



## Basic rules for selecting and handling of bearings

### NOTES ON SELECTING

- ◆ The efficiency of thin type bearings can be greatly affected by the precision of shaft and housing seats. The accuracy of the surrounding structure must be such that it will not adversely affect the operation of the bearing. If you have any questions, in particular regarding series 670 and 680, please contact us.
- ◆ In applications with steel crown type cages ( w type), where high acceleration, heavy loads, shock loads or vertical shafts occur or where oil is the only lubricant available, please contact us.
- ◆ Selection of fitting clearance and grease type requires a careful consideration of rotating speed, load conditions and temperature in order to prevent premature bearing failure.
- ◆ Full complement ball bearings are suitable for low speed and heavy radial load conditions. There is a danger of balls being pushed out of the bearing through the filling slot, even under light axial load. For this reason, full complement ball bearings are not suitable for supporting axial loads.

### NOTES ON HANDLING

- The actual assembly area should be kept free from dust as any contamination has a detrimental effect on the operation and life of rolling bearings. If there is any doubt concerning the cleanliness of a bearing, it can be washed with a suitable agent and then relubricated.
- When fitting bearings, the fitting forces must not be transmitted via the rolling elements. If it is necessary to heat the bearing to facilitate fitting, the temperature should not exceed +120°C.
- After assembly, the bearing should be rotated to check its correct operation. If the bearing does not appear to be functioning correctly, it should be re-examined to establish the cause of the malfunction.
- It is not advisable to mix oils and greases as this will affect the efficiency of the bearing.
- Bearings must be stored in a clean environment with stable temperature. They should be handled with care to avoid the possibility of corrosion and rusting.
- Lint-free cloth must be used to wipe shaft and housing seats to avoid the ingress of contaminants into the bearing.



## Problem, Cause, Remedy

PROBLEM		CAUSE	REMEDY
Noise	High pitched metallic noise	Poor lubrication	Improve lubrication
		Clearance too small	Correct clearance
		Poor fitting	Investigate mounting method and seating
		Excessive load	Examine shaft and housing tolerances for closing effect
	Low pitched metallic noise	Brinelled raceway surface	Avoid shock loads
	Regular noise	Rust and damage	Check and replace seals and relubricate
		Flaking of raceway surface	Improve lubrication and check fitting, clearance and fixing method
	Irregular noise	Ingress of foreign matter	Check and replace seals and relubricate
		Excessive clearance	Correct clearance
		Damage and flaking of rolling element	Reduce loads and/or clearance
Variable noise	Variable clearance due to temperature changes	Check fits taking housing material and temperature into consideration	
	Damage to raceways	Improve lubrication and check fitting, clearance and fixing method	
Heavy vibration	Flaking of raceway and rolling element	Improve lubrication and check fitting, clearance and fixing method	
	Ingress of foreign matter	Check and replace seals and relubricate	
	Excessive clearance	Correct clearance	
	Poor location	Ensure abutment face and fitting diameter are perpendicular	
Excessive heat generation	Clearance too small	Correct clearance	
	Poor location	Ensure abutment face and fitting diameter are perpendicular	
	Excessive load	Examine shaft and housing tolerances for closing effect	
	Poor lubrication	Improve lubrication	
	Creep	Maintain recommended shaft and housing fits	
Lubrication failure	Too much grease	Use correct lubricant quantity	
	Ingress of foreign matter	Check and replace seals and relubricate	



# Damage, Cause, Remedy

Incorrect handling of bearing can cause damage and shorten the life. The following list shows typical causes and suggested remedies.

PROBLEM	DAMAGE	CAUSE	REMEDY
Flaking	Flaking on one side of entire raceway	Excessive axial load by poor fitting or linear expansion	Use clearance fit on non-rotating bearing outer ring
	Flaking at rolling element pitch on raceways	Raceways brinelled during fitting	Careful fitting
	Premature flaking of raceway and rolling element surfaces	Excessive load	Check fitting Correct clearance Use correct lubricant quantity
		Clearance too small	
		Poor lubrication	
		Poor fitting	
Flaking across the raceway	Corrosion	Fitting and centering with care Use bearing with larger internal clearance Shaft and abutments to be square	
	Poor fitting and eccentricity		
	Shaft deflection		
Flaking around raceway	Geometric inaccuracy of shaft and housing	Check geometric accuracy of housing bore	
	Poor housing accuracy		
Indentations	Indentations on raceway at rolling element pitch	Shock loads during fitting or poor handling	Handling with care
	Overrolling	Excessive static load	Check static load
		Ingress of foreign matter	Ensure cleanliness of components and integrity of seals
Pick-up	Discolouration of raceway and rolling element surface	Excessive load	Check fitting
		Clearance too small	Correct clearance
	Softening of surfaces	Poor lubrication	Use correct lubricant quantity
		Poor fitting	Check fitting method
Electrical erosion	Raceway eroded at regular intervals	Arcing due to bearing conducting electricity	Ground the bearing, Insulate the bearing
Fracture	Raceway surface fracture	Excessive shock loads	Correct loading
		High interference fit	Proper fitting
		Increase of flaking and softening, welding of inner ring to shaft	Ensure correct geometry of shaft and housing
		Corner fillet radii too large	Correct fillet radii
	Rolling element fracture	Excessive shock loads	Correct loading
		Excessive internal clearance	Check fitting and clearance
	Cage fracture	Tilting moments	Fit with care
		High speed impulse and high acceleration	Ensure uniform rotation
Incorrect lubrication		Check lubricant and lubrication method	
Ingress of foreign matter in bearing		Improve sealing	
Skidding	Scoring of raceway and rolling element surfaces	Hard grease	Use soft grease
		High start-up acceleration	Control acceleration
Abrasion	Extreme abrasion of raceway, rolling element and cage	Ingress of foreign matter	Improve sealing
		Corrosion	Improve lubrication
		Poor lubrication	
	Creep	Loose fit	Correct tolerances and fitting
		Incorrectly fixed	Correct fixing
	Fretting corrosion	Small movements between surfaces	Increase interference fit
False brinelling	Vibration in non-rotating bearing	Insulate bearing from vibration Use oil as lubricant	
	Small oscillations in application	Apply preload	
Corrosion	Rust inside bearing	Poor storage	Careful storage and handling
		Condensation	
	Rust on fitting surface	Fretting	Increase interference fit
		Fluctuating load	Use oil as lubricant
	Corrosion	Ingress of acid, alkali or gas	Check sealing
	Chemical reaction with lubricant	Use correct lubricant	