

Bearing and Shaft Seal Maintenance

Course 343: Bearing and Shaft Seal Maintenance

Covers plain bearings, their parts, dimensions, functions, and relining techniques. Continues with installation and replacement of antifriction bearings. Also covers linear motion bearings and shaft seals.

TPC Training is accredited by IACET to offer **0.5 CEU** for this program.



Lesson 1: Plain Bearings

Topics

Plain Bearings; Measuring Plain Bearing Dimensions; Measuring Clearances; Plain-Bearing Linings; Bearing- and Lining-Material Characteristics; Prefabricated Bearing Liners; Poured Bearing Liners; Pouring the Babbitt; Cleaning the Bearing; Measuring and Inspecting the Shaft Journal; Installing Split-Housing Bearings; Deformation; Lubrication of Plain Bearings; Oils as Lubricants; Greases as Lubricants; Initial Run-in; Scheduling Inspections; Removing Faulty Bearings; Signs of Overheating; Troubleshooting

Objectives

- Name the important dimensions of a plain bearing.
- State the source for learning the proper running clearance in a plain-bearing installation and describe how to measure running clearance.
- State the characteristics of bearing and liner material and explain how they influence the choice of bearing for a given application.
- Discuss the steps involved in fabricating a poured babbitt bearing liner and obtaining the correct finished-bore dimensions.
- State the purpose and general principles of plain-bearing installation.
- List important factors to consider when selecting the correct lubricant for a given plain-bearing installation.
- Identify the symptoms of bearing trouble and describe how to remedy each situation.

Lesson 2: Installing Antifriction Bearings

Topics

Preparatory Cleanup; Inspecting the Bearing; Inspecting the Shaft Bearing Seat; Bearing Seating Methods; Cold Mount Techniques; Cold Mount Using Split Tapered Adapter; Temperature Mount; Mounted Internal Clearance Adjustment; Lubrication; Inspection and Maintenance

Objectives

- Describe proper procedures in handling, storing, cleaning, and inspecting antifriction bearings.
- Explain how to measure, inspect, and condition a shaft bearing seat prior to installing a new bearing.
- Tell where pressure should be applied to force a ball bearing onto a shaft.
- Name the two dimensions that are important in mounting a tapered-bore bearing on a shaft.
- Describe the steps involved in correctly seating an antifriction bearing.
- Discuss how an adapter is used to mount a bearing on a shaft.
- Describe the steps to take when using a hot-oil bath to heat a bearing for mounting.
- Name the three major signals of bearing failure in antifriction bearings.

Lesson 3: Removing and Replacing Antifriction Bearings

Topics

Preparation; Removing Retainers and Seals; Press or Impact Bearing Removal; Bearing Removal with Mechanical Pullers; Using Heat to Remove Bearings; Cleaning Used Bearings; Inspecting Used Bearings; Storing Bearings During Machine Overhauls; Replacing the Bearing; Conditioning Shaft and Housing Bore Surfaces; Replacement of Auxiliary Parts; Safety Measures

Objectives

- Describe the correct procedures for removing bearing seals and retaining devices from a bearing assembly.
- Describe the impact bearing removal technique.
- Explain how to use an aluminum heating ring to mount and dismount the inner ring of a cylindrical roller bearing.
- Discuss the steps involved in inspecting and cleaning used bearings.
- Describe the procedures for remounting sound used bearings.
- Explain how to replace a shaft seal.
- List the safety precautions that are essential to working with bearings.

Lesson 4: Mounted Antifriction Bearings

Topics

Bearing Types and Applications; Seals; Housings; Bearing Inserts and Mounting Devices; Shaft Misalignment; Installing Mounted Bearings; Pillow Block Lubrication; Regular Maintenance

Objectives

- Name the three major types of housings or mounts for bearings.
- Name the major components of a mounted antifriction bearing.
- Describe the two basic types of bearing seal and name the advantages of each.
- List the different methods of securing insert bearings to the shaft and describe the mounting methods involved.
- Discuss shaft alignment and describe bearing design factors that compensate for misalignment.
- Explain why most bearing/shaft assemblies have one free and one fixed bearing.
- List factors to consider when selecting bearing lubricants for pillow blocks.

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Lesson 5: Linear Motion Bearings and Shaft Seals

Topics

Linear Motion Bearings; Ball Bearing Screw Operation; Ball Bearing Screw Design and Performance; Ball Bearing Screw Support; Preparing for installation; Installing the Ball Bearing Screw; Ball Bearing Screw Lubrication; Shaft Seals; Shaft Seal Operation; Shaft Seal Selection; Effects of Temperature; Effects of Speed; Shaft and Housing Design; Shaft Seal Installation; Shaft Seal Removal; Troubleshooting Shaft Seals

Objectives

- Name the major components of a ball bearing screw.
- Describe the major differences between a ball bearing screw and an acme screw.
- Describe the main purpose of a ball bearing screw and give an example of a typical application.
- Describe the installation procedures for a ball bearing screw.
- Name the differences between contact and labyrinth seals and explain what creates the sealing action in each.
- List the factors that determine the choice of shaft seal.
- Describe how to install a lip seal on a shaft, including shaft preparation.
- Name the major problem that arises with lip seals and list at least four conditions that can cause it.