

## PAINTING FAILURES AND REMEDIES

### OBJECTIVES

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

1. Recognize the physical symptoms of various types of coating failures that occur on interior and exterior finishes.
2. State the cause or causes of specific types of failures.
3. Describe the appropriate method for correcting the specific types of failures and explain how each failure could have been prevented.
4. Describe the causes and remedies of coating failures related to high interior humidity.
5. Explain the causes and remedies of moisture damage due to snow and ice buildup on a roof.

### Note to the Instructor

Before teaching this Task Module, you should review the details in this Instructor's Guide for Equipment and Supplies, 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.

The specific content for Sessions 1, 2, and 3 may be altered at your discretion so that the sessions can easily be adapted to the local situation. An alternative to providing certain class materials is to take field trips to various job sites where painting failures and remedies can be observed and studied.

Color slides of the black and white illustrations of failed surfaces used in this module are available through the Painting and Decorating Contractors of America (PDCA), Fairfax, VA.

### Required Equipment and Materials

The following are required for instruction using this Task Module:

#### Equipment

Overhead projector and screen  
Chalkboard and chalk  
Appropriate Personal Protective Equipment

To the maximum extent possible, various samples of painting failures defined in the Trainee Module, including:

#### Materials

Trainee Task Module  
Module Examination  
Transparencies

Alligatoring  
Blistering  
Checking  
Cracking and flaking  
Excessive chalking  
Intercoat peeling (scaling or cornflaking)  
Peeling from different substrates  
Condensation problems  
Damage caused by melting snow and ice

## HOW TO USE THIS INSTRUCTOR'S GUIDE

For each 2½ hour class session in this Instructor's 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

*Suggested* time periods for classroom sessions are included throughout this Instructor's Guide. These time periods should be adapted to meet local conditions and training requirements.

Each class session is presented with two columns of information. On the left side of the page, a narrow column provides suggested trainee and instructor actions, icons to call your attention to material, safety, audio-visual, or testing requirements, and space for your notes. The right-hand column provides the outline of the suggested presentation for each class session.

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

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**Demonstration:** 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

The National Center for Construction Education and Research provides a standardized national program of accredited craft training based on the *Wheels of Learning*. Key features of the program include instructor certification, competency-based training, and performance testing. The program provides trainees, instructors, and companies with a standard form of recognition through a National Craft Training Registry. The program is described in full in the *Guidelines for Accreditation*, published by the National Center. For more information on standardized craft training, contact NCCER at P.O. Box 141104, Gainesville, FL 32614-1104; or call 352-334-0911.

## TASK MODULE OVERVIEW

This course introduces the painting trainee to the methods used to detect coating failures and the remedies for correcting these problems before repainting. The intended audience for this Task Module includes all painting trainees.

### Prerequisites

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

- NCCER Core Curricula
- NCCER Painting Level 1

### Teaching Time for This Task Module

Approximately 7<sup>1</sup>/<sub>2</sub> hours or three sessions of training time is suggested to cover *Painting Failures and Remedies*. The training class session is a suggested 2<sup>1</sup>/<sub>2</sub> 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 — Three 2<sup>1</sup>/<sub>2</sub> Hour Sessions

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction; Causes of Failures; Types of Exterior Failures	1.0.0 – 3.7.2
2	Types of Exterior Failures; Types of Interior Failures	3.8.0 – 4.5.2
3	Moisture-Related Problems	5.0.0 – 5.2.0
	Performance Testing and Module Examination	

### Optional References for Advanced Study

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than task training.

*Painting and Decorating Craftsman's Manual and Textbook*, Latest Edition, Painting and Decorating Contractors of America, Fairfax, Virginia.

*Painting and Coating*, The Sherwin-Williams Company, Cleveland, Ohio.

# PERFORMANCE PROFILE TASKS

- 1. State the common causes of failures in exterior finishes.**
- 2. Identify the types of exterior finish failures that can be caused by moisture in the substrate. Based on the symptoms:**
  - Identify the problem.**
  - State the probable cause(s) of the failure.**
  - State how the problem could have been prevented.**
  - Correct the problem or describe how it should be corrected.**

## PERFORMANCE PROFILE TASKS

- 3. Identify other exterior finish problems that can be caused by poor adhesion due to incorrect or inadequate surface preparation. Based on the symptoms:**
- **Identify the problem.**
  - **State the probable cause(s) of the failure**
  - **State how the problem could have been prevented.**
  - **Correct the problem or describe how it should be corrected.**

## PERFORMANCE PROFILE TASKS

- 4. Identify interior finish problems that can be caused by poor adhesion due to incorrect or inadequate surface preparation. Based on the symptoms:**
- **Identify the problem.**
  - **State the probable cause(s) of the failure.**
  - **State how the problem could have been prevented.**
  - **Correct the problem or describe how it should be corrected.**

## PERFORMANCE PROFILE TASKS

5. **Identify the kinds of problems that can be caused by high interior humidity and roof leakage.**
  - **State the likely cause of the problem(s) as related to inadequate or improper construction methods.**
  - **Identify methods that can be used to correct the problem(s) without reconstruction.**





## JOB PLANNING AND COMPLETION

### OBJECTIVES

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

1. Describe the general procedure or steps involved by a painting contractor when estimating a job for the purpose of submitting a bid.
2. Describe the general procedure or steps involved to properly plan and complete a painting job once a contract for the job has been awarded.
3. Correctly interpret contractual documents to determine the painting contractor's responsibilities.
  - Blueprints
  - Schedules (finish, door, etc.)
  - Contract/specifications
  - Scope of work
  - Change orders
4. Develop a detailed schedule for accomplishing a selected job or task using labor hour data recorded on estimating forms and/or takeoff sheets.
5. Determine the quantities of paints and other materials needed to cover selected surfaces.
  - From estimating forms and/or takeoff sheets
  - By actual surface measurement and quantity calculations

### Note to the Instructor

Before teaching this Task Module, you should review the details in this Instructor's Guide for Equipment and Supplies, 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.

The specific content for Sessions 1, 2, 3, and 4 may be altered at your discretion so that the sessions can easily be adapted to the local situation. An alternative to providing certain class materials is to take field trips to various job sites where painting job planning and completion can be observed and studied.

