

# ATLB-2130: PRESSURE PIPE

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## Cuyahoga Community College

### Viewing: ATLB-2130 : Pressure Pipe

#### Board of Trustees:

2012-06-28

#### Academic Term:

Spring 2019

#### Subject Code

ATLB - AIT-Construct/Hazard Material

#### Course Number:

2130

#### Title:

Pressure Pipe

#### Catalog Description:

Types of pressure pipe waterline, including asbestos and ductile iron pipe, and installation techniques required to meet industry standards. Bedding requirements, trenching safety standards, and tapping procedures. Applied math concepts required for pressure and volume loss tests are also covered.

#### Credit Hour(s):

2

#### Lecture Hour(s):

2

## Requisites

#### Prerequisite and Corequisite

Departmental approval: admission to the Construction Tending and Hazardous Material Abatement program.

## Outcomes

#### Course Outcome(s):

1. Identify the types of pressure pipe commonly used in waterline work for commercial, industrial, and residential installations.

#### Objective(s):

1. List the types of waterlines.
2. Identify the various pressure pipe fittings.
3. Discuss the characteristics of pipe, including materials used, ease of installation, and historical background.
4. Define the terms used in pressure pipe installation.

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#### Course Outcome(s):

2. Examine the inherent safety issues related to water main construction and repair.

#### Objective(s):

1. Explain subpart P of the Federal Code of Regulations 1926 under the Occupational Health and Safety Administration. (OSHA)
2. Identify general safety issues associated with pipe installation.
3. Identify the different types of soil conditions.
4. Discuss worker protection with respect to shoring, excavation, sloping, benching, and trench box usage.
5. Interpret the Ohio Revised Code as it pertains to excavation. Explain how the Ohio Utility Protection Service (OUPS) is used.

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#### Course Outcome(s):

3. Demonstrate the ability to install pressure pipe waterline according to industry standards including all fittings, connections, and bedding requirements.

**Objective(s):**

1. List all fittings and connections used.
  2. Interpret civil drawings to establish pipe locations.
  3. Discuss the sections of the National Fire Protection Association (NFPA) with respect to fire hydrant installation.
  4. Explain the various soil conditions and bedding requirements for pipe installation.
  5. Install waterline systems in accordance with accepted municipal and industry standards.
  6. Operate equipment to correctly cut pipe.
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**Course Outcome(s):**

4. Demonstrate the ability to install all appurtenances including valves, hydrants, and mechanical joints.

**Objective(s):**

1. Identify the starting point of waterline.
  2. Establish locations of valves, hydrants, and corporation stops.
  3. Identify and install thrust block location.
  4. Operate tapping machines and equipment for installation of corporation stops.
  5. Locate and install hydrants with respect to bury line requirements.
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**Course Outcome(s):**

5. Apply relevant math concepts to pressure testing procedures.

**Objective(s):**

1. Compute pipe volumes.
  2. Apply math formulas to determine actual and allowable pressure loss.
  3. Explain leakage testing.
  4. Compute trench width with respect to pipe size.
  5. Verify calculations.
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**Methods of Evaluation:**

1. Tests
2. Quizzes
3. Class Participation

**Course Content Outline:**

1. Pressure pipe
  - a. Types
  - b. Ductile iron
  - c. Polyvinyl chloride (PVC)
  - d. Concrete
  - e. Steel
  - f. Asbestos
  - g. Cast iron
2. Pressure pipe fittings
  - a. Elbows
  - b. Tees
  - c. Valves
  - d. Hydrants
  - e. Reducers
  - f. Mechanical joints
  - g. Characteristics
    - i. Metal vs. non-metal
    - ii. Connection style
    - iii. Ease of installation
    - iv. Historical

- h. Terms
  - i. Pressure pipe
  - ii. Curb stop
  - iii. Corporation
  - iv. Gate valves
  - v. Thrust block
  - vi. Mega lug
  - vii. Bedding
- 3. Safety
  - a. Subpart P of the Federal Code of Regulation 1926 under OSHA
    - i. Worker protection
    - ii. Soil identification
    - iii. Excavations
    - iv. Access and egress
  - b. General safety
    - i. Personal protective equipment
    - ii. Environmental
    - iii. Confined space
    - iv. Excavation depths
  - c. Soil conditions
    - i. Solid rock
    - ii. Type A
    - iii. Type B
    - iv. Type C
  - d. Shoring, sloping, and benching
  - e. Trench box
  - f. Ohio Revised Code and OUPS
- 4. Installation
  - a. Civil drawing
    - i. Location of system
    - ii. Profile views
    - iii. Plan views
    - iv. Details and sections
  - b. NFPA
    - i. Hydrant coloring
    - ii. Testing requirements
    - iii. Reference materials
  - c. Bedding requirements
    - i. Sand
    - ii. Stone
    - iii. Engineered fill
    - iv. Backfill slope
  - d. Installation
    - i. Pipe
    - ii. Valves
    - iii. Hydrants
    - iv. Thrust blocks
  - e. Pipe cutting
    - i. Equipment
    - ii. Manufacturer's specifications
    - iii. Safety
- 5. Appurtenance installations
  - a. Starting point
    - i. Reference
    - ii. Connection requirements
  - b. Layout
    - i. Valves
    - ii. Elbows
    - iii. Hydrants

- iv. Tees
- v. Corporation stops
- c. Thrust blocks
  - i. Purpose
  - ii. Material
  - iii. Location
- d. Tapping machines
  - i. Waterline to waterline
  - ii. Corporation stop installation
- e. Hydrants
  - i. Locations
  - ii. Assembly
  - iii. Wet barrel vs. dry barrel
  - iv. Bury line
- 6. Testing
  - a. Math
    - i. Pipe volume
    - ii. Allowable pressure
  - b. Pressure
    - i. Allowable
    - ii. Actual
  - c. Leakage
  - d. Trench width calculations
  - e. Verification

## Resources

LIUNA Training Fund. *Trenching Safety*. Pomfret Center, CN: LIUNA Training Fund, 2007.

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LIUNA Training Fund. *Tapping Water Mains*. Pomfret Center, CN: LIUNA Training Fund, 2007.

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LIUNA Training Fund. *Pressure Pipelaying Techniques*. Pomfret Center, CN: LIUNA Training Fund, 2007.

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Nick Capachi. *Excavation Grading Handbook*. existing. Chicago, IL: Craftsman Book Co, 2005.

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## Resources Other

1. "Making Successful Wet Taps" <http://www.wateronline.com/article.mvc/Making-Successful-Wet-Taps-0001> (<http://www.wateronline.com/article.mvc/Making-Successful-Wet-Taps-0001/>)
2. [new-sewer-water-line-installation-24537.html](http://www.new-sewer-water-line-installation-24537.html) (<http://www.new-sewer-water-line-installation-24537.html>)
3. [www.pexuniverse.com/pex-tubing/](http://www.pexuniverse.com/pex-tubing/) (<http://www.pexuniverse.com/pex-tubing/>)
4. [www.engineersedge.com/fluid\\_flow/pressure.../pressure\\_drop.htm](http://www.engineersedge.com/fluid_flow/pressure.../pressure_drop.htm) ([http://www.engineersedge.com/fluid\\_flow/pressure.../pressure\\_drop.htm](http://www.engineersedge.com/fluid_flow/pressure.../pressure_drop.htm))
5. [arash.dejkam.com/software/pressure\\_loss/](http://arash.dejkam.com/software/pressure_loss/)

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