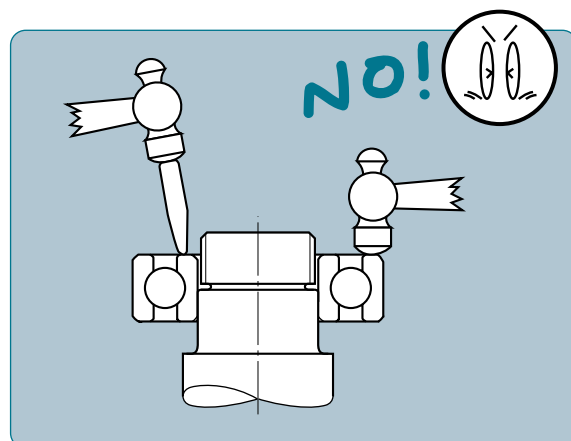
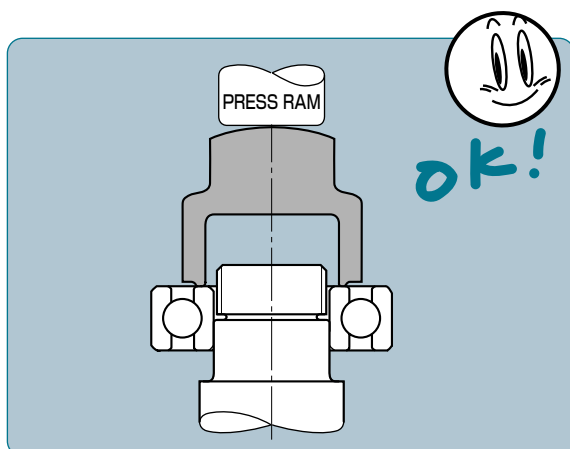


Flaking



Imbedding of solid contaminants

★Mounting bearings using a hammer causes damage due to sharp impacts. Please mount press fit bearings using a pressing arbor or other designed to provide a uniform face.

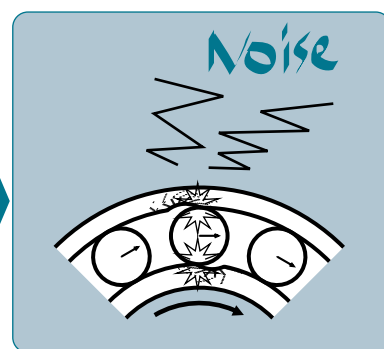
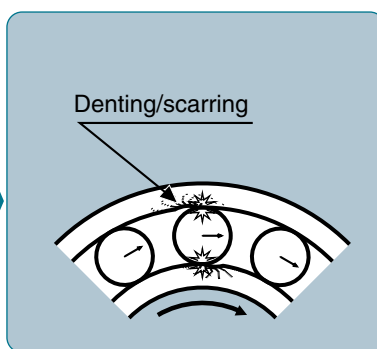
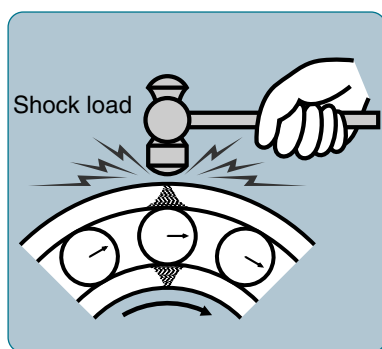


2.2 Bearing Care

★Bearings are very susceptible to impacts and shock loads!

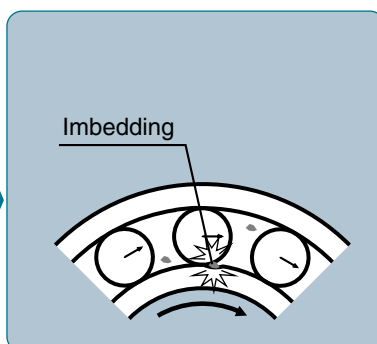
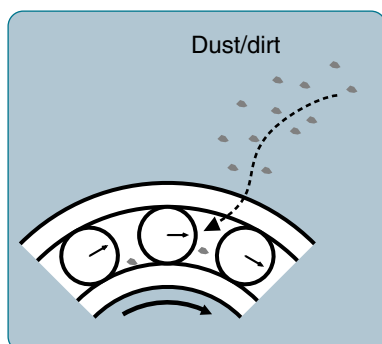
Bearings carry their loads along an extremely narrow contact surface between the rolling elements and the inner and outer raceway surfaces.

If an excessive load or impact is applied to this narrow area of contact, brinelling and/or scarring will occur. This damage leads to objectionable noise and vibration levels and rough bearing rotation. (Even dropping bearings on the floor will cause this type of damage.)



★Bearings are very susceptible to foreign particle contamination!