## **Required Equipment and Materials**

The following are required for instruction using this Task Module:

### **Equipment**

Overhead projector and screen

Chalkboard and chalk

Appropriate Personal Protective Equipment

### **Materials**

Trainee Task Module

Module Examination

Transparencies

Examples of various job estimating and planning forms and items including:

- Proposals (bids)

- Contract/specifications

- Estimator's takeoff sheets

- Working schedules for general and painting contractor projects

- Examples of material and equipment lists

- Set of architect's or general contractor's drawings (plans, blueprints), including various painting-related schedules

- Assortment of doors, windows, vents, and shutters

- Change orders

- Punchlists

- Quality control records

- PDCA Standards P1-92, P2-92, P3-93, P4-94, and P5-94

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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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## TASK MODULE OVERVIEW

This course introduces the painting trainee to job planning and completion tasks. The intended audience for this Task Module includes all painting trainees.

### Prerequisites

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

- NCCER Core Curricula
- NCCER Painting Level 1
- NCCER Painting Level 2, Module 07201

### Teaching Time for This Task Module

Approximately 10 hours or four sessions of training time is suggested to cover *Job Planning and Completion*. 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.

### Safety Considerations

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

- Appropriate Personal Protective Equipment

### 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; Overview of the Estimating Process; Job Planning After Contract Award; Reviewing the Job Requirements	1.0.0 – 4.4.0
	Performance Testing	
2	Scheduling the Work; Acquiring the Needed Materials/ Equipment; Performing the Job; Preparing Surfaces for Painting; Applying Paints/Coatings to Surfaces	5.0.0 – 9.0.0
	Performance Testing	
3	Calculating Quantity of Materials	13.0.0 – 13.2.0
	Performance Testing	
4	Quality Control; Touch-Up Painting and Damage Repair; Site Cleanup	10.0.0 – 12.0.0
	Performance Testing and Module Examination	

## Optional References for Advanced Study

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than task training.

*Estimating Guide*, Latest Edition, Painting and Decorating Contractors of America, Fairfax, Virginia.

*Painting and Decorating Craftsman's Manual and Textbook*, Latest Edition, Painting and Decorating Contractors of America, Fairfax, Virginia.

*Painting and Decorating Encyclopedia*, Latest Edition, The Goodheart-Willcox Company, Inc., South Holland, Illinois.

*Professional Estimating Procedures*, Latest Edition, Painting and Decorating Contractors of America, Fairfax, Virginia.

*PDCA Standard P1-92, Touch-Up Painting and Damage Repair – Financial Responsibility*, Latest Edition, Painting and Decorating Contractors of America, Fairfax, Virginia.

*PDCA Standard P2-92, Third-Party Inspection Qualifications and Responsibilities*, Latest Edition, Painting and Decorating Contractors of America, Fairfax, Virginia.

*PDCA Standard P3-93, Designation of Paint Colors*, Latest Edition, Painting and Decorating Contractors of America, Fairfax, Virginia.

*PDCA Standard P4-94, Responsibilities for Inspection and Acceptance of Surfaces Prior to Painting and Decorating*, Latest Edition, Painting and Decorating Contractors of America, Fairfax, Virginia.

*PDCA Standard P5-94, Benchmark Sample Procedures for Paint and Other Decorative Coating Systems*, Latest Edition, Painting and Decorating Contractors of America, Fairfax, Virginia.

# PERFORMANCE PROFILE TASKS

- 1. Interpret blueprints and schedules (finish, door, etc.) to determine the painting requirements for a selected job.**
- 2. Interpret contractual documents to determine the painting requirements for a selected job.**
  - Contract**
  - Specifications**
  - Scope of work**
- 3. Use the tasks and labor hours data recorded on estimating forms and/or takeoff sheets for a selected job to develop a detailed schedule for accomplishing the job.**

## PERFORMANCE PROFILE TASKS

- 4. Use the tasks and materials/equipment recorded on estimating forms/takeoff sheets for a selected job to develop a detailed materials/equipment list for accomplishing the job.**
- 5. Measure selected surfaces and calculate the quantity of paint needed to cover the surfaces.**





## CHEMICAL CLEANING AND STRIPPING

### OBJECTIVES

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

1. Describe or demonstrate knowledge of the types of chemical cleaners and strippers.
2. Describe or demonstrate knowledge of the hazards associated with chemical cleaners and strippers.
3. Describe or demonstrate the general methods of using chemical cleaners and strippers.

### Note to the Instructor

Before teaching this Task Module, you should review the details in this Instructor's Guide for Equipment and Supplies, 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.

The specific content for Sessions 1, 2, and 3 may be altered at your discretion so that the sessions can easily be adapted to the local situation. An alternative to providing certain class materials is to take field trips to various job sites where painting failures and remedies can be observed and studied.

Color slides of the black and white illustrations of failed surfaces used in this module are available through Painting and Decorating Contractors of America (PDCA).

### Required Equipment and Materials

The following are required for instruction using this Task Module:

#### Equipment

Overhead projector and screen  
Chalkboard and chalk  
Appropriate Personal Protective Equipment

#### Materials

Trainee Task Module  
Module Examination  
Transparencies

To the maximum extent possible, samples of various chemical cleaners and strippers and associated materials as defined in the Trainee Module

## 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

*Suggested* time periods for classroom sessions are included throughout this Instructor's Guide. These time periods should be adapted to meet local conditions and training requirements.

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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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## TASK MODULE OVERVIEW

This course introduces the painting trainee to the general types and methods of using chemical cleaners and strippers. The intended audience for this Task Module includes all painting trainees.

### Prerequisites

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

NCCER Core Curricula

NCCER Painting Level 1

NCCER Painting Level 2, Modules 07201 and 07202

### Teaching Time for This Task Module

Approximately 7½ hours or three sessions of training time is suggested to cover *Chemical Cleaning and Stripping*. 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.

### Safety Considerations

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

Appropriate Personal Protective Equipment

### 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; Cleaning and Surface Preparation Agents; Chemical Strippers	1.0.0 – 3.3.0
2	Washing and Cleaning Methods	4.0.0 – 4.3.0
3	Chemical Stripping Methods	5.0.0
	Performance Testing and Module Examination	

### Optional References for Advanced Study

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than task training.

*Painting and Decorating Craftsman's Manual and Textbook*, Latest Edition, Painting and Decorating Contractors of America, Fairfax, Virginia.

