

## Process Piping 2 Syllabus

**Time:** 40 hours

**Maximum Class Size:** 12

**Prerequisites:** None

**Course Description:** Process piping systems are used to transport and deliver water, gas, oil, sewage, cooling materials, food products, and pharmaceuticals. The Construction Craft Laborer who is skilled and knowledgeable in this industry is valued and in demand. This course builds on Process Piping 1 and is designed to educate the Laborer to be a productive and safety-minded employee for mechanical pipe contractors. In addition, the participant will develop professional work skills needed to work in new construction and retrofitting of Water Plants, Waste Treatment Plants, Power Plants, Refineries or Public Works.

### Goals/Objectives/Student Learning Outcomes:

- List and describe different ways to prevent back injuries and maintain a healthy back.
- Describe and demonstrate proper lifting procedures
- Demonstrate the ANSA standard hand signals for cranes
- Successfully complete a Process Piping 2 math test with a score of 80% or above.
- Demonstrate the correct set-up of a level transit, and given a set of elevation hubs, and calculate each elevation to within +/- .02'.
- Identify the most commonly used weight or wall thickness classifications for steel pipe.
- State two main advantages of stainless steel pipe over carbon steel pipe.
- Name the reason cast iron pipes are still used in many commercial buildings.
- Identify the full name of these copper tube abbreviations: ACR tube, GP tube and DWV Tube.
- State the color code for each of these color types: Type K, Type L, Type M and Type DWV.
- State the two principal functions or reasons for the use of valves.
- Identify seat sides and direction of flow in regards to valve placement.
- List the eight basic types of valves available.
- Name where to position a strainer if there is a possibility of foreign material in a line.
- Identify the basics of copper (as awareness only; no soldering, no hands-on).
- Name the suggested location for a horizontal valve stem. Describe how grooved pipe couplings are held together. Name one way to remove a pipe that will not unscrew from a cast iron fitting.

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- Identify the recommended number of threads needed for both hand and thread engagement to make up a 1" leak-proof threaded joint.
- Name four types of flange faces.
- Name three flange gaskets.
- State another name for a Van Stone Flange.
- Describe a method of extending the established centerline points on a section of pipe.
- Describe the best way to tighten or loosen a nut or stud.
- Name the correct size hanger rod that is recommended for a 20" steel pipe.
- Identify the maximum distance between hangers for an 18" steel pipe system.
- List four basic pipe end finishes that are commercially available.
- Identify the meaning of OWG.
- Perform and identify basic hand signals.
- Successfully complete a Confined Space Awareness Vocabulary exercise.
- Correctly answer math problems.
- Accurately perform an elevation exercise using a laser level.
- Correctly identify mechanical pipe tools and materials.
- Successfully build a pipe system that passes a hydro test.
- Correctly fill out a Process Piping 2 Materials Order Form.
- Correctly fill out a Process Piping 2 Pipe Pressure Test Data Form.
- Complete a Process Piping 2 Hands-On Performance Evaluation with a score of 80% or above to pass.
- Identify types of Split Couplers.
- Demonstrate how to Lay Out for Grooving Pipe.
- Discuss, in theory, different types of grooving.
- Complete a Process Piping 2 math quiz with an 80% or above to pass.
- Complete a written Exit Exam with a score of 80% or above to pass.

### Standards

- OSHA Standard 29CFR 1926.702 Requirements for Equipment & Tools
- Cal/OSHA Subchapter 7:
  - Group 2 Article 7: Safe Practices Pipelines
  - 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

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### 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

### Textbooks/Readings/Materials

- *Back Injury Prevention*-LIUNA Training
- *Confined Space Awareness*-LIUNA Training
- *Hand Signaling*-LIUNA Training
- *Hoisting and Rigging*-LIUNA Training
- Layout/Introduction to Mechanical Pipe Prints
- Confined Space Awareness Video/DVD
- Hand Signals Video/DVD
- Video/DVD Laser Level-Elevation off Hubs

### Textbooks/Readings/Materials continued:

- Process Piping 2 Ruler Handout
- Process Piping 2 Math Quiz
- Process Piping 2 Hands-On Evaluation #1 & #2
- Process Piping 2 Exit Exam
- Process Piping 2 Materials Order Form
- Pipe Pressure Test Data Handout
- Typical Metering Pump Pipe Detail Handout
- Set of Wastewater Reclamation Facility Blueprints CD
- Process Piping 2 Blueprint Reading Quiz
- Threaded Fitting Handout
- Handout of fitting takeoff for flange to flange and groove to groove fitting
- Hoisting & Rigging DVD
- Signal Person PowerPoint
- Back Injury Prevention DVD
- One-inch Pipe Assembly Hand-out
- Tube Bending Hand-out
- Pump Gallery Plans
- IPT Manual
- 6-calculators
- 6-clipboards

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- 12- No. 2 pencils
- 12-Red No. 2 pencils
- 1-Pencil sharpener
- 6-Notepads

### Tools/Equipment/Other Materials:

- 1-Truck for transportation
- 2-Rigid 75602 Pipe Threading Machines (with stands and dies)
- 1-Generator (Honda EB5000X)
- 1-14" Chop Saw
- 2- Carborundum Blades (14")
- 1-Knack Box or Job Box
- 2-Rigid Pipe Vices (tripod style)
- 6-Tripod Pipe Jacks
- 1-Laser Level (with tripod & Engineer's rod)
- 1-Roto-hammer TE-70 Hilti (with ¼", 3/8", and ½" bits)
- 1-Hydro-Test Pump
- 12-Pipe wrenches (18" size)
- 3-Flathead screwdrivers
- 3-Crescent wrenches (8")
- 3-Hammers
- 12-Tape Measures (feet & inches, 20' or 25')
- 2-Combination Tubing Benders (1/4"-1/2")
- 2-Small Tubing Cutters
- 1-Cable Come-along
- 2-Small speed squares
- 1-Large speed squares
- 1-50' Extension cord
- 1-5 gal. gas can
- 2-Flat files (for deburring)
- 2-Small Socket sets (3/8" drive with deep sockets)
- 2-Pairs channel lock pliers
- 2-Small toolboxes
- 8-Torpedo Levels
- 3-2' Levels
- 2-4' Levels
- 4-2' Framing squares

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- 2-Chalk boxed & extra strings)
- 1-Gal. red chalk
- 1-Jug hand cleaner
- 1-Box of rags
- 6-Quarts Pipe Dope

### Personal Protective Equipment

- 12 pairs of leather gloves
- 1 box of safety glasses
- 1 box of ear plugs
- 12 hard hats
- 1 box latex gloves

### Course Requirements

To receive credit for the course, participants must:

- Be present for full forty hours
- Participate in all classroom exercises
- Pass a written exam
- Pass a hands-on exam

### 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.