

# Insulator (Heat and Frost) Level 2

## Insulator (Heat and Frost)

**Unit:** B1 Blueprints and Specifications I

**Level:** Two

**Duration:** 14 hours

Theory: 14 hours

Practical: 0 hours

### Overview:

This unit is designed to provide the apprentice with introductory knowledge about blueprints and specifications. The unit covers interpreting blueprints and specifications, and sketching projection views.

<b>Objectives and Content:</b>	<b><u>Percent of Unit Mark (%)</u></b>
<b>1. Interpret blueprints.</b>	<b>50%</b>
a. Divisions	
b. Scales	
c. Lines	
d. Symbols and abbreviations	
e. Projection views	
• Orthographic	
• Oblique	
• Isometric	
• Perspective	
f. Sectional views	
• Detail interpretations	
• Cutting planes	
g. Elevation views	
<b>2. Sketch projection views.</b>	<b>30%</b>
<b>3. Interpret specifications.</b>	<b>20%</b>
a. Divisions	
b. Addenda	

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## Insulator (Heat and Frost)

**Unit:** B2 Routine Trade Practices II

**Level:** Two

**Duration:** 49 hours

Theory: 49 hours

Practical: 0 hours

### Overview:

This unit, which builds on *A5 – Routine Trade Practices I*, is designed to provide the apprentice with additional knowledge about routine trade practices. The unit includes layouts and a review of trade-related math concepts. Part of the unit covers cladding, jacketing and finishes. Finally, the unit covers insulation procedures for tank, vessels and equipment, and for plumbing and mechanical systems.

### Objectives and Content:

### Percent of Unit Mark (%)

- |   |            |
|---|------------|
| <b>1. Review unit A5 – Routine Trade Practices I.</b>   | <b>5%</b>  |
| a. Piping installation procedures <ul style="list-style-type: none"><li>• Substrate preparation</li></ul>   |            |
| b. Types of insulation materials  |            |
| c. Cladding, jacketing and finishes   |            |
| d. Application aids   |            |
| e. Layouts <ul style="list-style-type: none"><li>• Parallel line pattern development</li></ul>  |            |
| <b>2. Review trade-related math.</b>  | <b>35%</b> |
| a. Lateral and Total Area <ul style="list-style-type: none"><li>• Cone, rectangular and square-based pyramids</li><li>• Cylinders</li><li>• Spheres</li></ul>   |            |
| b. Volume <ul style="list-style-type: none"><li>• Cone, rectangular and square-based pyramids</li><li>• Cylinders</li><li>• Spheres</li></ul>   |            |
| c. Trigonometry <ul style="list-style-type: none"><li>• Pythagorean Theorem and the law of right angles</li><li>• Hypotenuse</li><li>• Opposite side</li><li>• Adjacent side</li><li>• Sine</li><li>• Cosine</li><li>• Tangent</li><li>• Length of the side of a triangle given one angle and the length of one side</li><li>• Rise of an elbow</li></ul> |            |

- 3. Describe layouts. 10%**
- a. Radial line pattern development
    - Measurements and calculations
    - Eccentric reducer
    - Concentric reducer
- 4. Describe cladding, jacketing and finishes. 5%**
- a. Plumbing and mechanical piping systems
    - Types of materials
    - Application procedures
    - Allowances
    - Fastening methods
    - Sealing methods
- 5. Describe insulation procedures for tanks, vessels and equipment. 30%**
- a. Types of insulation materials
  - b. Application of insulation to body
  - c. Application of insulation to head
  - d. Fastening methods
  - e. Expansion joints
  - f. Application of vapour barrier
- 6. Describe insulation procedures for plumbing and mechanical systems. 15%**
- a. Types of insulation materials
  - b. Piping
  - c. Ducting
  - d. Equipment
  - e. Fittings
  - f. Application procedures
  - g. Fastening methods
  - h. Application of vapour barrier

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## Insulator (Heat and Frost)

**Unit:** B3 Industrial and Commercial Applications II

**Level:** Two

**Duration:** 35 hours

Theory: 0 hours

Practical: 35 hours

### Overview:

This unit, which builds on *A6 – Industrial and Commercial Applications I*, is designed to provide the apprentice with additional knowledge about industrial and commercial applications. The unit includes insulation application for tanks, vessels and equipment. Part of the unit covers installation of cladding, jacketing for plumbing and mechanical piping. Finally, the unit covers insulation application for mechanical ducting and mechanical equipment.