# PERFORMANCE PROFILE TASKS

- 1. Recognize and describe the requirements for chemical cleaning and stripping.**
- 2. Recognize and describe the uses and hazards of various types of common or specialty chemical cleaners and treatments.**
- 3. Recognize and describe the uses and hazards of the three general classes of chemical strippers.**
- 4. Demonstrate and/or describe common cleaning methods using selected types of chemical cleaners on previously coated wood, metal, masonry, or concrete surfaces.**
- 5. Demonstrate and/or describe common stripping methods using selected types of chemical strippers on previously coated wood, metal, masonry, or concrete surfaces.**

## LOW-PRESSURE WATER CLEANING

### OBJECTIVES

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

1. Describe or demonstrate knowledge of low-pressure water washers:
  - Basic equipment components and functions
  - Accessories
  - Cleaning and surface preparation agents
  - Applications
  - Wet abrasive blasting requirements
  - Surface preparation standards and inspection techniques
2. Describe or demonstrate knowledge of typical low-pressure washer operation guidelines:
  - Warnings and hazards
  - Pressure relief
  - Starting and stopping
  - Spraying
  - Storage

### Note to the Instructor

Before teaching this Task Module, you should review the details in this Instructor's Guide for Equipment and Supplies, 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.

The specific content for Sessions 1, 2, and 3 may be altered at your discretion so that the sessions can easily be adapted to the local situation. An alternative to providing certain class materials is to take field trips to various job sites where low-pressure water cleaning can be observed.

### Required Equipment and Materials

The following are required for instruction using this Task Module:

#### Equipment

Overhead projector and screen

Chalkboard and chalk

Appropriate Personal Protective Equipment

## **Equipment (Cont'd)**

To the maximum extent possible, various examples of low-pressure water cleaning washers, spray tips, and accessories as defined in the Trainee Module, including:

- Gasoline engine model low-pressure washer
- 0° blaster tip
- 15° stripper tip
- 25° cleaner tip
- 40° rinser tip
- Rotary power scrub brush
- Telescoping extension
- Water blast nozzles
- Horizontal surface scrubber
- Variable tip cleaning nozzle
- Rotatable spray tip nozzle
- Wet abrasive injector

## **Materials**

Trainee Task Module

Module Examination

Transparencies

To the maximum extent possible, various samples of cleaning and surface preparation agents, as defined in the Trainee Module, including:

- Detergents
- Trisodium phosphate (TSP)
- Sodium metasilicate-based cleaner
- Other environmentally-safe cleaners
- Rust inhibitors
- Mineral abrasives
- Sodium bicarbonate abrasive

To the maximum extent possible, various samples of substrates and surfaces to be cleaned as listed in the Trainee Module, including:

- Wood
- Masonry and concrete
- Steel

To the maximum extent possible, copies or samples of the following standards, as defined in the Trainee Module:

- ASTM D-4258, Standard Practice for Cleaning Concrete
- ASTM D-4259, Standard Practice for Abrading Concrete
- ASTM D-4260, Acid etching
- ASTM D-4262, Litmus Test for PH Testing
- ASTM D-4263, Plastic Sheet Method for Moisture Testing
- SSPC-SP1
- SSPC-SP5 (NACE-1)
- SSPC-SP6 (NACE-3)
- SSPC-SP7 (NACE-4)
- SSPC-SP10 (NACE-2)

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Classroom, and/or Demonstration, and/or Laboratory  
Summary

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## TASK MODULE OVERVIEW

This course introduces the painting trainee to the cleaning of surfaces with low-pressure water cleaners. The intended audience for this Task Module includes all painting trainees.

### Prerequisites

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

NCCER Core Curricula

NCCER Painting Level 1

NCCER Painting Level 2, Modules 07201 through 07203

### Teaching Time for This Task Module

Approximately 7<sup>1</sup>/<sub>2</sub> hours or three sessions of training time is suggested to cover *Low-Pressure Water Cleaning*. The training class session is a suggested 2<sup>1</sup>/<sub>2</sub> 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 — Three 2<sup>1</sup>/<sub>2</sub> Hour Sessions

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction; Water Blast Cleaning Equipment; Low-Pressure Water Cleaning Equipment and Materials; Pressure Washing and Wet Abrasive Blasting; Surface Preparation Standards and Inspection Techniques	1.0.0 – 5.0.0
2	Safety Guidelines; Pressure Relief Guidelines; Start-Up Guidelines; Spraying Guidelines	6.0.0 – 9.0.0
3	Cleaning Techniques; Spray Tip Changing Guidelines; Pressure Washer Flushing and Storage	10.0.0 – 12.0.0
	Performance Testing and Module Examination	



## **Optional References for Advanced Study**

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than task training.

*Painting and Decorating Craftsman's Manual and Textbook*, Latest Edition, Painting and Decorating Contractors of America, Fairfax, Virginia.

# PERFORMANCE PROFILE TASKS

- 1. Recognize and describe the various categories and uses of low-pressure water washing equipment.**
- 2. Recognize and describe the functions of basic low-pressure washer components.**
- 3. Recognize and describe the uses of various low-pressure washer accessories.**
- 4. Recognize and describe the uses of various general surface preparation agents and wet abrasive media.**
- 5. Describe various general surface preparation standards and inspection techniques.**
- 6. Demonstrate proper start-up, operation, cleaning technique, shutdown, and safety guidelines for typical low-pressure washers using selected accessories.**

## ABRASIVE BLASTING

### OBJECTIVES

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

1. Recognize and describe basic abrasive blasting system equipment and materials.
  - System equipment components
  - Media
  - Operator protective gear
2. Describe or demonstrate basic abrasive blasting system hazards and operation guidelines.

### Note to the Instructor

Before teaching this Task Module, you should review the details in this Instructor's Guide for Equipment and Supplies, 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.

The specific content for Sessions 1, 2, and 3 may be altered at your discretion so that the sessions can easily be adapted to the local situation. An alternative to providing certain class materials is to take field trips to various job sites where abrasive blasting can be observed.

### Required Equipment and Materials

The following are required for instruction using this Task Module:

#### Equipment

Overhead projector and screen  
Chalkboard and chalk  
Appropriate Personal Protective Equipment  
To the maximum extent possible, various examples of basic blast system equipment as defined in the Training Module, including:

- Breathing air compressor or breathing air pump for low-pressure helmets
- Breathing air filter
- Air compressor
- Blast nozzles
- Blast machine
- Air hose/pipe
- Blast hose/pipe
- Portable centrifugal blasting machine

#### Materials

Trainee Task Module  
Module Examination  
Transparencies  
Steel shot and grit  
Coal slag abrasives

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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.

### NCCER Standardized Craft Training Programs

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## TASK MODULE OVERVIEW

This course introduces the painting trainee to the proper methods for abrasive blast cleaning and abrading of substrates and surfaces. The intended audience for this Task Module includes all painting trainees.

### Prerequisites

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

NCCER Core Curricula

NCCER Painting Level 1

NCCER Painting Level 2, Modules 07201 through 07204

### Teaching Time for This Task Module

Approximately 7½ hours or three sessions of training time is suggested to cover *Abrasive Blasting*. 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.