If foreign particles infiltrate the bearing during rotation, denting and/or scarring will occur and this will lead to poor bearing rotation and excess noise.



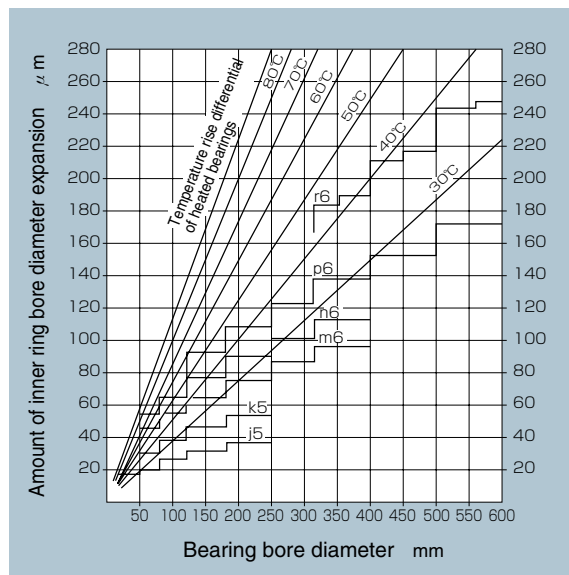
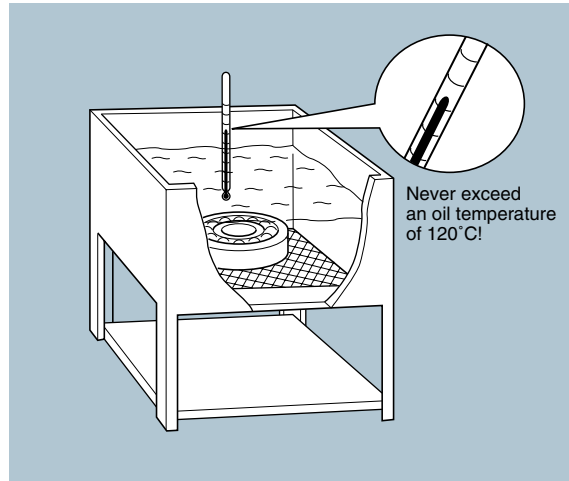
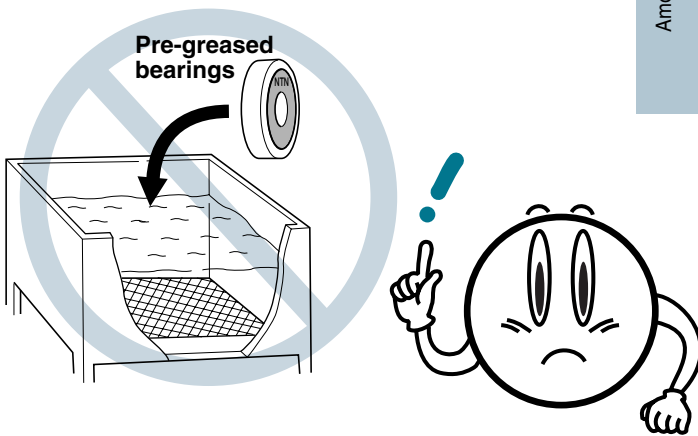
2.3 Temperature Mounting (Heat expansion of inner ring to ease installation)

Commonly used for large bearings and bearings with a heavy interference fit.

1. Immersion of the bearing in heated oil is the most common method.
Use clean oil and suspend the bearing in the oil with a wire or support it underneath using a metal screen in order to avoid uneven heating of bearing elements.
2. The temperature to which the inner ring should be heated depends upon the amount of interference fit i.e. the diameter of the interference fit surfaces. Refer to the following graph to determine the proper temperature.
3. To prevent gaps from occurring between the inner ring and shaft shoulder, bearings which have been heated and mounted on the shaft should be held in place until they have cooled completely.

★Observe these precautions when heating bearings

1. Bearings should never be heated over 120 °C.
2. This temperature mounting method cannot be used for pre-greased and sealed bearings or shielded bearings.



2.4 Other heating methods

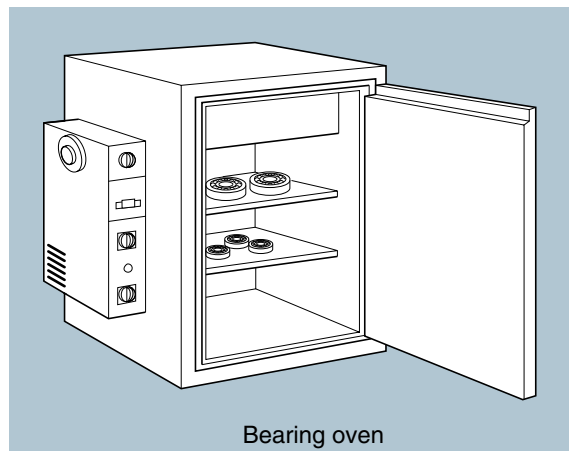
1. Bearing Oven

Bearings are dry. This method can also be used for pre-greased bearings.

