

OBJECTIVES

Upon completion of this module, the trainee will be able to:

1. Use a folding rule and/or tape measure to determine the quantity of insulation required for a job.
2. Use a scale ruler to convert drawing dimensions to full-size dimensions.
3. Add and subtract mixed numbers.
4. Convert fractions to decimals.
5. Convert inches to feet and feet to inches.
6. Bisect angles.
7. Define radius, circumference, diameter, and pi.
8. Calculate surface areas of objects when given formulas and measurements.
9. Convert Fahrenheit to Celsius and Celsius to Fahrenheit.

Note to the Instructor

Before teaching this Task Module, you should review the details in this Instructor's Guide for Equipment and Materials, Testing, and the suggested Teaching Sequence. Be sure to allow ample time to prepare your own training plan or lesson plan and to gather all required equipment and materials.

Required Equipment and Materials

The following are required for instruction using this module:

Equipment

Overhead projector and screen
Whiteboard / chalkboard
Calculator
Tape measure
Folding rule
Scale rulers
Dividers
Straight edge ruler
Various lengths of round and rectangular ductwork

Materials

Trainee Task Module
Transparencies
Paper/pencils
Markers/chalk
Sample blueprint
Module Examination
Performance Profile Sheets

HOW TO USE THIS INSTRUCTOR'S GUIDE

For each 2½ hour class session in this Instructor Guide, the basic Presentation Sequence is as follows:

Introduction/Overview
Classroom, and/or Demonstration, and/or Laboratory
Class Break
Classroom, and/or Demonstration, and/or Laboratory
Summary

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In this Instructor's Guide, the terms classroom, demonstration, and laboratory are defined and used as follows:

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Demonstrations: Instructors will demonstrate all procedures before trainees attempt them. Instructors should make sure that trainees can point out all safety procedures during demonstrations to be assured of the proper use of equipment by trainees.

Laboratory: Instructors will facilitate all laboratory activities, coach trainees as they practice the procedures, monitor trainee progress, and provide feedback. The instructor will make sure that safety rules are followed at all times and that protective equipment is worn.

NCCER Standardized Craft Training Programs

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MODULE OVERVIEW

This module introduces the trainee to basic math required in the Insulating trade. The intended audience for this module includes all insulating trainees.

Prerequisites

Please see the Course Map. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following modules:

Core Curricula; Insulating Level 1 and Level 2

Teaching Time For This Task Module

Approximately 7½ hours or three sessions of training time is suggested to cover *Trade Math*. The training class session is a suggested 2½ hour time period, which includes one break. **You will need to adjust the time required for hands-on activities and testing based on your class size and resources.** All time periods for this module are suggested, and you will need to adapt the suggested lesson plan to meet your local conditions.

Suggested Teaching Sequence — Three 2½-Hour Sessions

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction; Measuring Tools – Common Decimal Equivalents Performance Profile Test	1.0.0 – 3.2.1
2	Calculating Surface Areas – Formulas Performance Profile Test	4.0.0 – 4.2.0
3	Bisecting Angles – Math Examples Performance Profile Test and Module Examination	5.0.0 – 9.0.0

PERFORMANCE PROFILE TASKS

- 1. Using a sample blueprint, use a scale ruler to convert drawing dimensions to full-size dimensions.**
- 2. Calculate the square footage of insulation required for various lengths of round and rectangular ductwork.**
- 3. Bisect a given angle.**
- 4. Given a temperature of 75°F , calculate the temperature in Celsius.**
- 5. Given a temperature of -50°C , calculate the temperature in Fahrenheit.**

AIR DUCT SYSTEMS

OBJECTIVES

Upon completion of this module, the trainee will be able to:

1. Define the terminology used in the industry.
2. Identify the functions of various air ducts in buildings.
3. Explain the differences between high-, medium-, and low-pressure duct systems.
4. Explain which components of air duct systems are or are not insulated and why.
5. Recognize and identify the function(s) of common air handling system equipment.

Note to the Instructor

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Required Equipment and Materials

The following are required for instruction using this module:

Equipment

Overhead projector and screen
Whiteboard / chalkboard

Materials

Trainee Task Module
Transparencies
Copies of unlabeled drawings from
Appendix A
Paper / pencils
Markers / chalk
Module Examination
Performance Profile Sheets

HOW TO USE THIS INSTRUCTOR'S GUIDE

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Introduction/Overview
Classroom, and/or Demonstration, and/or Laboratory
Class Break
Classroom, and/or Demonstration, and/or Laboratory
Summary

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MODULE OVERVIEW

This module introduces the trainee to the basic requirements of air duct systems. The intended audience for this module includes all Insulating trainees.