### Safety Considerations

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

Appropriate Personal Protective Equipment

### 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; Basic Abrasive Blast Equipment; Air Compressors; Blast Machines; Hoses; Nozzles	1.0.0 – 6.0.0
2	Operator Protective Gear; Portable Centrifugal Blasting Equipment; Blasting Media	7.0.0 – 9.0.0
3	Recycling Systems; Containment; Dust Collectors; Safety Guidelines; Air Abrasive Blasting Operating Tips	10.0.0 – 14.0.0
	Performance Testing and Module Examination	

### Optional References for Advanced Study

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than task training.

*Blast Off 2 Manual*, Latest Edition, Clemco Industries Corp., Washington, Missouri.

*Principles of Operation for Air-Supported, Abrasive Blasting Equipment, SSPC-96 T-27 Tutorial*, Latest Edition, Steel Structures Painting Council, Pittsburgh, Pennsylvania.

# PERFORMANCE PROFILE TASKS

- 1. Recognize and describe the basic uses of conventional abrasive blast systems.**
- 2. Recognize and describe the types and sizes of basic blast machines and the functions of their components.**
- 3. Recognize and describe the requirements of air and blast hose and hose couplings.**
- 4. Recognize and describe the types and sizes of blast nozzles and holders.**
- 5. Recognize and describe the types and functions of blast operator protective gear and communications equipment, along with the hazards and limitations of the gear.**
- 6. Describe the basic safety and operating guidelines for conventional blast systems.**

# DRYWALL FINISHING AND PATCHING

## OBJECTIVES

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

1. Explain the different levels of finishing as defined in *Recommended Specification for Levels of Gypsum Board Finish*.
2. Identify the hand tools used in drywall finishing and demonstrate the ability to use these tools.
3. Identify the automatic tools used in drywall finishing and demonstrate the ability to use these tools.
4. Identify the materials used in drywall finishing and state the purpose and use of each type of material.
  - Compounds
  - Joint reinforcing tapes
  - Trim materials
  - Textures and coatings
5. Demonstrate the ability to properly finish drywall using hand tools and automatic tools.
6. Recognize various types of problems that occur in drywall finishes and identify the cause and correct method for solving each type of problem.
7. Demonstrate the ability to patch damaged drywall.

## Note to the Instructor

Before teaching this Task Module, you should review the details in this Instructor's Guide for Equipment and Supplies, 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.

The specific content for Sessions 1 through 10 may be altered at your discretion so that the sessions can easily be adapted to the local situation. An alternative to providing certain class materials is to take field trips to various job sites where drywall finishing and patching can be observed.

## **Required Equipment and Materials**

The following are required for instruction using this Task Module:

### **Materials**

Overhead projector and screen

Chalkboard and chalk

Appropriate Personal Protective Equipment

To the maximum extent possible, various hand and automatic tools used to cut, hang, and finish drywall as defined in the Trainee Module:

Straightedge or T-square

Utility knife

Drywall saw

Circle cutter

Drywall hammer

Caulking gun

Screwdriver

Broad knife

Joint trowel

Corner tool

Mud pan or hawk

Sandpaper/drywall screen

Sanding block, pole sander, or electric sander

Sponge sander

Banjo

Putty knife

Mud mashers

Mud mixers

Automatic finishing tools

### **Equipment**

Trainee Task Module

Module Examination

Transparencies

To the maximum extent possible, various samples of properly finished walls as defined in the Trainee Module, including:

Level 0

Level 1

Level 2

Level 3

Level 4

Level 5

Joint reinforcing tapes: fiberglass, metal edge, paper

Compounds: powder, premixed, quickset

Trims: corner bead with mesh flanges, L-bead, J-bead, expansion joint

Sanding materials



## HOW TO USE THIS INSTRUCTOR'S GUIDE

For each 2½ hour class session in this Instructor's 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

*Suggested* time periods for classroom sessions are included throughout this Instructor's Guide. These time periods should be adapted to meet local conditions and training requirements.

Each class session is presented with two columns of information. On the left side of the page, a narrow column provides suggested trainee and instructor actions, icons to call your attention to material, safety, audio-visual, or testing requirements, and space for your notes. The right-hand column provides the outline of the suggested presentation for each class session.

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

**Classroom:** Sessions are designed for lectures, group discussions, coaching, and additional activities. Trainees should be encouraged to actively participate.

**Demonstration:** 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.

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## TASK MODULE OVERVIEW

This course introduces the painting trainee to the proper methods for finishing and patching drywall. The intended audience for this Task Module includes all painting trainees.

### Prerequisites

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

NCCER Core Curricula

NCCER Painting Level 1

NCCER Painting Level 2, Modules 07201 through 07205

### Teaching Time for This Task Module

Approximately 25 hours or ten sessions of training time is suggested to cover *Drywall Finishing and Patching*. 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.

### Safety Considerations

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

Appropriate Personal Protective Equipment

### Suggested Teaching Sequence — Ten 2½ Hour Sessions

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction; Finishing Standards; Drywall Finishing Tools	1.0.0 – 3.5.6
2	Drywall Finishing Procedures	4.0.0 – 4.5.0
3	Drywall Finishing Procedures	5.0.0 – 5.5.6
4	Drywall Finishing Procedures	5.0.0 – 5.5.6
5	Drywall Finishing Procedures	5.0.0 – 5.5.6
6	Drywall Finishing Procedures	5.0.0 – 5.5.6
7	Drywall Finishing Procedures	5.0.0 – 5.5.6
8	Problems and Remedies	6.0.0 – 6.4.8

<b>Session</b>	<b>Topic</b>	<b>Trainee Module Section(s)</b>
9	Problems and Remedies	6.0.0 – 6.4.8
10	Problems and Remedies	6.0.0 – 6.4.8
Performance Testing and Module Examination		

### **Optional References for Advanced Study**

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than task training.

*Drywall Installation and Finishing*, Latest Edition, Delmar Publishers, Albany, New York.

*Painting and Decorating Craftsman’s Manual and Textbook*, Latest Edition, Painting and Decorating Contractors of America, Fairfax, Virginia.