★When using this method with pre-greased bearings, do not heat the bearings above 120°C.

2. Induction Heating

This method can also be used for the inner rings of cylindrical roller bearings. Bearings are dry and can be heated up in a short period of time. After using this method, administer a demagnetizing treatment to the bearing. For more detailed information concerning bearing heating methods, contact NTN.

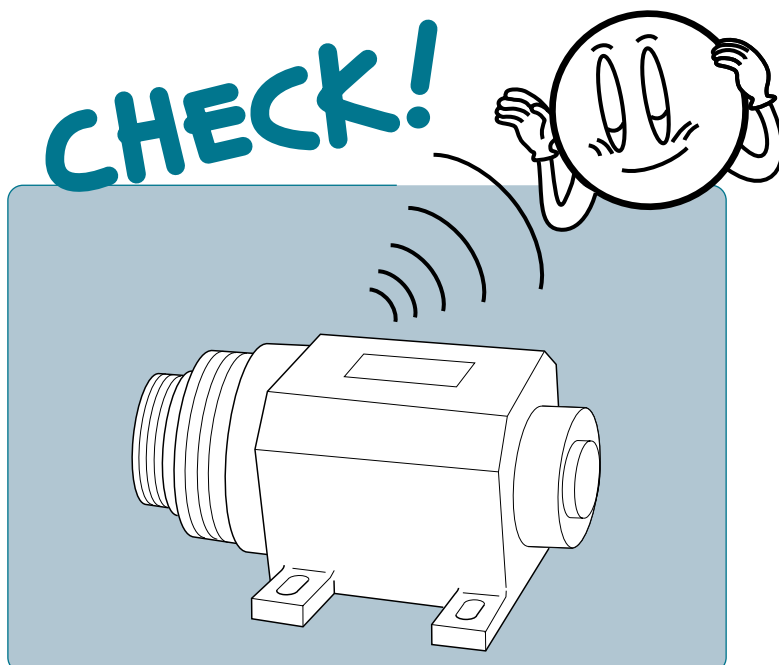


3 Inspection after Mounting

To confirm that the bearing has been mounted correctly, perform a rotation check.

1. First, rotate the shaft or housing to see whether anything unusual can be detected.
2. Next, engage the bearing without applying a load. After observing its rotational condition at low speed, slowly increase the rotational speed and load while checking for any rise in operational noise levels, vibrations and temperature.
3. If anything unusual is detected during operation, stop the bearing and perform an inspection.

★Checking for unusual noise or noise levels should be performed by someone familiar with the sound of properly mounted bearings operated under standard conditions.



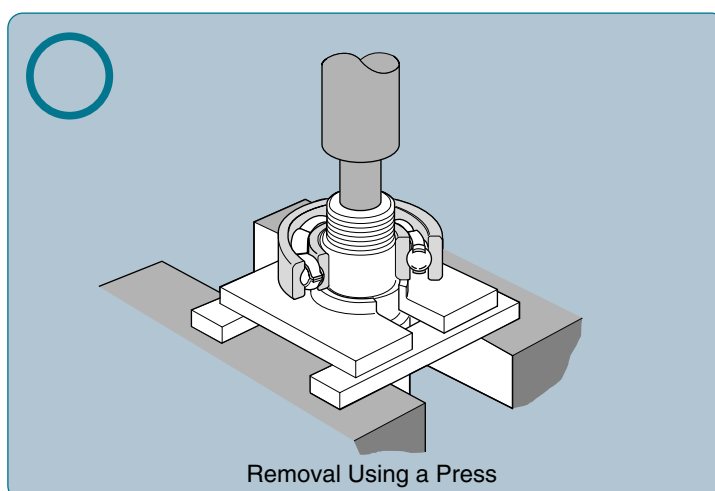
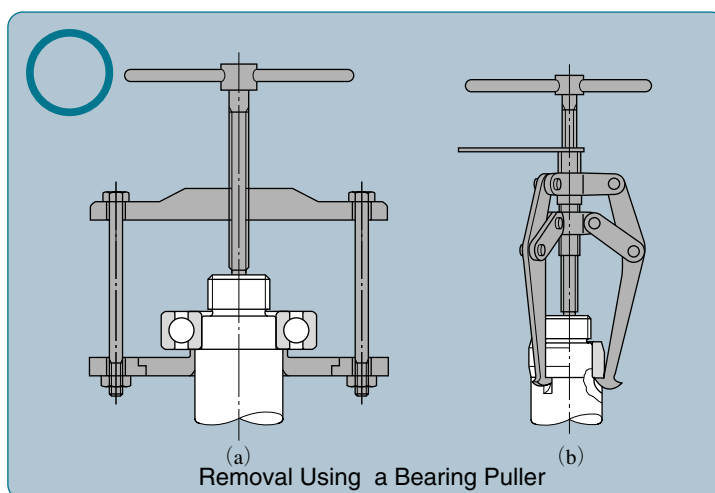
4 Bearing Removal

