

ATPL-2510: PUMPS

Cuyahoga Community College

Viewing: ATPL-2510 : Pumps**Board of Trustees:**

2012-06-28

Academic Term:

Spring 2019

Subject Code

ATPL - Applied Ind Tech - Plumbers

Course Number:

2510

Title:

Pumps

Catalog Description:

Pumps, pump theory, and different systems used to pump various viscous liquids in plumbing systems. Reviews basic electricity and applies that knowledge to sequence of operations of pumping controls. Includes pump installation and alignment procedures and safety.

Credit Hour(s):

2

Lecture Hour(s):

2

Requisites**Prerequisite and Corequisite**

Departmental approval: admission to Plumbers' apprenticeship program.

Outcomes**Course Outcome(s):**

1. Identify safety regulation to be followed while installing and troubleshooting problems with pumps.

Course Outcome(s):

2. Discuss pump theory and its application to mechanical systems.

Course Outcome(s):

3. Explain the classifications of pumps and list the different types and operation of each.

Course Outcome(s):

4. Discuss field installation procedures that are followed during installation of pumps.

Course Outcome(s):

5. Discuss the operation and effects of centrifugal force on pumps and identify different types of impellers that are used.

Methods of Evaluation:

1. Homework
2. Quizzes

- 3. Tests
- 4. Participation

Course Content Outline:

- 1. Safety regulations/troubleshooting
 - a. Occupational Safety and Health Administration
 - i. Electrical safety
 - ii. Material handling
 - iii. Rigging
 - iv. Tool operation
 - b. National Electrical Code
 - i. Arcing hazards
 - ii. Ground fault protection
 - iii. Tool and equipment grounding
 - c. Electrical potential
 - i. Voltmeters
 - 1. Safe currents
 - 2. Live currents
 - ii. Ammeters
- 2. Pump theory
 - a. Mechanical systems
 - i. Fluid flow
 - ii. Static head pressures
 - b. Pump operation
 - i. Impellers
 - ii. Rotation
 - iii. Difusers
 - c. Performance curves
 - i. Horsepower considerations
 - ii. Pressure boost
 - iii. Gallons per minute of flow
 - iv. Feet of head
 - d. Open and closed systems
 - i. Pressure
 - 1. Static
 - 2. Pump
 - ii. Pipe diameters
 - iii. Gallons per minute of output
- 3. Pump classification
 - a. Types
 - i. Centrifugal
 - ii. Jet
 - iii. Reciprocating
 - b. Operations
 - i. Recirculating
 - ii. Well pumps
 - iii. Direct
 - c. Pressure and pump operations
 - i. Pressure loss
 - 1. Pipe length
 - 2. Management
 - ii. Pump loading
 - 1. Pounds of weight
 - 2. Pressure
 - d. Friction loss
 - i. Effects
 - 1. Changes in head pressures
 - 2. Static pressures
 - ii. Flow rate
- 4. Field installation procedures

- a. Pump positioning
 - i. Coupling alignment
 - ii. Motor alignment
 - iii. Piping
 - b. Foundation considerations
 - i. Base plate
 - ii. Anchors
 - iii. Vibration dampening
 - iv. Grouting
 - v. Sealing
 - c. Construction drawings
 - i. Pump location
 - ii. Energy sources
 - d. Base plate considerations
 - i. Size
 - ii. Securing method
 - iii. Grout
 - 1. Non-shrinking
 - 2. Thickness and spread
 - 3. Consistency
 - iv. Flexible couplings
 - 1. Suction deffusers
 - 2. Motor housings
 - v. Sealing method
5. Centrifugal force
- a. Effects
 - i. Dispersion graphs
 - ii. Diffusers
 - iii. Volute
 - b. Pump efficiency
 - c. Impellers
 - i. Open end suction
 - ii. Semi enclosed
 - iii. Enclosed
 - iv. Double suction
 - d. Waste water discharge
 - i. Control panel
 - ii. Mercury float switches
 - iii. Lifting cables
 - iv. Basin specifications
 - v. Check valves

Resources

United Association Journeymen Apprentices. *United Association Journeyman Apprentices Pumps*. International Pipe Trades Joint Training Committee, Inc., 2000.

National Fire Protection Association. *National Electrical Code 2011*. 1st. Delmar Cengage Learning, 2010.

Resources Other

1. Power points and handouts - Plumbers Local 55 JATC
2. Hampden Bulletin285-EX Ed 2nd
3. Thrush Engineering Inc.

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