Prerequisites

Please see the Course Map. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following modules:

Core Curricula; Insulating Level 1 and Level 2; Insulating Level 3, Task Module 19301

Teaching Time for This Task Module

Approximately 5 hours or two sessions of training time is suggested to cover *Air Duct Systems*. The training class session is a suggested 2½ hour time period, which includes one break. **You will need to adjust the time required for hands-on activities and testing based on your class size and resources.** All time periods for this module are suggested, and you will need to adapt the suggested lesson plan to meet your local conditions.

Suggested Teaching Sequence — Two 2½-Hour Sessions

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction – Low-Pressure Duct Systems	1.0.0 – 3.1.0
2	Medium- and High-Pressure Duct Systems Performance Profile Test and Module Examination	3.2.0

PERFORMANCE PROFILE TASKS

- 1. Using an unlabeled drawing of a low-pressure duct system, label the various components of the system.**
- 2. Using an unlabeled drawing of a medium- or high-pressure duct system, label the various components of the system.**

**THEORY OF HEAT TRANSFER
AND MOISTURE EFFECTS**

OBJECTIVES

Upon completion of this module, the trainee will be able to:

1. Describe the basic methods of heat transfer.
2. Relate the basic principles of moisture migration.
3. Compare the efficiency ratings of various types of insulating materials in order to select the best material for the application.

Note to the Instructor

Before teaching this Task Module, you should review the details in this Instructor's Guide for Equipment and Materials, Testing, and the suggested Teaching Sequence. Be sure to allow ample time to prepare your own training plan or lesson plan and to gather all required equipment and materials.

Required Equipment and Materials

The following are required for instruction using this module:

Equipment

Overhead projector and screen
Whiteboard / chalkboard
Mock-up of wall section with vapor barrier
Piping mock-up
Various types of field-installed vapor barriers along with the necessary application tools and materials (e.g., utility knife, tape, adhesives, etc.)

Materials

Trainee Task Module
Transparencies
Paper / pencils
Markers / chalk
Module Examination
Performance Profile Sheets

HOW TO USE THIS INSTRUCTOR'S GUIDE

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Introduction/Overview
Classroom, and/or Demonstration, and/or Laboratory
Class Break
Classroom, and/or Demonstration, and/or Laboratory
Summary

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MODULE OVERVIEW

This module introduces the trainee to the theory of heat transfer and moisture effects. The intended audience for this module includes all Insulating trainees.

Prerequisites

Please see the Course Map. Prior to training with this Task Module, it is recommended that the trainee shall have successfully completed the following Task Modules:

Core Curricula; Insulating Level 1 and Level 2;
Insulating Level 3, Modules 19301 and 19302

Teaching Time for This Task Module

Approximately 2½ hours or one session of training time is suggested to cover *Theory of Heat Transfer and Moisture Effects*. The training class session is a suggested 2½ hour time period, which includes one break. **You will need to adjust the time required for hands-on activities and testing based on your class size and resources.** All time periods for this module are suggested, and you will need to adapt the suggested, lesson plan to meet your local conditions.

Suggested Teaching Sequence — One 2½-Hour Session

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction – Building Insulation Vapor Problems Performance Profile Test and Module Examination	1.0.0 – 6.3.0

TRANSPARENCY 1-2
TASK MODULE 19303,
THEORY OF HEAT TRANSFER AND MOISTURE EFFECTS

PERFORMANCE PROFILE TASKS

- 1. Find the K factors of the following materials at 100°F mean temperature using the K factor chart:**
 - Cellular glass**
 - Mineral fiber**
 - Elastomeric**
 - Polyurethane**

- 2. Apply a vapor barrier to pipe insulation on a mock-up.**

ADHESIVES AND THEIR USES

OBJECTIVES

Upon completion of this module, the trainee will be able to:

1. Identify various types of adhesives and list the most common applications of each type.
2. Describe the proper storage and application procedures for factory-applied jacket adhesive.
3. Describe the general application method for contact adhesive.
4. Explain how to apply anchors using general purpose adhesive.
5. List two methods of applying lagging adhesive.