# PERFORMANCE PROFILE TASKS

- 1. State the differences in the six levels of finish established by industry standards and be able to distinguish a finish level by observation.**
- 2. Finish a joint to one of the six levels as identified by the instructor.**
- 3. Identify an application in which each of the following compounds would be used:**
  - Taping compound**
  - Topping compound**
  - Premix compound**
  - Quickset compound**
- 4. Properly prepare each type of compound in use.**

## PERFORMANCE PROFILE TASKS

5. **Select the appropriate hand tools and perform the following tasks:**
  - **Joint taping and finishing**
  - **Fastener spotting**
  - **Corner finishing**
  - **Sanding**
  
6. **Select appropriate automatic tools and perform the following finishing tasks:**
  - **Joint taping**
  - **Fastener spotting**
  - **Corner finishing**
  - **Sanding**

# PERFORMANCE PROFILE TASKS

- 7. Recognize selected finish failures and state the appropriate action for each:**
  - **Joint problems**
  - **Compound problems**
  - **Fastener problems**
  - **Wallboard problems**
- 8. Patch and finish damaged drywall.**

## STAINS

### OBJECTIVES

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

1. Describe the differences between stains and other coatings.
2. Describe the differences between dye and pigmented stains.
3. Describe the advantages and disadvantages of using waterborne stains.
4. Select the appropriate stain given a job application and substrate description.
5. Identify application considerations unique to stains.

### Note to the Instructor

Before teaching this Task Module, you should review the details in this Instructor's Guide for Equipment and Supplies, 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.

The specific content for Sessions 1, 2, and 3 may be altered at your discretion so that the sessions can easily be adapted to the local situation. An alternative to providing certain class materials is to take field trips to various job sites where staining can be observed.

### Required Equipment and Materials

The following are required for instruction using this Task Module:

#### Equipment

Overhead projector and screen  
Chalkboard and chalk  
Appropriate brushes, rollers etc.  
for applying stains  
Appropriate Personal Protective Equipment

#### Materials

Trainee Task Module  
Module Examination  
Transparencies

To the maximum extent possible, various samples of substrates and surfaces defined in the Trainee Module, including:

- Types of wood
- Masonry, concrete, stucco
- Synthetic, metal, aged, and previously coated substrates

To the maximum extent possible, various samples of stains defined in the Trainee Module, including:

- Dye stains
- Pigmented stains
- Mineral spirits
- Waterborne stains
- Stains with wood preservative
- Latex stains
- Varnish
- Lacquer
- Colored polyurethane
- Wiping stains
- Glazes
- Pickling stains
- Concrete stains

## HOW TO USE THIS INSTRUCTOR'S GUIDE

For each 2½ hour class session in this Instructor's 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

*Suggested* time periods for classroom sessions are included throughout this Instructor's Guide. These time periods should be adapted to meet local conditions and training requirements.

Each class session is presented with two columns of information. On the left side of the page, a narrow column provides suggested trainee and instructor actions, icons to call your attention to material, safety, audio-visual, or testing requirements, and space for your notes. The right-hand column provides the outline of the suggested presentation for each class session.

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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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## TASK MODULE OVERVIEW

This course introduces the painting trainee to the proper surface and substrate preparation and application of stains. The intended audience for this Task Module includes all painting trainees.

### Prerequisites

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

NCCER Core Curricula

NCCER Painting Level 1

NCCER Painting Level 2, Modules 07201 through 07206

### Teaching Time for This Task Module

Approximately 7½ hours or three sessions of training time is suggested to cover *Stains*. 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.

### Safety Considerations

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

Appropriate Personal Protective Equipment

### 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; Ingredients; Properties	1.0.0 – 3.8.0
2	Types of Stains; Substrate Considerations; Selecting Stains; Application Considerations	4.0.0 – 7.3.0
3	Application Considerations	7.0.0 – 7.3.0
	Performance Testing and Module Examination	

### Optional References for Advanced Study

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than task training.

*Painting and Decorating Craftsman's Manual and Textbook*, Latest Edition, Painting and Decorating Contractors of America, Fairfax, Virginia.

# PERFORMANCE PROFILE TASKS

- 1. Distinguish stains from other coatings on several surfaces.**
- 2. Distinguish between pigmented and dye stains on stained wood samples.**
- 3. Identify the advantages of using waterborne stains.**
- 4. Identify the disadvantages of using waterborne stains.**

## PERFORMANCE PROFILE TASKS

5. **Select an appropriate stain using product data sheets for various job applications:**
  - **Exterior wood siding**
  - **Wooden decks**
  - **Exterior concrete**
  - **Interior wood furniture (transparent coverage)**
  - **Interior wood furniture (opaque coverage)**
  - **Interior wood floors**
  - **Interior wood trim**
6. **Describe the application considerations unique to stains.**
7. **Apply transparent and solid color stain to a wood surface.**



**CLEAR FINISHES**

**OBJECTIVES**

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

1. Describe the types of clear finishes and their properties.
2. Determine if a clear finish should be used given a description of the substrate and job.
3. Select an appropriate clear finish using packaging, technical data sheets, and job information.
4. Describe the application procedures for clear finishes.
5. Correctly apply clear finishes, observing proper safety precautions.

**Note to the Instructor**

Before teaching this Task Module, you should review the details in this Instructor's Guide for Equipment and Supplies, 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.

The specific content for Sessions 1, 2, and 3 may be altered at your discretion so that the sessions can easily be adapted to the local situation. An alternative to providing certain class materials is to take field trips to various job sites where application of clear finishes can be observed.

**Required Equipment and Materials**

The following are required for instruction using this Task Module:

**Equipment**

- Overhead projector and screen
- Chalkboard and chalk
- Appropriate brushes, rollers, sprayers, etc.  
for applying clear finishes
- Appropriate Personal Protective Equipment

- Metal substrates
- Plastics
- Previously coated substrates; good and bad examples

**Materials**

- Trainee Task Module
- Module Examination
- Transparencies
- To the maximum extent possible, various samples of substrates and surfaces as defined in the Trainee Module, including:
  - Types of wood
  - Masonry, concrete, stucco

- To the maximum extent possible, various samples of clear finishes as defined in the Trainee Module, including:
  - Varnishes: oil-based, polyurethane, spar, alkyd
  - Lacquers: waterborne, traditional
  - Shellacs: orange, white
  - Acrylics: waterborne, solvent-based
  - Urethanes: water-based, traditional
  - Epoxies

## 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

*Suggested* time periods for classroom sessions are included throughout this Instructor's Guide. These time periods should be adapted to meet local conditions and training requirements.

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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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## TASK MODULE OVERVIEW

This course introduces the painting trainee to proper surface and substrate preparation and to the application of clear finishes. The intended audience for this Task Module includes all painting trainees.

### Prerequisites

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

NCCER Core Curricula

NCCER Painting Level 1

NCCER Painting Level 2, Modules 07201 through 07207

### Teaching Time for This Task Module

Approximately 7½ hours or three sessions of training time is suggested to cover *Clear Finishes*. 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.

