



Course Name	Pumps Part 2
Credit Hours	3 Hours
Course Description	This course continues looking at additional pump types, including reciprocating pumps, metering pumps, and special purpose pumps. For each pump type, we'll discuss internal parts, construction, and operation. We also discuss sealing devices, including packing and mechanical seals, bearings, lubrication, and installation.
Course Objectives	<p>After completing this course, the licensee should be able to:</p> <ul style="list-style-type: none">• Name the parts that make up the power end of a reciprocating pump and describe their operation.• Define the terms single-acting pump and double-acting pump when given the piston ratio and motor air supply.• Explain how the pumped fluid lubricates a reciprocating pump.• Calculate the discharge pressure of an air-driven pump• Compare simplex and duplex pumps• Tell what pumps are used for metering applications.• Describe metering pump lubrication techniques.• Name the parts of a diaphragm metering pump and state the function of each.• Explain the operation of a diaphragm metering pump.• Describe the operation of a flexible-tube pump.• Give an application for a progressing-cavity pump.• Name one disadvantage of a sealless magnetic-drive pump.• Explain how to prepare a new centrifugal pump for operation.• Tell which parts of a reciprocating slurry pump require the most maintenance.• Tell why slight leakage through shaft seals is necessary.• Name the type of stuffing box required for pumps operating under suction lift conditions.• Give a typical application each for cotton, Teflon® and aluminum packing.• Describe the procedure for replacing pump packing.• Describe a packingless seal.• Name three types of antifriction bearings.

- Name three factors to consider when preparing pump lubrication schedules.
- Describe a typical application for both felt and synthetic bearing seals.
- Tell the two major maintenance problems encountered in rotary pumps.

Course Timed Syllabus

Attached

Method of Presentation

This online course uses instructor-led video, animation, text, and images. Multiple choice questions are used to test how well the student understands the material between each section. Each answer choice has a response which tells the student whether the selected answer is correct or not.

Schedule and Location

This course may be taken at any time at www.aypotech.com. The student may sign in and out of the course as many times as needed to complete the course.

Attendance Verification

Licensees can only access the training course using a secure username and password, linked to their unique email address.

Method of Evaluation

The licensee must complete all multiple-choice questions between sections correctly to get credit for the course. If their first response is incorrect, students will have to try again until they choose the correct answer. Question choices are randomized, so each participant will have a unique testing experience.

The course is also timed; participants will not get credit until they spend at least 180 active minutes in the course.

After successful completion of the course, the licensee is required to complete and submit a questionnaire in order to access their certificate of completion.

Instructor(s)
Cost

Ralph Stevens
\$30

Pumps Part 2 Timed Syllabus

Section	Topic	Questions	Word Count	Minutes
Reciprocating Pumps				
1	Reciprocating Pump Applications	1	243	3.0
2	Reciprocating Pump Parts	3	384	6.2
3	Reciprocating Pump Classifications	1	361	4.0
4	Steam-Driven Pump Operation	1	770	7.4
5	Power Pump Operations	1	126	2.1
6	Horizontal Plunger Pumps	1	191	2.6
7	Vertical Plunger Pumps	1	196	2.6
8	Air-Driven Pump Operation	2	1152	11.6
Metering Pumps				
9	Introduction to Metering Pumps	1	158	2.3
10	Metering Pump Classifications	2	256	4.1
11	Plunger and Piston Metering Pumps	3	934	10.8
12	Diaphragm Pumps	3	823	9.9
13	Air-Operated Metering Pumps	1	412	4.4
14	Rotary Metering Pumps	3	301	5.5
Special Purpose Pumps				
15	Handling Difficult Materials	1	112	1.9
16	Chemical Pumps	1	434	4.6
17	Special Chemical Pumps	1	717	7.0
18	Magnetic-Drive Pumps	1	286	3.4
19	Canned-Motor Pumps	2	127	3.1
20	Centrifugal Slurry Pumps	1	191	2.6
21	Pulp-Handling Pumps	1	83	1.7
22	Trash and Sewage Pumps	1	298	3.5
23	Diaphragm Pumps	1	232	2.9
24	Reciprocating Slurry Pumps	1	221	2.8
25	Vortex Pumps	2	341	4.8
Packing and Seals				
26	Pump Sealing Requirements	1	202	2.7
27	Stuffing Boxes	3	928	10.7
28	Packing Materials	1	266	3.2
29	Installing Packing	2	514	6.3
30	Mechanical Seals	3	887	10.4
31	Special Seals	1	277	3.3
Pump Maintenance				
32	Pump and Sleeve Bearings	1	222	2.9
33	Antifriction and Special Bearings	1	555	5.6
34	Bearing Lubrication	4	729	10.1
35	Bearing Seals	3	419	6.5
36	Pump Installation and Maintenance	1	470	4.9
37	End-Suction Centrifugal Pumps	1	263	3.2
38	Vertical Turbine Pumps	1	133	2.1
39	Rotary Pumps	1	150	2.3
40	Reciprocating Pumps	1	122	2.0
41	Difficult Material Pumps and Other Maintenance Problems	1	135	2.1
Totals:		63	15621	193.2
Time Required to Complete Course:				180

Ralph Stevens

Certificates/Licenses

- Certified Maintenance Reliability Professional
- Grade 4 Electrical/Instrumentation & Grade 3 Water Treatment Operator Licenses (CA)
- Grade 3 Operator, Maintenance Technician, & Grade 1 Collection Operator Licenses (AZ)

Instructional Experience

TPC Training/JADE Learning/American Safety Council 2017 - present

Conducts training seminars, assessing the training needs and comprehension of the students, preparing training material and agenda, continually enhancing technical instructional delivery and presentation skills, adjusting course content in accordance with business needs and regulatory requirements, and ensuring the quality of the course content throughout a course life cycle. Over 600 hours of classroom instructional experience per year.

California Water Environment Association

Class trainer for Electrical/Instrumentation licensees. Workshop trainer for Reliability Centered Maintenance.

Technical Experience

Maintenance Reliability Supervisor (CCWRD) 2017 - 2020

Helping leadership enhance the district into RCM, RCD, and Operational Excellence.

Planner/Scheduler (Clark County Water) 2012 - 2014

Planned, scheduled, inspected work performed along with mentoring staff at the WWTP, lift stations and lagoons. Instructed staff on the install, repair, and maintenance of motors, pumps, SCADA, controls, plant facilities and project management. Used Maximo EMS to monitor and control work flow, budgets, assets, and cost roll up. Served as onsite safety trainer, odor compliant person, and site inspector. Performed root cause analysis and predictive maintenance on plant equipment.

Electrical Supervisor (Metropolitan Water Reclamation) 1978 - 2012

Supervised Electrical Department in all wastewater processes, SCADA control wave, lift stations, deep tunnel, power plant sub-stations, control structures, disinfection, ozone, pumps, tide gates, and day-to-day operations. Supervised 4 WWTP operators, 24 electricians, support trades and contract workers. Setup the Mainsaver CMMS system, asset management, job and safety plans, and RCM implementation. Used CMMA and SAP to track progress, order parts, schedule work, and oversee work order completion. Worked on general construction from the sub-contractor side of the Deep Tunnel Storm Water Collection Systems.