

Bearing Maintenance and Inspection

Maintenance

Bearings and operating conditions must be periodically inspected and maintained to maximize bearing life, to prevent mechanical failure, ensure reliable operation, raise productivity, and enhance cost performance.

Maintenance should be performed regularly according to work standards that may vary according to machine operating conditions. Operating conditions should be monitored, lubricant replenished or changed, and the machine periodically disassembled and overhauled.

1. Inspection under operating conditions

Review lubricant properties, check operating temperatures, and inspect for any vibrations and bearing noise to determine bearing replacement periods and replenishment intervals of the lubricant.

2. Inspection of the bearing

Be sure to thoroughly examine the bearings during periodic machine inspections and part replacement. Check the raceway for any damage and confirm if the bearing can be reused or should be replaced.

Inspection points

Items to be checked while the machine is running should include bearing noise, vibrations, temperature, and lubricant condition.

1. Bearing noise

Sound detection instruments can be used during operation to ascertain the volume and characteristics of bearing rotation noise through sound patterns that are readily distinguishable, which can reveal the presence of bearing damage such as slight flaking. Three typical noise conditions are described in Table 1.

2. Bearing vibration

Bearing irregularities can be analyzed by performing a quantitative analysis of vibration amplitude and frequency using a frequency spectrum analyzer. Measured data varies depending on the operating conditions of the bearing and the location of the vibration pick-up. Therefore, this method requires the determination of evaluation standards for each measured machine.

Table 1. Bearing irregularity causes and countermeasures

Irregularities		Possible causes	Countermeasures
Noise	Loud metallic sound	Abnormal load	Improve the fit, internal clearance, preload, or position of housing shoulder.
		Incorrect mounting	Improve machining accuracy, alignment accuracy or mounting accuracy of shaft and housing, or use the correct mounting method.
		Insufficient or improper lubricant	Replenish the lubricant or select another lubricant.
		Contact of rotating parts	Modify the labyrinth seal, etc.
	Loud regular sound	Flaws, corrosion, or scratches on raceways caused by foreign matter	Replace or clean the bearing, improve sealing conditions, or use clean lubricant.
		Brinelling	Replace the bearing and use care when handling.
		Flaking on raceway	Replace the bearing.
	Irregular sound	Excessive clearance	Improve the fit, clearance, or preload.
		Contamination by foreign particles	Replace or clean the bearing, improve the seals, and use clean lubricant.
Flaws or flaking on balls		Replace the bearing.	
Abnormal temperature rise	Excessively small clearance	Improve the fit, clearance, or preload.	
	Excessive amount of lubricant	Reduce amount of lubricant and select stiffer grease.	
	Insufficient or improper lubricant	Replenish lubricant or select a proper one.	
	Abnormal load	Improve the fit, internal clearance, preload, or position of housing shoulder.	
	Incorrect mounting	Improve machining accuracy, alignment accuracy or mounting accuracy of shaft and housing, or use the correct mounting method.	
	Creep on fitted surface, or excessive seal friction	Correct the seals, replace the bearing, and correct the fitting or mounting.	
Vibration (Axial runout)	Brinelling	Replace the bearing, and use care when handling bearings.	
	Flaking	Replace the bearing.	
	Incorrect mounting	Correct the squareness between the shaft and housing shoulder or side of spacer.	
	Penetration of foreign particles	Replace or clean the bearing components and improve sealing.	
Leakage or discoloration of lubricant	Too much lubricant, or contamination by foreign matter or wear debris	Reduce the amount of lubricant. Select a stiffer grease. Replace the bearing or lubricant. Clean the housing and adjacent parts.	