### Safety Considerations

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

Appropriate Personal Protective Equipment

### 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; Ingredients; Properties; Types of Clear Finishes	1.0.0 – 4.6.0
2	When to use a Clear Finish; Application Procedures; Problems and Remedies	5.0.0 – 7.0.0
3	Application Procedures  Performance Testing and Module Examination	6.0.0

### Optional References for Advanced Study

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than task training.

*Causes of Common Finishing Difficulties and Their Remedies*, Sherwin-Williams Company, Cleveland, Ohio.

*Coating Solutions: The Journal of Industrial and Marine Coatings Technology*, 2(2): 1996.  
*Reducers and Thinners*, Sherwin-Williams Company, Cleveland, Ohio.

# PERFORMANCE PROFILE TASKS

- 1. Identify and describe the types of clear finishes, including:**
  - **Shellacs**
  - **Lacquers**
  - **Urethanes**
  - **Acrylics**
  - **Epoxies**
- 2. Distinguish the compatibility of a clear finish with the substrate, environment, and coating system in use.**
- 3. Select an appropriate clear finish using packaging, technical data sheets, and job information.**



# PERFORMANCE PROFILE TASKS

- 4. Correctly apply clear finishes, observing proper safety precautions:**
- **Brush application**
  - **Roller application**
  - **Spray application**



## OBJECTIVES

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

1. Explain why wood should be finished.
2. Describe the characteristics of wood.
3. Recognize open-grain and closed-grain wood surfaces.
4. Name and describe the use of basic wood finishing materials.
5. Demonstrate and/or describe the steps that are involved in the wood finishing process.
  - Sanding and cleaning
  - Bleaching
  - Staining
  - Filling
  - Sealing
  - Applying finish coat(s)

## Note to the Instructor

Before teaching this Task Module, you should review the details in this Instructor's Guide for Equipment and Supplies, 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.

The specific content for Sessions 1 through 9 may be altered at your discretion so that the sessions can easily be adapted to the local situation. An alternative to providing certain class materials is to take field trips to various job sites and/or lumber yards where the different kinds of wood, wood products, and wood finishing products can be observed.

## Required Equipment and Materials

The following are required for instruction using this Task Module:

### Equipment

Overhead projector and screen

Chalkboard and chalk

Appropriate Personal Protective Equipment

Moisture meter

Power sanders: belt, orbital, half-sheet, detail

A variety of brushes, rollers, etc. used for  
applying stains and clear wood finishes

Assortment of empty containers for use  
with stains, clear finishes, etc. and for  
cleanup of brushes, rollers, etc.

## **Materials**

Trainee Task Module

Module Examination

Transparencies

Examples of different types of wood, including:

Maple	Poplar
Walnut	Cherry
Birch	Lauan
White Oak	Southern Yellow
Redwood	Pine
Cedar	Spruce
White Pine	Ponderosa Pine
Balsam Fir	Cypress
Ash	

Examples of plywood (different surface grain patterns), particle board, hardboard, veneers, etc.

A variety of different wood finishing products, including:

- Sealers
- Fillers
- Bleaches
- Stains

A variety of clear wood finishing products, including:

- Varnish
- Lacquer
- Shellac
- Polyurethane

A variety of protective stains and wood toners for use on chemically treated woods

A variety of sandpapers including those used with belt, sheet, and disc sanders

Burlap or coarse cloths

Rags

Turpentine/thinners

Pumice rubbing compound or rottenstone

Tung oil

Wax

## HOW TO USE THIS INSTRUCTOR'S GUIDE

For each 2½ hour class session in this Instructor's 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

*Suggested* time periods for classroom sessions are included throughout this Instructor's Guide. These time periods should be adapted to meet local conditions and training requirements.

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## TASK MODULE OVERVIEW

This course introduces the painting trainee to the proper methods for finishing wood. The intended audience for this Task Module includes all painting trainees.

### Prerequisites

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

NCCER Core Curricula

NCCER Painting Level 1

NCCER Painting Level 2, Modules 07201 through 07208

### Teaching Time for This Task Module

Approximately 22½ hours or nine sessions of training time is suggested to cover *Wood Finishing*. 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.

### Safety Considerations

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

Appropriate Personal Protective Equipment

### Suggested Teaching Sequence — Nine 2½ Hour Sessions

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction; Wood Science and Technology	1.0.0 – 2.2.2
	Performance Testing	
2	Wood Finishing Products	3.0.0 – 3.5.4
3	Finishing Bare Wood	4.0.0 – 4.3.0
	Performance Testing	
4	Finishing Bare Wood	4.4.0 – 4.5.0
	Performance Testing	
5	Finishing Bare Wood	4.6.0 – 4.6.2
	Performance Testing	

<b>Session</b>	<b>Topic</b>	<b>Trainee Module Section(s)</b>
6	Applying Finish Coatings Performance Testing	5.0.0 – 5.4.0
7	Other Finishes and Methods Performance Testing	6.0.0 – 6.5.0
8	Finishing Chemically-Treated Wood Performance Testing	7.0.0
9	Maintenance and Refinishing; Wood Finishing Problems Performance Testing and Module Examination	8.0.0 – 9.0.0

### **Optional References for Advanced Study**

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than task training.

*Architectural Coatings (Catalog)*, Latest Edition, Sherwin-Williams Company, Cleveland, Ohio.

*Painting & Coating Systems (Product Data)*, Latest Edition, Sherwin-Williams Company, Cleveland, Ohio.

*Painting and Decorating Craftsman's Manual and Textbook*, Latest Edition, Painting and Decorating Contractors of America, Fairfax, Virginia.

*Painting And Decorating Encyclopedia*, Latest Edition, The Goodheart-Wilcox Company, Inc., South Holland, Illinois.

*Wood Finishes*, Latest Edition, Simon & Schuster, New York, New York.

# PERFORMANCE PROFILE TASKS

- 1. Recognize hardwoods and softwoods.**
- 2. Recognize open-grain and closed-grain woods.**
- 3. Use a moisture meter to measure the moisture content of selected wood surfaces.**
- 4. Demonstrate proper hand and power tool sanding techniques and cleaning of selected wood substrates.**
- 5. Use bleach to lighten selected wood substrates.**
- 6. Apply fillers to selected open-grained substrates.**
- 7. Apply a sealer to selected wood substrates.**



# PERFORMANCE PROFILE TASKS

- 8. Apply stains to selected interior/exterior wood substrates.**
- 9. Apply clear finishes to selected wood substrates.**
  - **Varnish**
  - **Lacquer**
  - **Shellac**
  - **Polyurethane**



## COATINGS II

### OBJECTIVES

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

1. Describe the properties of a high-performance coating.
2. Identify some unique coating ingredients and properties.
3. Identify several coating types besides common alkyd and latex paints.
4. Describe some situations that require unique coating solutions.
5. Select an appropriate coating given a job description.
6. Describe some coating preparations, tests, and inspections that can be done to ensure successful coating application.