<b>Objectives and Content:</b>	<b><u>Percent of Unit Mark (%)</u></b>
<b>1. Perform insulation application for tanks, vessels and equipment.</b>	<b>25%</b>
a. Insulation application	
• Measurements and calculations	
• Application to body	
• Application to head	
• Fastening methods	
b. Vapour barrier application	
• Measurements and calculations	
• Application to body	
• Application to head	
<b>2. Perform installation of cladding, jacketing and finishes for plumbing and mechanical piping.</b>	<b>25%</b>
a. Application	
b. Measurements and calculations	
c. Allowances	
d. Fastening methods	
e. Sealing methods	
<b>3. Perform insulation application for mechanical ducting.</b>	<b>25%</b>
a. Insulation application	
• Measurements and calculations	
• Ducting	
• Fittings	
• Hangers	
b. Vapour barrier application	
• Measurements and calculations	

- Ducting
- Fittings

**4. Perform insulation application for mechanical equipment.**

**25%**

- a. Insulation application
  - Measurements and calculations
  - Piping
  - Fittings
  - Equipment
  - Hangers
- b. Vapour barrier application
  - Measurements and calculations
  - Piping
  - Fittings
  - Equipment

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## Insulator (Heat and Frost)

**Unit:** B4 Common Applications to Industrial and Commercial

**Level:** Two

**Duration:** 21 hours

Theory: 21 hours

Practical: 0 hours

### Overview:

This unit is designed to provide the apprentice with the knowledge about common applications to industrial and commercial. The unit covers insulation for soundproofing and underground systems.

<b>Objectives and Content:</b>	<b><u>Percent of Unit Mark (%)</u></b>
<b>1. Describe insulation for soundproofing.</b>	<b>30%</b>
a. Soundproofing for piping	
• Types of materials	
• Application procedures	
• Fastening methods	
b. Soundproofing for turbines, equipment and mechanical systems	
• Types of materials	
• Application procedures	
• Fastening methods	
c. Fabrication of acoustic panels	
d. Installation of acoustic panels	
• Ceilings	
• Walls	
<b>2. Describe insulation for underground systems.</b>	<b>70%</b>
a. Application of pipe insulation	
• Types of materials	
• Fastening methods	
• Piping	
• Fittings	
• Hangers	
b. Application of pour-in-place insulation	
• Types of materials	
• Piping	
• Fittings	
• Hangers	

- c. Application of spray-on insulation
  - Types of materials
  - Piping
  - Fittings

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## Insulator (Heat and Frost)

**Unit:** B5 Specialized Applications

**Level:** Two

**Duration:** 56 hours

Theory: 21 hours

Practical: 35 hours

### Overview:

This unit is designed to provide the apprentice with the knowledge about specialized applications. The unit includes sealers, coatings and spray-on insulation. Part of the unit covers insulation systems for refractory application. Finally, the unit covers insulation systems for cryogenic application.

<b>Objectives and Content:</b>	<b><u>Percent of Unit Mark (%)</u></b>
<b>1. Perform layouts.</b>	<b>20%</b>
a. Radial line pattern development	
• Measurements and calculations	
• Eccentric reducer	
• Concentric reducer	
<b>2. Describe sealers, coatings and spray-on insulation.</b>	<b>10%</b>
a. Work area preparation	
b. Application preparation procedures	
c. Installation of reinforcing materials	
d. Application procedures	
<b>3. Describe and perform insulation systems for refractory application.</b>	<b>35%</b>
a. Types of materials	
b. Application procedures	
c. Piping, tanks, vessels and equipment	
• Expansion joints	
d. Breechings	
e. Fastening methods	
f. Fittings	
g. Hangers	
<b>4. Describe and perform insulation systems for cryogenic application.</b>	<b>35%</b>
a. Types of materials	
b. Application procedures	
c. Piping, tanks, vessels and equipment	
• Contraction joints	
d. Vapour barriers	
e. Fastening methods	

- f. Fittings
- g. Hangers

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