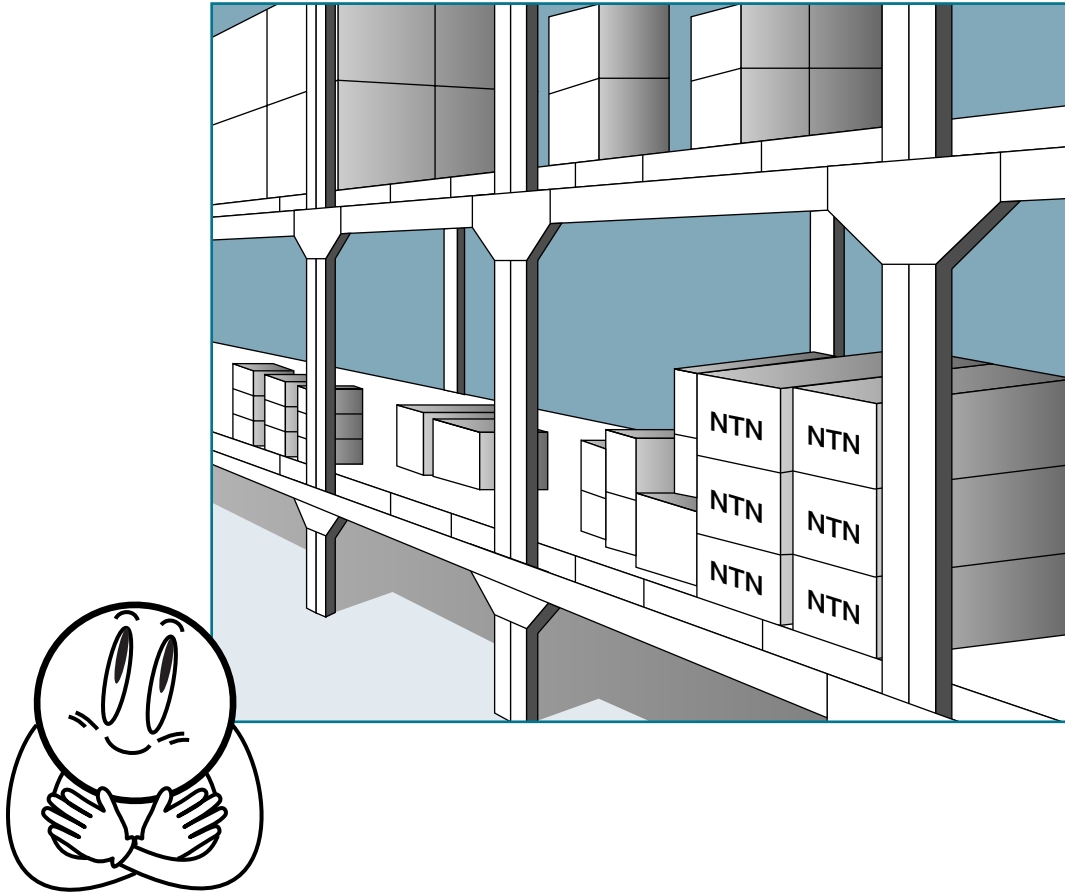
In order to avoid damage to machinery and danger to workers when changing or removing bearings, proper protective equipment and bearing removal equipment should be used.

Generally speaking, reuse of bearings is not recommended. If you are considering the reuse of a bearing, please read carefully Section 2, "Bearing Mounting."

The process mentioned therein will need to be performed in reverse when removing the bearing. In this situation, maximum care must be taken not to effect the performance of the bearing during the removal process.

If a bearing which is press fit onto a shaft is removed by applying force to the outer ring, reuse of the bearing is not recommended.





Bearings are coated with a rust preventative compound and securely packaged before delivery. Please observe the following guidelines when storing bearings.

1. Ideally, bearings should be stored in a location with low humidity, i.e. less than 60% relative humidity.
2. Bearings should never be stored on the ground, but should be stored on shelves or pallets at least 20 cm above the ground.
3. Boxes of bearings should not be stacked too high or the rust preventative compound may be squeezed out of bearings on the bottom.

The handling procedures mentioned in these pages represent basic guidelines. The observance of these guidelines does not entail all necessary procedures and precautions. Depending on the type of product, specialized handling procedures may also be required. Fulfillment of a bearing's original performance can be ensured only through the observance of proper handling procedures. When necessary, please contact **NTN** to clarify points of uncertainty.