Note to the Instructor

Before teaching this Task Module, you should review the details in this Instructor's Guide for Equipment and Materials, Testing, and the suggested Teaching Sequence. Be sure to allow ample time to prepare your own training plan or lesson plan and to gather all required equipment and materials.

Required Equipment and Materials

The following are required for instruction using this Task Module:

Equipment

Overhead projector and screen
Whiteboard / chalkboard
Various types of insulation adhesives along
with the necessary tools for application
Piping mock-up
Duct mock-up
Appropriate Personal Protective Equipment

Materials

Trainee Task Module
Transparencies
Paper / pencils
Markers / chalk
Module Examination
Performance Profile Sheets

HOW TO USE THIS INSTRUCTOR'S GUIDE

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Introduction/Overview
Classroom, and/or Demonstration, and/or Laboratory
Class Break
Classroom, and/or Demonstration, and/or Laboratory
Summary

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MODULE OVERVIEW

This module introduces the trainee to adhesives. The intended audience for this module includes all Insulating trainees.

Prerequisites

Please see the Course Map. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following modules:

Core Curricula; Insulating Level 1 and Level 2;
Insulating Level 3, Modules 19301 through 19303

Teaching Time for This Task Module

Approximately 2½ hours or one session of training time is suggested to cover *Adhesives and Their Uses*. The training class session is a suggested 2½ hour time period, which includes one break. **You will need to adjust the time required for hands-on activities and testing based on your class size and resources.** All time periods for this module are suggested and you will need to adapt the suggested, lesson plan to meet your local conditions.

Suggested Teaching Sequence — One 2½-Hour Session

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction – Hot Asphalt Adhesives Performance Profile Test and Module Examination	1.0.0 – 2.7.0

PERFORMANCE PROFILE TASKS

- 1. Install fiberglass pipe insulation with a self-sealing lap system.**
- 2. Install fiberglass pipe insulation with a field-applied adhesive.**
- 3. Use a general purpose adhesive to apply insulation anchors to ductwork.**

STEAM, CONDENSATE, AND PROCESS WATER SYSTEMS

OBJECTIVES

Upon completion of this module, the trainee will be able to:

1. Identify steam and condensate piping in buildings.
2. Understand the need for insulated process pipe systems in buildings.
3. Recognize the various pressures and temperatures of steam systems.
4. Understand the relationships between the equipment and steam systems in buildings.

Note to the Instructor

Before teaching this Task Module, you should review the details in this Instructor's Guide for Equipment and Materials, Testing, and the suggested Teaching Sequence. Be sure to allow ample time to prepare your own training plan or lesson plan and to gather all required equipment and materials.

Required Equipment and Materials

The following are required for instruction using this module:

Equipment

Overhead projector and screen
Whiteboard / chalkboard
Access to a steam and condensate
return system
Appropriate Personal Protective Equipment

Materials

Trainee Task Module
Module Examination
Transparencies
Paper / pencils
Markers / chalk
Performance Profile Sheets

HOW TO USE THIS INSTRUCTOR'S GUIDE

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Introduction/Overview
Classroom, and/or Demonstration, and/or Laboratory
Class Break
Classroom, and/or Demonstration, and/or Laboratory
Summary

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MODULE OVERVIEW

This module introduces the trainee to steam, condensate, and process water systems. The intended audience for this Task Module includes all Insulating trainees.

Prerequisites

Please see the Course Map. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following modules:

Core Curricula; Insulating Level 1 and Level 2;
Insulating Level 3, Modules 19301 through 19304

Teaching Time For This Task Module

Approximately 5 hours or two sessions of training time are suggested to cover *Steam, Condensate, and Process Water Systems*. The training class session is a suggested 2½ hour time period, which includes one break. **You will need to adjust the time required for hands-on activities and testing based on your class size and resources.** All time periods for this module are suggested, and you will need to adapt the suggested lesson plan to meet your local conditions.

