

# ATIN-2130: FUNDAMENTAL INSULATION IV - TANKS AND EQUIPMENT

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## Cuyahoga Community College

### Viewing: ATIN-2130 : Fundamental Insulation IV - Tanks and Equipment

**Board of Trustees:**

October 2024

**Academic Term:**

Spring 2025

**Subject Code**

ATIN - Applied Industrial Technology - Insulators

**Course Number:**

2130

**Title:**

Fundamental Insulation IV - Tanks and Equipment

**Catalog Description:**

Develop skills to install an insulation and jacketing system for various tanks, vessels, and boilers. Includes tape measure reading, geometric design, material estimation, determining diameter, circumferences, radii, and mathematical conversions. Also covers mathematical skills used for material estimation, including. perimeter, square footage, area of cylinder, and decimal to fraction calculations.

**Credit Hour(s):**

2

**Lecture Hour(s):**

2

### Requisites

**Prerequisite and Corequisite**

Departmental approval: admission to Heat and Frost Insulator's apprenticeship program.

### Outcomes

**Course Outcome(s):**

Utilize material estimation skills.

**Objective(s):**

1. Utilize Pi to calculate accurate diameters, circumferences, and radii.
2. Calculate areas with insulation thickness included.
3. Apply industry standard formulas to calculate material estimation for job sites.
4. Convert decimals to fractions to determine accurate measurements.
5. Divide fractions into portions.

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**Course Outcome(s):**

Install effective insulations system to tanks and vessels.

**Objective(s):**

1. Determine products and materials needed based on temperature and environment.
2. Perform accurate installation of insulation products.
3. Design layout patterns for tank heads insulation and jacketing.
4. Assemble best methods for tank head installation.

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**Course Outcome(s):**

Install effective insulations system for boilers and breechings.

**Objective(s):**

1. Determine products and materials needed based on temperature and environment.
2. Perform accurate installation of insulation products.
3. Design layout patterns for boiler/ breeching insulation and jacketing.
4. Assemble best methods for boiler/ breeching installation.

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**Methods of Evaluation:**

1. Quizzes from International
2. Tests from International
3. Final exam from International
4. Tape measure skills practice
5. Caliper and Divider skills practice
6. Estimation exercises
7. Homework worksheets
8. Geometric construction projects

**Course Content Outline:**

1. Pipe Sizes
  - a. Standardized diameter charts
  - b. Inside diameter
  - c. Outside diameter
  - d. Wall thickness
  - e. Total outside diameter including insulation
    - i. Radii calculation
    - ii. Diameter calculation
    - iii. Circumference calculation
2. Material estimation
  - a. Types of materials
  - b. Perimeter calculation
  - c. Measurement of total footage runs
  - d. Calculation of square and rectangular areas.
  - e. Calculation of area of circles
  - f. Calculation of area of cylinders
  - g. Calculate square footage with insulation
  - h. Determine amounts of material needed
3. Materials
  - a. Fiberglass
  - b. Ceramic fiber
  - c. Cellular glass
  - d. Calcium silicate
  - e. Cellular foam
  - f. Polyisocyanurate
  - g. Polystyrene
4. Rough in installation
  - a. Single layer
  - b. Double layer
  - c. Vertical tanks
  - d. Horizontal tanks
5. Jacketing installation
  - a. Interior
  - b. Exterior

- i. Methods of watershed
- c. Metal
  - i. Aluminum
  - ii. Stainless steel
  - iii. Corrugated
- d. Polyvinylchloride (PVC)
- e. Ventureclad

## Resources

International Association of Heat and Frost Insulators and Asbestos Workers. *Applied Insulators Math I*. International Association of Heat and Frost Insulators and Asbestos Workers., 2020.

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International Association of Heat and Frost Insulators and Asbestos Workers. *Applied Insulators Math II*. International Association of Heat and Frost Insulators and Asbestos Workers, 2020.

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Heat and Frost Insulators - Local 3. *First Year Math Manual*. Cleveland, OH, 2019.

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International Association of Heat and Frost Insulators and Asbestos Workers. *Fundamental Insulation I Piping Manual - Version 2*. International Association of Heat and Frost Insulators and Asbestos Workers, 2014.

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International Association of Heat and Frost Insulators and Asbestos Workers. *Fundamental Insulation II Equipment Manual - Version 2*. International Association of Heat and Frost Insulators and Asbestos Workers, 2015.

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International Association of Heat and Frost Insulators and Allied Workers. *Shop Fabrication Layout & Patternmaking Student Manual*. International Association of Heat and Frost Insulators and Allied Workers, 2014.

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, International Association of Heat and Frost Insulators and Allied Workers. *Metal & Rubber Layout Book*., International Association of Heat and Frost Insulators and Allied Workers, 2014.

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## Resources Other

[www.jatctraining.com](http://www.jatctraining.com) (<http://www.jatctraining.com>) 2024.

Insulators Union - YouTube (<https://www.youtube.com/@insulatorsunion/>) 2024.

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