



Course Name	Pump Installation and Maintenance
Credit Hours	3 Hours
Instructor(s)	Jerry Durham
Fee	\$30.00

Course Description

This course introduces operators to pumping systems, hydraulics, basic pumping terminology, and pump curves. We will also look at a number of pump types, including end-suction centrifugal pumps, propeller pumps, turbine pumps, and rotary pumps. For each pump type, we'll discuss internal parts, construction, and operation. This course has no prerequisites.

Learning Objectives

After completing this course, the licensee will be able to:

- Describe dead-end and recirculating hot water distribution systems.
- List several special considerations involved in chemical pumping systems.
- Define the term viscosity and give examples of high-viscosity materials.
- Describe suction head and suction lift pumping conditions.
- Tell what three elements make up total dynamic head.
- Define static suction head.
- Contrast liquid, brake, and electrical horsepower.
- Tell what information can be gained from pump curves.
- Describe the function of the following: pump casing, shaft, impeller, wear rings, and stuffing box.
- Contrast frame-mounted and close-coupled end- suction pumps.
- Give characteristics of fluids pumped with open, semi-open, and closed impellers.
- Name an advantage and a disadvantage each for stainless steel and brass shaft sleeves.
- Explain the construction of a lineshaft turbine pump.
- Name the two types of flow in a propeller pump.
- Tell the function of diffuser vanes in an axial-flow propeller pump.
- Define electrochemical corrosion and state its cause.
- Describe fluids that can be pumped by a regenerative turbine pump.
- Describe the fluids that can be pumped by a rotary pump.
- Explain the operation of external- and internal-gear pumps.
- Describe the parts and construction of a lobe pump.
- Compare/contrast timed- and untimed-screw pumps.
- Tell why sealed bearings might be used in a vane pump.

Equipment Requirements

You must have an active, working internet connection to access this course online, as well as a platform to access the internet, such as a computer, tablet, or phone. All popular web browsers are supported, including Google Chrome, Mozilla Firefox, Safari, and Opera. No specialized software, speaker, microphone, or web camera is required.

Schedule and Location

This course is available online at any time at www.AYPOTech.com. Upon enrolling in the course, students will have access for 365 days or until the agency-issued course expiration date, whichever comes first. After the access expiration date, the student may re-activate their course if the course approval has not expired. If they do not re-activate, the course will be removed from the student's account and any progress in the course will be lost. Before the access expiration date, the student may sign in and out of the course as many times as needed to complete the course.

Student Support

Both general and technical support is available to the student before, during, and after taking the course online. Students have access to general customer support via phone, chat, and email. Students have access to the course instructor via email. All questions, concerns, and comments received will be responded to within one business day.

Participation/Interactivity Verification

Timed Logs - Per our company's record retention policy, each student's every log-in, log-out, and lesson/assessment completion time is tracked and retained as part of the student record.

Review Questions - After each section of text, students must answer a review question. Students cannot progress in the course until the question between sections has been answered correctly.

Global Timer - Students will not get credit until they spend a minimum of 180 active minutes total in the course.

Identity Verification

Unique Username/Password - Each student that wants to complete a training course with us must create an account by registering a unique personal email address and password. The student must enter this unique identifier every time they take a break from the course.

Assessment Details

Review Questions - The student must successfully answer all review questions between sections to get credit for the course. If their first response is incorrect, students will have to try again until they choose the correct answer.

Pump Installation and Maintenance Timed Syllabus

Section	Topic	Questions	Minutes
	Basic Pumping Concepts		
1	Force and Work	1	5
2	Power and Horsepower	2	5
3	Energy	1	4
4	Velocity and Acceleration	1	6
5	Static Suction Lift	1	5
6	Pressure Losses: Friction and Vapor Pressure	1	4
7	Available and Required Net Positive Suction Head (NPSH)	2	5
8	Checking Pump Capacity and Pumping Hot Water	1	5
9	Computing Pump Power Requirements and Effects of Operational Factors	2	6
10	Priming a Pump	1	4
	Maintaining Packing and Seals		
11	Uses and Types of Packing and Seals	1	3
12	Packing	1	6
13	Selecting Packing Material	1	3
14	Removing Old Packing	1	4
15	Installing New Packing	1	7
16	Testing New Packing and Packing Precautions	1	4
17	Mechanical Seals	2	4
18	Mechanical Seals versus Packing	1	3
19	Types of Mechanical Seals	1	6
20	Installing Mechanical Seals	1	5
21	Maintaining and Troubleshooting Packing and Seals	2	6
	Maintaining Centrifugal Pumps		
22	Installing the Pump and Preparing the Foundation	1	4
23	Fabricated Steel Baseplates	1	4
24	Checking Shaft Alignment and Grouting the Baseplate	1	4
25	Mounting Pump and Motor Separately	1	4
26	Compensating for Heat and Installing Auxiliary Pump Drives	1	4
27	Maintaining Centrifugal Pumps	1	2
28	Inspecting Packing, Seals, and Bearings	1	3
29	Motor and Drive	1	2
30	Avoiding Common Pump Problems	1	2
31	Cavitation	1	3
32	Ring Seizure	1	3
33	Overheating	1	2
34	Pump Operation	1	4
35	Scheduling Maintenance and Troubleshooting	1	4

	Overhauling Centifugal Pumps		
36	Preparation, Work Areas, and Rigging	1	4
37	Moving a Pump	1	3
38	Disassembling a Pump	3	10
39	Inspecting Pump Parts	2	8
40	Checking Clearances	1	2
41	Reassembling a Pump	2	8
42	Reinstalling a Pump	1	2
	Maintaining Rotary Pumps		
43	Types of Rotary Pumps	1	2
44	Gear-Type and Vane-Type Rotary Pumps	1	7
45	Axial-Flow Pumps	1	2
46	Installing Rotary Pumps	1	3
47	Aligning Pump and Piping	1	3
48	Direction of Rotation	1	2
49	Pump Start-Up	1	3
50	Maintaining Rotary Pumps	2	8
51	Scheduling Inspections and Maintenance	1	2
52	Troubleshooting Rotary Pumps	2	8
	Totals:	63	222
	Student Minimum Time Required:		180