Suggested Teaching Sequence — Two 2½-Hour Sessions

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction – Condensate Tank & Deaerator	1.0.0 – 3.2.0
2	Piping Characteristics of Steam and Condensate Systems – Insulation of Piping	4.0.0 – 7.0.0
	Performance Profile Test and Module Examination	

TRANSPARENCY 1-2
TASK MODULE 19305,
STEAM, CONDENSATE, AND PROCESS WATER SYSTEMS

PERFORMANCE PROFILE TASKS

- 1. Identify all elements of a steam system.**
- 2. Identify all elements of a condensate return system.**

LARGE BOILERS, BREECHINGS, PRECIPITATORS, & APPARATUS

OBJECTIVES

Upon completion of this module, the trainee will be able to:

1. Describe different types of boilers and their insulation requirements.
2. Identify various sections of large boilers and understand their insulation requirements.
3. Identify insulation requirements on breechings from large boilers.
4. Identify precipitators and other apparatus relating to large boilers.

Note to the Instructor

Before teaching this Task Module, you should review the details in this Instructor's Guide for Equipment and Materials, Testing, and the suggested Teaching Sequence. Be sure to allow ample time to prepare your own training plan or lesson plan and to gather all required equipment and materials.

Required Equipment and Materials

The following are required for instruction using this module:

Equipment

Overhead projector and screen
Whiteboard / chalkboard

Materials

Trainee Task Module
Module Examination
Transparencies
Copies of unlabeled drawings from
Appendix A
Paper / pencils
Markers / chalk
Performance Profile Sheets

HOW TO USE THIS INSTRUCTOR'S GUIDE

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Introduction/Overview
Classroom, and/or Demonstration, and/or Laboratory
Class Break
Classroom, and/or Demonstration, and/or Laboratory
Summary

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MODULE OVERVIEW

This module introduces the insulating trainee to large boilers, breechings, precipitators, and apparatus. The intended audience for this module includes all insulating trainees.

Prerequisites

Please see the Course Map. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following modules:

Core Curricula; Insulating Level 1 and Level 2;
Insulating Level 3, Modules 19301 through 19305

Teaching Time for This Task Module

Approximately 10 hours or four sessions of training time is suggested to cover *Large Boilers, Breechings, Precipitators, and Apparatus*. The training class session is a suggested 2½ hour time period, which includes one break. **You will need to adjust the time required for hands-on activities and testing based on your class size and resources.** All time periods for this module are suggested, and you will need to adapt the suggested lesson plan to meet your local conditions.

Suggested Teaching Sequence — Four 2½-Hour Sessions

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction – Large Field-Erected Boilers	1.0.0 – 2.2.1
2	Precipitators – Breechings	2.3.0 – 3.0.0
3	Pollution Control Equipment – Other Types of Boilers	4.0.0 – 5.0.0
4	General Insulation Requirements – Insulation Handling and Storage	6.0.0 – 6.6.0
	Performance Profile Test and Module Examination	

TRANSPARENCY 1-2
TASK MODULE 19306,
LARGE BOILERS, BREECHINGS, PRECIPITATORS, AND APPARATUS

PERFORMANCE PROFILE TASKS

- 1. Using the unlabeled diagram of a large boiler, identify the major components.**
- 2. Using the unlabeled diagram of a precipitator, identify the major components.**
- 3. Identify at least five of the ten general guidelines for the storage and handling of materials at a boiler insulation project.**

REFRIGERATION AND CRYOGENIC SYSTEMS

OBJECTIVES

Upon completion of this module, the trainee will be able to:

1. Identify refrigeration piping in refrigeration and air conditioning systems.
2. Identify ammonia piping in low-temperature storage buildings.
3. Identify systems where cryogenic piping may be used.
4. State the conditions under which refrigerant lines must be insulated.

Note to the Instructor

Before teaching this Task Module, you should review the details in this Instructor's Guide for Equipment and Materials, Testing, and the suggested Teaching Sequence. Be sure to allow ample time to prepare your own training plan or lesson plan and to gather all required equipment and materials.

Required Equipment and Materials

The following are required for instruction using this module:

Equipment

Overhead projector and screen
Whiteboard / chalkboard

Materials

Trainee Task Module
Module Examination
Transparencies
Copies of unlabeled diagrams from
Appendix A
Paper / pencils
Markers / chalk
Performance Profile Sheets

HOW TO USE THIS INSTRUCTOR'S GUIDE

For each 2¹/₂ hour class session in this Instructor Guide, the basic Presentation Sequence is as follows:

Introduction/Overview
Classroom, and/or Demonstration, and/or Laboratory
Class Break
Classroom, and/or Demonstration, and/or Laboratory
Summary

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MODULE OVERVIEW

This module introduces the trainee to refrigeration and cryogenic systems. The intended audience for this module includes all Insulating trainees.

