

## Process Piping 1 Syllabus

**Time:** 40 hours

**Maximum Class Size:** 12

**Prerequisites:** None

### Course Description

This course is designed to teach the skills needed to be a safety-minded and productive employee for mechanical pipe contractors. Students will be required to identify and demonstrate the tools and materials associated with mechanical piping. Among the skills students will learn are cutting, threading, and deburring pipe using the Rigid 1224, using a rotohammer and Chop saw, and manufacturing flange gaskets. Students will be introduced to both the theory and hands-on skills needed to calculate, set-up and test a basic mechanical pipe loop system.

### Goals/Objectives/Student Learning Outcomes:

- List and describe five ways to prevent back injuries
- Describe and demonstrate proper lift procedures
- Describe oxygen enriched, oxygen deficient, and toxic atmospheres
- Identify weight classifications and schedule numbers
- Identify pipe grooving (cut and rolled)
- Identify threads available
- Identify pipe identifications and markings
- Identify pipe coatings
- Identify types of steel pipes available
- Identify thermos-plastic pipe
- Identify standard dimensional ratio
- Identify the effects of reduced oxygen levels in the body
- Identify the upper and lower flammable limits in the fire triangle
- Describe how atmospheres are tested with reading instruments
- Identify the surface color code for utilities
- Identify the advantages of HDPE and PVC pipe-IPTS
- Explain the purpose of each of the following materials:
  - All-thread rod
- Describe and demonstrate joining pipe sections using various mechanical systems
- Describe and demonstrate hydrostatic testing procedures for all types of pipe and demonstrate test pump set-up and operation using a hand hydro pump
- Complete a Math Quiz to solve problems involving fractions and decimals with a score of 80% or above.
- Determine pipe elevation for centerline of pipe
- Describe the hazards specific to dismantling mechanical pipe systems

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- Describe the hazards of water, steam, gases, oil and organic material in pressurized pipe
- Demonstrate how to assemble mechanical joints with the correct bolt tightening sequence
- Demonstrate the proper cutting, threading, deburring and grooving process on the pipe threader
- Demonstrate safe use and procedures of abrasive chop saw
- Demonstrate how to make flange gaskets
- Demonstrate the proper procedure for drilling with the rotohammer
- Using the rotohammer, install Unistruts with wedge anchors
- Assemble and mount the Unistruts
- Describe the ASTM national standards for pipe
- Identify straight seams, spiral seam and seamless pipe
- Describe pipe end finishes
- Describe valve types
- Describe the different types of pipe supports and overhead hangers
- Identify different types of Split Couplers
- Discuss, in theory, different types of grooving
- Complete a loop system project, check for leaks, make repairs & dismantle
- Complete a Mechanical Pipe Hands-on Evaluation with a score of 80% or above to pass
- Complete a 35-question Mechanical Pipe Exit Exam (A or B) with a score of 80% or above to pass

### Standards

- 1910.146 Confined Space Entry
- 1926.201(b) and 1926.550 (a)(4) for Hand Signaling
- 1926.300 Subpart I for Power Tools.
- 1926.702 Requirements for Equipment & Tools
- Cal/OSHA Subchapter 7:
  - Group 2 Article 7- Safe Practices Pipe Lines
  - Group 6 Article 47- Machine and Machine Parts
  - Group 20 Article 146 Piping, Valves, Fittings
- A.N.S.I. / A.W.W.A.
  - C606; NAPF 400
  - U.L. Certificate Number 101097-MH25360

### Classroom Rules and Procedures

- All classes begin at 6:30 am and end at 3:00 pm
- Upon entering classroom, all participants must sign in and be seated by 6:30 am
- Class will consist of a combination of lecture, video, demonstration, coached group exercises, individual exercises and assessment.
- Students are required to report to class ready to work and maintain the provided PPE

## Process Piping 1 Syllabus

### Textbooks/Readings/Materials

- IPT Pipe Trades Training Manual-Robert A Lee IPT Publishing Edmonton, Alberta, Canada-class set
- Laborers Training School Process Piping 1 Student Handout Packet-class set

### Other Classroom Materials

- Nametags or Index Cards
- Camera
- 6 Photos of people doing everyday (mechanical-pipe related) tasks (IT1)
- Flip chart with markers
- Whiteboard with Dry Erase markers
- I-Pad
- Computer
- Projector
- Screen or area to project on
- Highlighters
- Valves Power Point
- Dig Alert cards-class set
- Tape
- Job Site Analysis (IT2)
- Process Piping 1 Exit Exam A or B
- Process Piping 1 Exit Exam Answer Sheet
- Process Piping 1 Hands-On Assessment
- Process Piping 1 Hands-On Rubric
- 1-4" piece of straight seam welded pipe
- 1-1" merchant coupling
- 1-1" taper tapped coupling
- 1 piece 3" pipe cut to length of 4" and deburred/cleaned for identification
- 4-12" pieces ½" copper rigid leach for the four colors
- 1-4" piece of plain end pipe
- 1-4" piece of beveled end pipe
- 1-4" piece of grooved end pipe
- 1-4" piece of threaded end pipe

### Personal Protective Equipment

- 12 pairs of gloves
- 12 pairs of Safety Glasses
- 20 pairs of Ear plugs

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### Course Requirements

To receive credit for the course, participants must:

- Be present for full 40-hours
- Participate in all classroom exercises
- Pass a Process Piping math quiz
- Pass a written exam
- Pass a hands-on assessment

### Course Policies

- Participants must be on-time and ready to work.
- Participants must return from breaks on-time.
- Participants must participate in each exercise and assignment
- Participants who are on “light duty” are not allowed to take this course due to the physically demanding requirements.

### Assessment and Grading

Participants will be assessed on the following:

- All written exams must be passed with a score of 80% or above.
- All hands-on exercises are graded on performance and participation. They are pass/fail and must be passed with a score of 80% or above.

### Safety

Failure to maintain and use PPE may result in dismissal from the course.