

Pump Installation and Maintenance

Course 344: Pump Installation and Maintenance

Covers basic pumping concepts. Describes required maintenance of packing and seals. Covers maintenance and overhaul of centrifugal pumps. Concludes with maintenance of rotary pumps.

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



Lesson 1: Basic Pumping Concepts

Topics

Force; Work; Power; Horsepower; Energy; Velocity and Acceleration; Static Suction Lift; Pressure Losses; Available NPSH; Required NPSH; Checking Pump Capacity; Pumping Hot Water; Computing Pump Power Requirements; Effects of Operational Factors; Priming a Pump

Objectives

- Compute the amount of work done when given values for force and distance.
- Name the two types of energy.
- Check pump capacity by determining NPSHA of the system.
- Compute the brake horsepower required to drive a pump under given conditions.
- Explain how to prime a fluid-handling pump.

Lesson 2: Maintaining Packing and Seals

Topics

Uses of Packing and Seals; Two Types of Seals; Packing; Selecting Packing Material; Removing Old Packing; Installing New Packing; Packing Precautions; Mechanical Seals; Mechanical Seals Versus Packing; Types of Mechanical Seals; Installing Mechanical Seals; Maintaining Packing and Seals; Troubleshooting Packing and Seals

Objectives

- Identify the two major functions of packing and seals.
- Explain selection and installation of packing rings on a pump shaft.
- Identify the components of typical mechanical seals.
- Name at least three advantages of mechanical seals over packing.
- Describe how to install a mechanical seal on a pump shaft.
- Discuss the care and maintenance of packing and seals.

Lesson 3: Maintaining Centrifugal Pumps

Topics

Installing the Pump; Preparing the Foundation; Fabricated Steel Baseplates; Leveling the Baseplate; Checking Shaft Alignment; Grouting the Baseplate; Mounting Pump and Motor Separately; Compensating for Heat; Installing Auxiliary Pump Drives; Maintaining Centrifugal Pumps; Inspecting Packing and Seals; Inspecting Bearings; Motor and Drive; Avoiding Common Pump Problems; Cavitation; Ring Seizure; Overheating; Pump Operation; Scheduling Maintenance; Troubleshooting

Objectives

- Explain how to align and level a pump on its base.
- Explain the needs for and uses of auxiliary pump drives.
- Identify the major symptom of faulty packing.
- Identify the major symptom of cavitation on a pump impeller.
- Describe the causes and remedies of common centrifugal pump problems.
- Tell how to conduct a periodic inspection of the major pump components.

Lesson 4: Overhauling Centrifugal Pumps

Topics

Preparation; Work Areas and Rigging; Moving a Pump; Disassembling a Pump; Inspecting Pump Parts; Checking Clearances; Reassembling a Pump; Reinstalling a Pump

Objectives

- Describe the procedures involved in disassembling, inspecting, reassembling, and reinstalling a centrifugal pump.
- Explain how to check the runout of a pump shaft.
- Explain how to check the clearances between stationary rings and the impeller or rotating rings.
- Describe how to make a new housing gasket.

Lesson 5: Maintaining Rotary Pumps

Topics

Types of Rotary Pumps; Gear-Type Rotary Pumps; Vane-Type Rotary Pumps; Axial Flow Pumps; Installing Rotary Pumps; Aligning Pump and Piping; Direction of Rotation; Pump Start-Up; Maintaining Rotary Pumps; Scheduling Inspections and Maintenance; Troubleshooting Rotary Pumps

Objectives

- Identify the differences between the different types of rotary pumps.
- Trace the path of fluid through a rotary pump.
- Identify the major problem areas in a rotary pump.
- Explain how to troubleshoot some of the common problems of rotary pumps.
- Create a maintenance schedule for inspections and a record-keeping log.