Prerequisites

Please see the Course Map. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following modules:

Core Curricula; Insulating Level 1 and 2;
Insulating Level 3, Modules 19301 through 19306

Teaching Time for This Task Module

Approximately 2½ hours or one session of training time is suggested to cover *Refrigeration and Cryogenic Systems*. The training class session is a suggested 2½ hour time period, which includes one break. **You will need to adjust the time required for hands-on activities and testing based on your class size and resources.** All time periods for this module are suggested, and you will need to adapt the suggested lesson plan to meet your local conditions.

Suggested Teaching Sequence — One 2½-Hour Session

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction – Cryogenics Performance Profile and Module Examination	1.0.0 – 4.0.0

PERFORMANCE PROFILE TASKS

- 1. Label an unmarked diagram of a refrigeration cycle.**
- 2. Label an unmarked diagram of an ammonia refrigeration system.**

SPECIALIZED INSULATION SYSTEMS

OBJECTIVES

Upon completion of this module, the trainee will be able to:

1. Define a prefabricated panel system.
2. Explain where prefabricated conduit systems are used on underground pipe and which portions may require field insulation.
3. Explain double-walled vacuum systems as used in cryogenic temperature applications.
4. Explain where refractory-type insulation is used.
5. Describe the use of fireproofing materials in buildings.
6. List the types of insulation used in soundproofing applications.

Note to the Instructor

Before teaching this Task Module, you should review the details in this Instructor's Guide for Equipment and Materials, Testing, and the suggested Teaching Sequence. Be sure to allow ample time to prepare your own training plan or lesson plan and to gather all required equipment and materials.

Required Equipment and Materials

The following are required for instruction using this module:

Equipment

Overhead projector and screen
Whiteboard / chalkboard

Materials

Trainee Task Module
Module Examination
Transparencies
Paper / pencils
Markers / chalk
Performance Profile Sheets

HOW TO USE THIS INSTRUCTOR'S GUIDE

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Classroom, and/or Demonstration, and/or Laboratory
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Laboratory: Instructors will facilitate all laboratory activities, coach trainees as they practice the procedures, monitor trainee progress, and provide feedback. The instructor will make sure that safety rules are followed at all times and that protective equipment is worn.

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MODULE OVERVIEW

This module introduces the insulating trainee to specialized insulation systems. The intended audience for this module includes all insulating trainees.

Prerequisites

Please see the Course Map. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following modules:

Core Curricula; Insulating Level 1 and Level 2;
Insulating Level 3, Modules 19301 through 19307

Teaching Time for This Task Module

Approximately 5 hours or two sessions of training time is suggested to cover *Specialized Insulation Systems*. The training class session is a suggested 2½ hour time period, which includes one break. **You will need to adjust the time required for hands-on activities and testing based on your class size and resources.** All time periods for this module are suggested, and you will need to adapt the suggested lesson plan to meet your local conditions.

Suggested Teaching Sequence — Two 2½-Hour Sessions

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction – Preinsulated Pipe Systems	1.0.0 – 4.0.0
2	Pour-in-Place for Underground Pipe – Cryogenic Insulation Systems	5.0.0 – 10.0.0
	Performance Profile Test and Module Examination	

PERFORMANCE PROFILE TASKS

- 1. Identify the methods and materials used to insulate refrigerant lines and condensate drains.**
- 2. Identify the methods and materials used to insulate walls, ceilings, and floors.**

BLUEPRINTS AND SPECIFICATIONS

OBJECTIVES

Upon completion of this module, the trainee will be able to:

1. Interpret blueprints and architect's plans to identify insulation requirements.
2. Use blueprints and plans to verify correct installation of insulation.
3. Interpret specifications.
4. Describe a shop drawing.
5. Describe an as-built and the steps required to develop it.
6. Perform basic takeoff procedures.

Note to the Instructor

Before teaching this Task Module, you should review the details in this Instructor's Guide for Equipment and Materials, Testing, and the suggested Teaching Sequence. Be sure to allow ample time to prepare your own training plan or lesson plan and to gather all required equipment and materials.

