



Insulating

Level Three

Module 19303

Theory of Heat Transfer and Moisture Effects

EXAMINATION PACKET

This packet contains the reproducible Module Examination, Answer Key, and Performance Profile Sheet(s).

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SECURE AREA!**

**NATIONAL CENTER FOR
CONSTRUCTION EDUCATION AND RESEARCH**

Pearson Education, Inc.

Upper Saddle River, New Jersey Columbus, Ohio

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Name: _____ Date: _____

Social Security Number: _____

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|-------|--|-------|---|
| _____ | <p>1. A temperature difference existing between two bodies causes heat energy to transfer from the body at the _____ temperature to the body at the _____ temperature.</p> <ul style="list-style-type: none"> a. air; ambient b. external; internal c. higher; lower d. internal; external | _____ | <p>5. The life and proper functioning of insulation installed on a cold system is dependent on a _____ over its entire warm side to prevent water vapor penetration.</p> <ul style="list-style-type: none"> a. cork board b. special glue c. vapor barrier d. tar mixture |
| _____ | <p>2. Which of the following is <i>not</i> one of the three basic methods of heat transfer?</p> <ul style="list-style-type: none"> a. Induction b. Radiation c. Convection d. Conduction | _____ | <p>6. The K factor is used to rate the _____ of insulating materials.</p> <ul style="list-style-type: none"> a. moisture resistance b. density c. resistance to heat transfer d. physical dimensions |
| _____ | <p>3. Insulation materials are most efficient when _____.</p> <ul style="list-style-type: none"> a. wet b. dry c. moist d. cold | _____ | <p>7. What is the unit used to measure vapor permeability of materials?</p> <ul style="list-style-type: none"> a. Perm b. Btu c. Degrees d. Pounds per cubic foot |
| _____ | <p>4. Which of the following is <i>not</i> needed to calculate heat loss through insulation?</p> <ul style="list-style-type: none"> a. The K factor b. The surface type of the materials c. The amount of fuel required to produce steam d. The ambient temperature | _____ | <p>8. Which of the following formulas can be used to determine insulation thickness?</p> <ul style="list-style-type: none"> a. $P \times K$ b. $T \times K$ c. R/K d. $R \times K$ |

Theory of Heat Transfer and Moisture Effects

- _____ 9. Vapor is _____.
- a. compressed water.
 - b. a barrier used on cold work
 - c. a gaseous form of liquid
 - d. a temperature measurement
- _____ 10. Surfaces that minimize radiation should be used on _____.
- a. hot applications
 - b. cold applications
 - c. vapor barriers
 - d. outdoor applications

NOTE ON PERFORMANCE PROFILE TESTING

Performance Profiles are included in this Instructor's Guide in a format that can be easily photocopied for each trainee. The Profiles measure trainee competency in the tasks taught in this module.

Please note the number of tasks to be tested while teaching this module. Each trainee should be tested on the tasks listed in the Performance Profile. Before the performance testing, the instructor should brief the trainees on:

- test objectives and criteria,
- safety precautions, and
- procedures for each task to be tested.

The instructor administering the performance testing should also do the following:

- ensure that all of the needed equipment is available and operating properly;
- set up the testing stations;
- organize and administer the test in a way that allows for optimal performance;
- complete the Performance Profile Sheet for each trainee by assigning a score for each listed task;
- monitor adherence to all safety regulations and precautions;
- provide adequate supervision to prevent injuries; and
- take immediate and effective action to remedy any emergency.

ACCREDITATION TESTING

If this Performance Profile Testing is done in the National Center for Construction Education and Research Standardized Craft Training Program, the following conditions must be met:

1. The Craft Instructor must hold valid NCCER instructor certification.
2. The training must be delivered through a Training Program Sponsor recognized by the NCCER.
3. For every module, the specific performance testing must be completed to the satisfaction of the instructor.
4. The results of the testing must be recorded on the Craft Training Report Form. This form must be provided to the local Training Program Sponsor to be forwarded to the NCCER National Craft Training Registry.

Craft: Insulating

Task Module Number: 19303

Task Module Title: Theory of Heat Transfer and Moisture Effects



TRAINEE NAME: _____

TRAINEE SOCIAL SECURITY NUMBER: _____

CLASS: _____

TRAINING PROGRAM SPONSOR: _____

INSTRUCTOR: _____

- Rating Levels:**
1. Passed: performed task.
 2. Failed: did not perform task.

Recognition: When testing for the NCCER Standardized Craft Training Program, be sure to record Performance Profile testing results on Craft Training Report Form 200 and submit the results to the Training Program Sponsor.

TASK	RATING
1. Find the K factors of the following materials at 100°F mean temperature using the K factor chart:	
<ul style="list-style-type: none"> • Cellular glass 	
<ul style="list-style-type: none"> • Mineral fiber 	
<ul style="list-style-type: none"> • Elastomeric 	
<ul style="list-style-type: none"> • Polyurethane 	
2. Apply a vapor barrier to pipe insulation on a mock-up.	

Answer Key to Module Examination

<u>Answer</u>	<u>Section</u>
1. c	1.0.0
2. a	2.0.0
3. b	6.1.0
4. c	5.0.0
5. c	6.1.0
6. c	3.0.0
7. a	6.2.0
8. d	4.0.0
9. c	Terms
10. a	5.0.0