### Note to the Instructor

Before teaching this Task Module, you should review the details in this Instructor's Guide for Equipment and Supplies, 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.

The specific content for Sessions 1, 2, 3, and 4 may be altered at your discretion so that the sessions can easily be adapted to the local situation. An alternative to providing certain class materials is to take field trips to various job sites where application of coatings can be observed.

### Required Equipment and Materials

The following are required for instruction using this Task Module:

#### Equipment

Overhead projector and screen  
Chalkboard and chalk  
Appropriate brushes, rollers, sprayers, etc.  
for applying high-performance coatings  
Testing tools, including sling psychrometer,  
digital thermometer, and moisture meter  
Appropriate Personal Protective Equipment

#### Materials

Trainee Task Module  
Module Examination  
Transparencies

To the maximum extent possible, product data sheets, containers, and applied samples of high-performance coatings as defined in the Trainee Module, including:

Thermoplastic coatings  
Water emulsion coatings  
Vinyl butyral wash primers  
Chlorinated rubber coatings  
Thermoset coatings  
Dry oil coatings  
Oil-based alkyd coatings  
Epoxy and epoxy ester coatings  
Urethane coatings  
Multicolor coatings  
Dry heat-resistant coatings  
Fire-retardant coatings  
Low-temperature application  
coatings  
Elastomeric coatings  
Dry fall/fog coatings

## HOW TO USE THIS INSTRUCTOR'S GUIDE

For each 2½ hour class session in this Instructor's 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

*Suggested* time periods for classroom sessions are included throughout this Instructor's Guide. These time periods should be adapted to meet local conditions and training requirements.

Each class session is presented with two columns of information. On the left side of the page, a narrow column provides suggested trainee and instructor actions, icons to call your attention to material, safety, audio-visual, or testing requirements, and space for your notes. The right-hand column provides the outline of the suggested presentation for each class session.

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

**Classroom:** Sessions are designed for lectures, group discussions, coaching, and additional activities. Trainees should be encouraged to actively participate.

**Demonstration:** 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

The National Center for Construction Education and Research provides a standardized national program of accredited craft training based on the *Wheels of Learning*. Key features of the program include instructor certification, competency-based training, and performance testing. The program provides trainees, instructors, and companies with a standard form of recognition through a National Craft Training Registry. The program is described in full in the *Guidelines for Accreditation*, published by the National Center. For more information on standardized craft training, contact NCCER at P.O. Box 141104, Gainesville, FL 32614-1104; or call 352-334-0911.

## TASK MODULE OVERVIEW

This course introduces the painting trainee to the proper surface and substrate preparation and application of high-performance coatings. The intended audience for this Task Module includes all painting trainees.

### Prerequisites

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

NCCER Core Curricula

NCCER Painting Level 1

NCCER Painting Level 2, Modules 07201 through 07209

### Teaching Time for This Task Module

Approximately 10 hours or four sessions of training time is suggested to cover *Coatings II*. 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.

### Safety Considerations

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

Appropriate Personal Protective Equipment

### 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; Unique Ingredients and Properties; Coating Types by Film-Forming Mechanism	1.0.0 – 3.4.0
2	Coating Types by Function	4.0.0 – 4.6.0
3	Selecting a Coating; Surface Preparation; Coating Preparation	5.0.0 – 7.0.0
4	Testing and Inspection	8.0.0 – 8.3.0
	Performance Testing and Module Examination	

## **Optional References for Advanced Study**

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than task training.

*Coatings for Electric Utilities*, Sherwin-Williams Company, Cleveland, Ohio.

*Coatings for Food and Beverage Plants*, Sherwin-Williams Company, Cleveland, Ohio.

*Epoxy Application and Reference Guide*, Sherwin-Williams Company, Cleveland, Ohio.

*Painting and Decorating Craftsman's Manual and Textbook*, Latest Edition, Painting and Decorating Contractors of America, Fairfax, Virginia.

*Protective Coating Systems for Industrial Tanks*, Sherwin-Williams Company, Cleveland, Ohio.

*Protective Coating Systems for Water and Waste Water Treatment Plants*, Sherwin-Williams Company, Cleveland, Ohio.

*Surface Preparation*, Sherwin-Williams Company, Cleveland, Ohio.

TRANSPARENCY 1-2  
TASK MODULE 07210, PAINTING

## **PERFORMANCE PROFILE TASKS**

- 1. Select an appropriate coating, given a job description and several coating product data sheets.**
- 2. Successfully prepare/mix a multi-component coating for application.**
- 3. Satisfactorily apply at least two coatings covered in this module.**
- 4. Perform an accurate substrate moisture content test.**
- 5. Perform an accurate substrate surface temperature test.**

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## **SPRAY PAINTING (CONVENTIONAL, AIRLESS, AND HVLP)**

### **OBJECTIVES**

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

1. Recognize conventional spray systems and components. Explain the purpose or function served by each component in a conventional spray system.
2. Recognize airless and air-assisted airless spray systems and components. Explain the purpose or function served by each component in airless and air-assisted airless spray systems.
3. Recognize HVLP spray systems and components. Explain the purpose or function served by each component in an HVLP spray system.
4. Demonstrate how to properly mix paint in preparation for spray painting.
5. Select and/or properly size conventional spray system components needed for spraying different materials and surfaces. Demonstrate how to use the equipment to properly apply paint to selected surfaces.
6. Select and/or properly size airless spray system components needed for spraying different materials and surfaces. Demonstrate how to use the equipment to properly apply paint to selected surfaces.
7. Select and/or properly size HVLP spray system components needed for spraying different materials and surfaces. Demonstrate how to use the equipment to properly apply paint to selected surfaces.
8. Perform cleaning and maintenance on conventional spray equipment per the instructions given in the equipment manufacturer's service literature.
9. Perform cleaning and maintenance on airless spray equipment per the instructions given in the equipment manufacturer's service literature.
10. Perform cleaning and maintenance on HVLP spray equipment per the instructions given in the equipment manufacturer's service literature.
11. Demonstrate how to measure the thickness of wet and dry paint films.
12. Demonstrate how to measure the viscosity of paints and coatings.