Required Equipment and Materials

The following are required for instruction using this module:

Equipment

Overhead projector and screen
Whiteboard / chalkboard
Calculator

Materials

Trainee Task Module
Module Examination
Transparencies
Paper / pencils
Markers / chalk
Sample blueprints supplied with Trainee Module
Sample specifications
Performance Profile Sheets

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MODULE OVERVIEW

This module introduces the insulating trainee to the methods and procedures for reading blueprints and specifications. The intended audience for this module includes all insulating trainees.

Prerequisites

Please see the Course Map. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following modules:

Core Curricula; Insulating Level 1 and Level 2;
Insulating Level 3, Modules 19301 through 19308

Teaching Time for This Task Module

Approximately 12.5 hours or five sessions of training time are suggested to cover *Blueprints and Specifications*. The training class session is a suggested 2½ hour time period, which includes one break. **You will need to adjust the time required for hands-on activities and testing based on your class size and resources.** All time periods for this module are suggested, and you will need to adapt the suggested lesson plan to meet your local conditions.

Suggested Teaching Sequence — Five 2½-Hour Sessions

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction – Reading Blueprints	1.0.0 – 2.0.0
2	Site Plan – Section Drawings	2.1.0 – 2.6.0
3	Plumbing Plan – Electrical Plan	2.7.0 – 2.9.0
4	Exercises in Blueprint Reading – CSI Format	3.0.0 – 5.4.1
5	Shop Drawings – Material and Labor Takeoff	6.0.0 – 8.0.0
	Performance Profile Test and Module Examination	

PERFORMANCE PROFILE TASKS

- 1. Using a sample set of drawings, identify:**
 - **Plan view**
 - **Elevation view**
 - **Isometric**
 - **Flow diagram**

- 2. Using a sample specification, identify:**
 - **The type of base, securement, and finish materials required for the job.**
 - **The method of application for these materials.**
 - **The use of any approved alternate procedures or materials.**

JACKETING FABRICATION – PIPING AND FITTINGS

OBJECTIVES

Upon completion of this module, the trainee will be able to:

1. Identify the different types of jacketing used for piping.
2. Identify the different gauges or thicknesses used for piping.
3. Explain the application procedures used for straight piping.
4. Identify the different types of fittings that can receive jacketing.
5. Perform the application procedures for jacketing on fittings.
6. Identify the tools required for layout and installation of jacketing.
7. Explain the layout procedures and how to install fitting jacketing.
8. Identify and apply the different methods of securement for jacketing.

Note to the Instructor

Before teaching this Task Module, you should review the details in this Instructor's Guide for Equipment and Materials, Testing, and the suggested Teaching Sequence. Be sure to allow ample time to prepare your own training plan or lesson plan and to gather all required equipment and materials.

Required Equipment and Materials

The following are required for instruction using this module:

Equipment

Overhead projector and screen
Whiteboard / chalkboard
Calculator
Dividers
Razor knife
Sample of jacketing materials
Samples of securements
Sample of Z-clip
Samples of preformed ells and gores
Beader and crimper
Piping mock-up
Electric shears
Gore pattern
Sample of prefabricated tee

Pittsburgh (sheet metal seaming) machine
Easy edger
Sample of prefabricated valve and flange
Sample of reducers, bevels, and end caps
Appropriate Personal Protective Equipment

Materials

Trainee Task Module
Markers / chalk
Transparencies
Paper / pencils
Module Examination
Performance Profile Sheets

HOW TO USE THIS INSTRUCTOR'S GUIDE

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MODULE OVERVIEW

This module introduces the trainee to the methods and procedures for installing and fabricating jacketing materials for insulation systems. The intended audience for this module is all Insulating trainees.

Prerequisites

Please see the Course Map. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following modules:

Core Curricula; Insulating Level 1 and Level 2;
Insulating Level 3, Modules 19301 through 19309

Safety Considerations

Make sure that the trainees are equipped with proper safety equipment, to include:

Appropriate Personal Protective Equipment

Teaching Time For This Task Module

Approximately 40 hours or 16 sessions of training time is suggested to cover *Jacketing Fabrication – Piping and Fittings*. The training class session is a suggested 2½ hour time period, which includes one break. **You will need to adjust the time required for hands-on activities and testing based on your class size and resources.** All time periods for this module are suggested, and you will need to adapt the suggested lesson plan to meet your local conditions.

