

Module Overview

This module covers industrial coating safety for workers, for persons not directly involved in the coating operation, and for the environment. Information is also provided about the special precautions that must be taken when operations occur in dangerous areas, such as aboveground, near roadways, and in confined spaces.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Industrial Coating and Lining Application Specialist Level One*.

Objectives

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

1. Identify appropriate health and safety regulatory bodies pertaining to surface preparation and coating work.
2. Determine access requirements to structures needing coating work.
3. Identify site-specific lockout/tagout procedures and demonstrate verification of lockout.
4. Select the correct fall prevention system based on the job-site conditions.
5. Recognize intrinsically safe/explosion-proof equipment and devices.
6. Identify proper personal protective equipment (PPE) for surface preparation, coating mixing and thinning, and coating application operations.
7. Describe safety procedures associated with the following:
 - Pre-cleaning
 - Hand and power tool cleaning
 - Dry and wet abrasive blast cleaning
 - Ultra-high-pressure waterjetting
 - Chemical stripping
 - Disturbance of coatings containing toxic metals
 - Material handling, storage, disposal, and waste minimization
 - Mixing, thinning, and coating operations

Performance Tasks

Under the supervision of the instructor, the trainee should be able to do the following:

1. Demonstrate lockout/tagout procedures.
2. Demonstrate proper donning of a personal fall-arrest system.
3. Identify intrinsically safe/explosion-proof equipment and devices.

Materials and Equipment

Markers/chalk	Full-face and half-mask respirators
Pencils and scratch paper	Lockout/tagout devices and tags
Whiteboard/chalkboard	Supply of personal fall-arrest systems
<i>Industrial Coating and Lining Application Specialist</i>	Different types of gas-detection meters
Level Two PowerPoint® Presentation Slides	Quantity of intrinsically safe/explosion-proof
(ISBN 978-0-13-605573-0)	equipment, along with some equipment that is not
Multimedia projector and screen	Quick Quiz*
Computer	Module Examinations**
Appropriate personal protective equipment	Performance Profile Sheets**

* Located at the back of this module.

** Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

Safety Considerations

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Ensure that all trainees are properly briefed on field safety, including electrical safety, lockout/tagout procedures, and fall arrest systems. Ensure that trainees are briefed on site safety policies prior to any site visits.

Additional Resources

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 for task training.

Field Safety Participant Guide. National Center for Construction Education and Research. Upper Saddle River, NJ: Prentice Hall.

Hydroblasting Trainee Guide. National Center for Construction Education and Research. Upper Saddle River, NJ: Prentice Hall.

OSHA 29 CFR 1926, Safety and Health Standards for Construction.

Safety Orientation Pocket Guide. National Center for Construction Education and Research. Upper Saddle River, NJ: Prentice Hall.

Safety Technology Participant Guide. National Center for Construction Education and Research. Upper Saddle River, NJ: Prentice Hall.

Teaching Time For This Module

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 30 hours are suggested to cover *Industrial Coating Safety*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of trainees may be noted during these exercises for Performance Testing purposes.

Topic	Planned Time
Session I. Introduction	
A. Introduction	_____
B. Industrial and Governmental Organizations Involved with Safety	_____
1. OSHA	_____
2. EPA	_____
C. Counterfeit and Knock-Off Parts, Materials, and Equipment	_____
Session II. Basic Components of a Safety Program	
A. Safety Rules and Training	_____
B. Emergency Response	_____
C. Recordkeeping	_____
D. HazCom Program	_____
E. Material Safety Data Sheets (MSDSs)	_____
F. Personal Protective Equipment	_____
Sessions III and IV. Work-Zone Safety	
A. Signs	_____
B. Safety Tag Applications and Types	_____
C. Lockout/Tagout Devices, Procedures, and Safeguards	_____
E. Laboratory	_____
Have trainees demonstrate lockout/tagout procedures. This laboratory corresponds to Performance Task 1.	
F. Barricade and Barrier Safety	_____

Sessions V–VII. Aboveground Work; Roadway Work

A. Aboveground Work

- 1. Ladders
- 2. Scaffolding
- 3. Falls and Fall-Arrest Systems

B. Laboratory

Have trainees demonstrate the proper donning of a personal fall-arrest system. This laboratory corresponds to Performance Task 2.