### **Note to the Instructor**

Before teaching this Task Module, you should review the details in this Instructor's Guide for Equipment and Supplies, 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.

The specific content for Sessions 1 through 13 may be altered at your discretion so that the sessions can easily be adapted to the local situation. An alternative to providing certain class materials is to take field trips to various job sites or equipment distributors where spray painting equipment and/or the use of spray painting equipment can be observed.

## **Required Equipment and Materials**

The following are required for instruction using this Task Module:

### **Equipment**

Overhead projector and screen

Chalkboard and chalk

Appropriate Personal Protective Equipment

Conventional air spraying system and components, including:

- Spray guns with an assortment of air caps, fluid nozzles, and needle valves

- Air compressors

- Air pressure regulators and air cleaning devices

- Tanks and cups

- Fluid paint pumps

- Air hoses, couplings, and fittings

Airless and air-assisted airless spray system and components

- Spray guns, assorted tips, and tip guards

- Immersion tube and siphon-type feed pumps

- Fluid hoses, couplings, fittings

- Tip, gun, and pump filters

- Tip extensions

- Pole gun

High-volume, low-pressure (HVLP) spray system components, including:

- Spray guns (HVLP and conversion HVLP)

- Turbine units

- Air hoses

- Air nozzle test gauge

Hygrometers

Paint mixing containers and equipment

Wet film thickness gauge

Dry film paint thickness gauges

Zahn/Ford-type velocity measuring cups

### **Materials**

Trainee Task Module

Module Examination

Transparencies

Drop cloths and tarps

Masking tape/materials

Various types of paints and other coatings for spraying

Solvents for cleaning equipment

## HOW TO USE THIS INSTRUCTOR'S GUIDE

For each 2½ hour class session in this Instructor's 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

*Suggested* time periods for classroom sessions are included throughout this Instructor's Guide. These time periods should be adapted to meet local conditions and training requirements.

Each class session is presented with two columns of information. On the left side of the page, a narrow column provides suggested trainee and instructor actions, icons to call your attention to material, safety, audio-visual, or testing requirements, and space for your notes. The right-hand column provides the outline of the suggested presentation for each class session.

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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.

### NCCER Standardized Craft Training Programs

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## TASK MODULE OVERVIEW

This course introduces the painting trainee to the proper methods for spray painting. The intended audience for this Task Module includes all painting trainees.

### Prerequisites

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

NCCER Core Curricula

NCCER Painting Level 1

NCCER Painting Level 2, Modules 07201 through 07210

### Teaching Time for This Task Module

Approximately 32½ hours or thirteen sessions of training time is suggested to cover *Spray Painting (Conventional, Airless, and HVLP)*. 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.

### Safety Considerations

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

Appropriate Personal Protective Equipment

### Suggested Teaching Sequence — Thirteen 2½ Hour Sessions

Adjust your class times based on class size and resources.

Session	Topic	Trainee Module Section(s)
1	Introduction; Conventional Spray Systems and Components	1.0.0 – 2.3.6
2	Initial Preparation Before Spray Painting Begins; Spraying with a Conventional Spray System	5.0.0 – 6.5.0
3	Spraying with a Conventional Spray System Performance Testing	6.0.0 – 6.5.0
4	Spraying with a Conventional Spray System Performance Testing	6.0.0 – 6.5.0
5	Airless Spray Systems and Air-Assisted Airless Spray Systems	3.0.0 – 3.2.0

<b>Session</b>	<b>Topic</b>	<b>Trainee Module Section(s)</b>
6	Spraying with an Airless System	7.0.0 – 7.5.5
7	Spraying with an Airless System Performance Testing	7.0.0 – 7.5.5
8	Spraying with an Airless System Performance Testing	7.0.0 – 7.5.5
9	Spraying with an Airless System Performance Testing	7.0.0 – 7.5.5
10	HVLP Spray Systems	4.0.0 – 4.1.2
11	Spraying with an HVLP System; Common Spray Painting Problems Performance Testing	8.0.0 – 9.0.0
12	Spraying with an HVLP System; Common Spray Painting Problems Performance Testing	8.0.0 – 9.0.0
13	Measuring the Thickness of Paint; Measuring the Viscosity of Paint Performance Testing and Module Examination	10.0.0 – 11.0.0

### **Optional References for Advanced Study**

This module is intended to present thorough resources for task training. The following reference works are suggested for both instructors and motivated trainees interested in further study. These are optional materials for continued education rather than task training.

*Employee's Safety Handbook*, Latest Edition, Painting and Decorating Contractors of America, Fairfax, Virginia.

*Painting and Decorating Craftsman's Manual and Textbook*, Latest Edition, Painting and Decorating Contractors of America, Fairfax, Virginia.

*Painting and Decorating Encyclopedia*, Latest Edition, The Goodheart-Willcox Company, Inc., South Holland, Illinois.

# PERFORMANCE PROFILE TASKS

- 1. Demonstrate the following skills for conventional spraying:**
  - Recognize and choose the correct spray system components needed to spray different paints/coatings and substrates.**
  - Properly protect the adjacent surfaces prior to spraying.**
  - Properly mix the paint/coating for spraying.**
  - Spray paint/coating on selected substrates.**
  - Clean and/or maintain the spray equipment per the manufacturer's instructions.**
  - Use correct personal safety equipment.**
  - Follow all environmental regulations and laws pertaining to the handling and disposal of waste paints, solvents, etc.**

## PERFORMANCE PROFILE TASKS

### 2. Demonstrate the following skills for airless spraying:

- Recognize and choose the correct spray system components needed to spray different paints/coatings and substrates.
- Properly protect the adjacent surfaces prior to spraying.
- Properly mix the paint/coating for spraying.
- Spray paint/coating on selected substrates.
- Clean and/or maintain the spray equipment per the manufacturer's instructions.
- Use correct personal safety equipment.
- Follow all environmental regulations and laws pertaining to the handling and disposal of waste paints, solvents, etc.

## PERFORMANCE PROFILE TASKS

### 3. Demonstrate the following skills for HVLP spraying:

- Recognize and choose the correct spray system components needed to spray different paints/coatings and substrates.
- Properly protect the adjacent surfaces prior to spraying.
- Properly mix the paint/coating for spraying.
- Spray paint/coating on selected substrates.
- Clean and/or maintain the spray equipment per the manufacturer's instructions.
- Use correct personal safety equipment.
- Follow all environmental regulations and laws pertaining to the handling and disposal of waste paints, solvents, etc.