Suggested Teaching Sequence — Sixteen 2½-Hour Sessions

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction – General Jacket Installation	1.0.0 – 2.0.0
2	Measuring and Ordering Jacketing – Installing Jacket On Horizontal Piping	2.1.0 – 2.4.0
3	Installing Jacket on Vertical Pipe	2.5.0
4	Installing Jacket at Jacket Penetrations	2.6.0
5	Installing Jacket on Pipe Elbows – Installing Preformed Elbow Covers	2.7.0 – 2.7.1
6	Installing Segmented Elbow Covers (Gore Type) – Procedures for Field- Or Shop-Fabricating Sweeps or Bends	2.7.2 – 2.7.3
7	Installing Segmented Elbow Covers (Gore Type) – Procedures for Field- Or Shop-Fabricating Sweeps or Bends	2.7.2 – 2.7.3
8	Installing Segmented Elbow Covers (Gore Type) – Procedures for Field- Or Shop-Fabricating Sweeps or Bends	2.7.2 – 2.7.3
9	Installing Segmented Elbow Covers (Gore Type) – Procedures for Field- Or Shop-Fabricating Sweeps or Bends	2.7.2 – 2.7.3

Suggested Teaching Sequence — Continued

Session	Topic	Trainee Module Section(s)
10	Field-Installing Jacket on Pipe Tees	2.8.0
11	Shop Fabrication of Tees	2.9.0
12	Installing Reducers, End Caps, and Other Shapes	3.0.0
13	Installing Reducers, End Caps, and Other Shapes	3.0.0
14	Installing Jacket on Flanged Valves – General Jacketing Considerations	4.0.0 – 5.0.0
15	Installing Jacket on Flanged Valves – General Jacketing Considerations	4.0.0 – 5.0.0
16	Performance Profile Test and Module Examination	

TRANSPARENCY 1-2
TASK MODULE 19310,
JACKETING FABRICATION – PIPING AND FITTINGS

PERFORMANCE PROFILE TASKS

- 1. Using a piping mock-up with the insulation installed, apply a two-piece metal elbow, straight run aluminum jacket, a metal tee, and a terminus bevel.**

- 2. Lay out a 14 x 2 gored elbow. Cut the gores out and apply the proper beading and crimping. Apply the gores to the piping mock-up.**

- 3. Apply PVC jacketing to straight run piping using an adhesive and nylon bands. Finish the fittings with PVC fitting covers.**

JACKETING FABRICATION – VESSELS AND EQUIPMENT

OBJECTIVES

Upon completion of this module, the trainee will be able to:

1. Describe the different types of jacketing materials used for vessels and equipment.
2. List the different thicknesses and gauges of jacketing materials.
3. Know the different areas of equipment which can receive jacketing materials.
4. Demonstrate the layout procedures for heads, flanges, reducers, and specialty items.
5. Demonstrate the installation procedures for equipment jacketing.
6. List the securements used for jacketing materials.

Note to the Instructor

Before teaching this Task Module, you should review the details in this Instructor's Guide for Equipment and Materials, Testing, and the suggested Teaching Sequence. Be sure to allow ample time to prepare your own training plan or lesson plan, and to gather all required equipment and materials.

Required Equipment and Materials

The following are required for instruction using this module:

Equipment

Overhead projector and screen
Whiteboard / chalkboard
Appropriate Personal Protective Equipment
Calculator
Vessel mock-up
Samples of different types of jacketing
Samples of different types of securements
Beader and crimper

Materials

Trainee Task Module
Markers / chalk
Paper / pencils
Module Examination
Transparencies
Performance Profile Sheets

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MODULE OVERVIEW

This module introduces the insulating trainee to the methods and procedures for jacketing vessels and equipment. The intended audience for this module is all insulating trainees.

Prerequisites

Please see the Course Map. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following modules:

Core Curricula; Insulating Level 1 and Level 2;
Insulating Level 3, Modules 19301 through 19310

Safety Considerations

Make sure that the trainees are equipped with proper safety equipment, to include:

Appropriate Personal Protective Equipment

Teaching Time for This Task Module

Approximately 40 hours or sixteen sessions of training time is suggested to cover *Jacketing Fabrication – Vessels and Equipment*. The training class session is a suggested 2½ hour time period, which includes one break. **You will need to adjust the time required for hands-on activities and testing based on your class size and resources.** All time periods for this module are suggested, and you will need to adapt the suggested lesson plan to meet your local conditions.

