

ATMW-1350: HYDRAULICS/CENTRIFUGAL PUMPS

Cuyahoga Community College

Viewing: ATMW-1350 : Hydraulics/Centrifugal Pumps

Board of Trustees:

2012-06-28

Academic Term:

Fall 2025

Subject Code

ATMW - Appld Ind Tech - Millwrighting

Course Number:

1350

Title:

Hydraulics/Centrifugal Pumps

Catalog Description:

Covers the operation and the maintenance of overhung centrifugal pumps and mechanical seals. Disassembly, inspection, checking clearances and rebuilding these pumps to industry standards will be an integral part of this course.

Credit Hour(s):

2

Lecture Hour(s):

2

Requisites

Prerequisite and Corequisite

Departmental approval: Admissions to Millwrighting Technology apprenticeship program.

Outcomes

Course Outcome(s):

N/A

Objective(s):

1. Explain the construction and design of a centrifugal pump.
2. Use precision tools accurately.
3. Disassemble, inspect, rebuild and reassemble a centrifugal pump.
4. Set a mechanical seal.
5. Draw and define a pump curve.

Methods of Evaluation:

1. Quizzes
2. Tests
3. Class participation
4. Field exercises

Course Content Outline:

1. Introduction to pumps
 - a. Operation and classifications
 - i. Positive & dynamic
 - ii. American National Standards Institute & American Petroleum Institute
 - iii. Pump safety
 - b. Pump components
 - i. Suction
 - ii. Casing
 - iii. Impeller
 - iv. Stuffing box
 - v. Discharge
 - vi. Bearings
 - vii. Shaft
 - viii. Gland
2. Precision tools
 - a. Recording measurements
 - i. Micrometers
 - ii. Calipers
 - iii. Dial indicators
 - iv. Depth gage
 - v. Telescoping gage
 - b. Calibration of precision tools
3. Sealing devices
 - a. Packing
 - i. Types
 - ii. Installation/removal
 - iii. Lantern rings
 - b. Mechanical seals
 - i. Classifications
 - ii. Installations
4. Pump performance
 - a. Frictional losses
 - i. Pipe
 - ii. Valves
 - iii. Strainers
 - iv. Elbows
 - b. Head
 - i. Static
 - ii. Frictional
 - iii. Pressure
 - iv. System
 - c. Pump curves
 - i. Distinguishing head from flow
 - ii. Recording & graphing
5. Pump disassembly & reassembly
 - a. Safety
 - i. Product being pumped
 - ii. Temperature
 - iii. Closing and blanking of lines
 - b. Disassembly
 - i. Separating back pullout case
 - ii. Removing impeller
 - iii. Seal chamber gland
 - iv. Power end (bearings & seals)
 - v. Press bearings off shaft
6. Inspections
 - a. Axial movement
 - b. Radial deflection

- c. Shaft run out
- d. Stuffing box perpendicularity
- e. Bearing and shaft measurements
- f. Record all readings
- 7. Reassembly
 - a. Heat bearings
 - b. Assemble components

Resources

Carpenters International Training Fund. *UBC/Flowserve Pump Repair Technician Level 1*. Carpenters International Training Fund, 2011.

L. S. Starrett Company. *Tools Rules for Precision Measuring*. L. S. Starrett Company, 2007.

Centrifugal Pump Design. *Centrifugal Pump Design*. Centrifugal Pumps Inc., 2007.

Gould Pumps. *Introduction to Pump Curves*. Berea, OH: Gould Pumps, 2001.

Jacques Chaurrette p.eng. *Centrifugal Pump Systems*. Quebec Canda Fluid Design Pub, 2005.

Resources Other

1. www.scribd.com/doc/57132560/Centrifugal-Pump-Systems
2. fliiby.com/file/825468/wph735jli8.html
3. www.absoft.info/docs/hvac-pump-handbook-scribd
4. pdftop.net/cameron+hydraulic+data-pdf/

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