

Course 304: Bearings

Covers principles and applications of various types of bearings, including plain journal, ball, and roller bearings. Explains installation, inspection and repair of bearings. Deals with specialized bearings, including powdered-metal, nonmetallic, and hydrostatic bearings. Covers bearing seals, lubrication, and maintenance practices.

TPC Training is accredited by IACET to offer **1.0 CEU** for this program.



Lesson 1: Bearings and Shafts

Topics

Bearing Classification; Bearing Selection; Principles of Bearing Operation; Shafts and Shafting; Shaft Materials; Shaft Stresses; Vibration and Critical Speed; Fits and Clearances

Objectives

- Name the two main categories of bearings and cite their advantages.
- Identify bearings by the kind of support they provide.
- Describe the three kinds of stresses acting on shafts.
- Explain natural frequency of vibration and critical speed.
- Name and describe three classes of fits.

Lesson 2: Plain Journal Bearings I

Topics

Plain Journal Bearings; Advantages of Plain Journal Bearings; Lubrication; Lubricating Grooves; Seals; Types of Plain Journal Bearings; Split Bearings; Bearing Design and Selection

Objectives

- Explain the function of lubricating grooves.
- State two reasons for using seals on plain bearings.
- Name the principal types of plain journal bearings.
- Describe the structure of two kinds of precision inserts.
- Define crush and spread.

Lesson 3: Plain Journal Bearings II

Topics

Characteristics of Bearing Materials; Score Resistance; Load Capacity; Fatigue Strength; Conformability; Embeddability; Corrosion Resistance; Temperature Resistance; Bearing Materials; Inspection; Bearing Repair; Relining; Disassembly and Reconditioning; Bearing Installation

Objectives

- Name and explain the characteristics that are most important in materials for bearings.
- State advantages and disadvantages of the standard types of bearing materials.
- Describe standard practices for inspecting bearings.
- Explain bearing repair procedures.

Lesson 4: Antifriction Bearings I

Topics

Antifriction Bearings; Operating Principles; Bearing Materials; Cage Materials; Lubrication of Antifriction Bearings; Seals and Shields; Bearing Classifications; Tolerances; Bearing Installation

Objectives

- Identify the functions of the various parts of a typical rolling-element bearing.
- Explain the three elements of the AFBMA code.
- Define the categories of tolerances for ball bearings.
- Describe the factors that influence running accuracy of bearings.

Lesson 5: Antifriction Bearings II

Topics

Bearing Design; Environment; Mounting Types; Radial and Axial Clearance; Fixed and Floating Bearings; Bearing Fits; Squareness and Alignment; Mounting Methods; Mounting for Precision Applications; Bearing Applications

Objectives

- Name the factors that must be considered in the design of antifriction bearings.
- Describe the process of checking adequate running clearances for bearings.
- Explain the reasons for using fixed and floating bearings together.
- Describe the common methods of mounting bearings.

Lesson 6: Ball and Roller Bearings

Topics

Ball and Roller Bearings; Ball Bearings; Basic Ball Bearings; Single-Row, Angular-Contact Bearings; Double-Row, Angular-Contact Bearings; Other Ball Bearings; Two-Piece, Inner-Ring Bearings; Fractured-Ring Bearings; Bearing Series; Roller Bearings; Cylindrical Roller Bearings; Spherical Roller Bearings; Tapered Roller Bearings; Needle Roller Bearings

Objectives

- Name the three basic ball bearing designs and describe their characteristics.
- Explain the purposes served by the basic roller bearing shapes and their variations in typical applications.

Lesson 7: Specialized Bearings

Topics

Thrust Bearings; Self-Aligning Bearings; Linear-Motion Bearings; Mounted Bearings; Instrument Bearings; Unground Ball Bearings; Powdered-Metal Bearings; Nonmetallic Bearings; Other Materials; Hydrostatic Bearings

Objectives

- Identify ten specialized bearings.
- Describe a specific function or application of each of these bearing types.

Lesson 8: Bearing Seals

Topics

Why Seals Are Used; Seal Functions; Labyrinth Seals; Oil Seals; Oil Seal Terminology; Oil Seal Classification; Special Seals; Seal Selection; Other Seal Materials; Seal Applications; Other Special Seals; O-Rings and Mechanical Seals

Objectives

- Identify the functions of bearing seals.
- Describe the construction and operation of labyrinth and oil seals.
- Explain the two classification systems for oil seals.
- Name typical applications for the different kinds of seals.

Bearings**Lesson 9: Lubrication***Topics*

Lubrication Practices; Bearing Lubrication and Lubricants; Oil Lubrication; Grease Lubrication; Special-Purpose Greases; Packing Bearings; Lubrication Equipment; Manual Lubricating Devices; Natural Oil Lubrication Systems; Pressurized Oil Lubrication; Automatic Oil Lubricating Devices; Automatic Grease Lubrication Systems; Rules for Lubrication

Objectives

- State typical applications for oil lubrication of bearings.
- Detail the cleaning procedures for different oil lubrication systems.
- Discuss the three qualities that are the bases for selecting a grease lubricant.
- Give five easy rules for lubricating bearings.

Lesson 10: Bearing Maintenance*Topics*

Bearing Maintenance; Installing Plain Journal Bearings; Installing Antifriction Bearings; Mounting a Bearing; Bearing Removal; Bearing Loading Patterns; Bearing Failure Terminology; Bearing Cleaning

Objectives

- Identify a principal cause of early bearing failure.
- Describe installation procedures for antifriction and plain journal bearings.
- Name the different types of bearing failure and their causes.
- Tell how bearings should be cleaned and lubricated after inspection.