Suggested Teaching Sequence — Sixteen 2½-Hour Sessions

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction – Moisture Barriers	1.0.0 – 1.2.0
2	Finishes and Laps – Securing Jacketing Materials	1.3.0 – 1.4.0
3	Types of Jacketing Materials	1.5.0
4	Types of Jacketing Materials – Installing Roll-Type Jacketing	1.5.0 – 2.0.0
5	Installing Roll-Type Jacketing	2.0.0
6	Installing Roll-Type Jacketing	2.0.0
7	Installing Roll-Type Jacketing	2.0.0
8	Installing Corrugated Sheets	3.0.0
9	Installing Corrugated Sheets	3.0.0
10	Installing Corrugated Sheets	3.0.0
11	Application of Gored Heads to Vessels	4.0.0
12	Application of Gored Heads to Vessels	4.0.0
13	Application of Gored Heads to Vessels	4.0.0
14	Application of Gored Heads to Vessels	4.0.0
15	Application of Standing Seam Heads – Application of Specialty Jacket Items	5.0.0 – 6.0.0
16	Review Performance Profile Test Module Examination	

TRANSPARENCY 1-2
TASK MODULE 19311,
JACKETING FABRICATION – VESSELS AND EQUIPMENT

PERFORMANCE PROFILE TASKS

- 1. Using the vessel mock-up, install roll-type jacketing using screws and bands for securement.**

- 2. Using the vessel mock-up, install sheet jacketing using screws and bands.**

- 3. Using the vessel mock-up, lay out and install a gored head.**

SHEET METAL LAGGING

OBJECTIVES

Upon completion of this module, the trainee will be able to:

1. Identify and use specific sheet metal tools.
2. Know the limitations of metal.
3. Understand measuring requirements.
4. Explain cutting and shaping methods.
5. List various attachments used.
6. Explain installation methods.
7. Identify proper flashing and sealing techniques.

Note to the Instructor

Before teaching this Task Module, you should review the details in this Instructor's Guide for Equipment and Materials, Testing, and the suggested Teaching Sequence. Be sure to allow ample time to prepare your own training plan or lesson plan and to gather all required equipment and materials.

Required Equipment and Materials

The following are required for instruction using this module:

Equipment

Overhead projector and screen
Whiteboard / chalkboard
Calculator
Mock-up of flashing sidewall
Sheet metal tools, including
break and shears
Pittsburgh machine
Screw gun
Utility knife
Electric drill
Appropriate Personal
Protective Equipment
Pin welder
Flat stock for flashing
Boxed rib sheets
Pins
Insulating material

Hex mesh wire
Speed clips
Plywood sheet
Self-tapping screws
4 ft. × 8 ft. Z bars
Rubber closing strips

Materials

Trainee Task Module
Markers / chalk
Paper / pencils
Module Examination
Transparencies
Performance Profile Sheets

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MODULE OVERVIEW

This module introduces the insulating trainee to the methods and procedures for sheet metal lagging for insulation systems. The intended audience for this module is all insulating trainees.

Prerequisites

Please see the Course Map. Prior to training with this module, it is recommended that the trainee shall have successfully completed the following modules:

Core Curricula; Insulating Level 1 and Level 2;
Insulating Level 3, Modules 19301 through 19311

Teaching Time For This Task Module

Approximately 12¹/₂ hours or five sessions of training time is suggested to cover *Sheet Metal Lagging*. The training class session is a suggested 2¹/₂ hour time period, which includes one break. **You will need to adjust the time required for hands-on activities and testing based on your class size and resources.** All time periods for this module are suggested, and you will need to adapt the suggested lesson plan to meet your local conditions.

Safety Considerations

Make sure that the trainees are equipped with proper safety equipment, to include:

Appropriate Personal Protective Equipment

Suggested Teaching Sequence — Five 2¹/₂-Hour Sessions

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction	1.0.0
2	Lagging Materials	2.0.0
3	Installing Insulation and Lagging Supports	2.1.0
4	Installing Insulation – Installing Sheet Metal Lagging	2.2.0 – 2.3.0
5	Installing Sheet Metal Lagging – Installing Preinsulated Panels Performance Profile Test and Module Examination	2.3.0 – 2.5.0

PERFORMANCE PROFILE TASKS

- 1. Using a mock-up, flash a top to side juncture.**
- 2. Using a mock-up, flash an inside vertical corner.**
- 3. Using a mock-up, flash a sidewall offset detail.**