C. Roadway Work

- 1. Temporary Traffic Control (TTC)
- 2. Flaggers

Sessions VIII and IX. Confined Spaces

A. Confined-Space Classification

- 1. Non-Permit Required Confined Space
- 2. Permit Required Confined Space

B. Entry Permits

C. Atmospheric Hazards

D. Laboratory

Have trainees identify intrinsically safe/explosion-proof equipment and devices. This laboratory corresponds to Performance Task 3.

E. Additional Confined-Space Hazards

F. Worker and Supervisor Responsibilities and Duties

G. Confined-Space Safeguards

Sessions X and XI. Safety Guidelines

A. Fire Hazards

B. Hand and Power Tools

C. Pneumatic Tools

D. Abrasive Blasting

E. Waterjetting

F. Chemical Stripping

G. Coating Application

H. Debris Management

Session XII. Review and Testing

A. Module Review

B. Module Examination

- 1. Trainees must score 70 percent or higher to receive recognition from NCCER.
- 2. Record the testing results on Training Report Form 200, and submit the results to the Training Program Sponsor.

C. Performance Testing

- 1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.
- 2. Record the testing results on Training Report Form 200, and submit the results to the Training Program Sponsor.

Module Overview

This module explains how and why corrosion occurs and how it can be prevented through the use of coatings and other corrosion protection techniques.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Industrial Coating and Lining Application Specialist Level One* and *Industrial Coating and Lining Application Specialist Level Two*, Module 69201-10.

Objectives

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

1. Identify the components of a corrosion cell.
2. Describe dissimilar metal corrosion.
3. Describe how concrete corrodes.
4. Describe how concrete rebar corrodes and the consequences of that corrosion.
5. List the types and classifications of corrosion.

Performance Tasks

This is a knowledge-based module; there are no performance tasks.

Materials and Equipment

Markers/chalk	Multimedia projector and screen
Pencils and scratch paper	Computer
Whiteboard/chalkboard	Appropriate personal protective equipment
<i>Industrial Coating and Lining Application Specialist Level Two</i>	Rust and corrosion kit
PowerPoint® Presentation Slides (ISBN 978-0-13-605573-0)	Samples of reinforcement corrosion in concrete
	Quick Quiz*
	Module Examinations**

* Located at the back of this module.

** Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

Safety Considerations

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Ensure that trainees are properly briefed on all appropriate field safety and site safety procedures prior to any site visits.

Additional Resources

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 for task training.

Kennedy Space Center Corrosion Technology Laboratory website. <http://corrosion.ksc.nasa.gov>.

U.S. Army Corps of Engineers Mobile District website, for information about corrosion control and cathodic protection. www.sam.usace.army.mil.

Chemical Bonding. Anthony Carpi, Ph.D. Visionlearning Vol. CHE-1 (7), 2003. www.visionlearning.com.

Teaching Time For This Module

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 5 hours are suggested to cover *Corrosion Protection*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources.

Topic	Planned Time
Session I. Introduction; Corrosion Cell; Classifications of Corrosion	
A. Introduction	_____
B. Corrosion Cell	_____
C. Classifications of Corrosion	_____
1. Corrosion Protection Techniques	_____
Session II. Concrete; Review and Testing	
A. Concrete	_____
B. Module Review	_____
C. Module Examination	_____
1. Trainees must score 70 percent or higher to receive recognition from NCCER.	
2. Record the testing results on Training Report Form 200, and submit the results to the Training Program Sponsor.	

Module Overview

This module covers the tasks and considerations involved in work planning and quality control for coatings projects. Calculations used in the planning process, and formulas used to determine the area of different surface shapes are described.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Industrial Coating and Lining Application Specialist Level One* and *Industrial Coating and Lining Application Specialist Level Two*, Modules 69201-10 and 69202-10.

Objectives

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

1. Follow and execute a work plan, including documentation of all processes.
2. Use process control on coatings projects.
3. Calculate ratios and areas for simple structures.
4. Calculate adjusted volatile organic compounds (VOCs) based on thinner additions.
5. Describe how pressure, volume, and temperature affect surface preparation and coating application operations.
6. Prepare test sections, demonstrating processes.

Performance Tasks

Under the supervision of the instructor, the trainee should be able to do the following:

1. Follow and execute a work plan, including documentation of all processes.

Materials and Equipment

Markers/chalk

Pencils and scratch paper

Whiteboard/chalkboard

Industrial Coating and Lining

Application Specialist Level Two

PowerPoint® Presentation Slides

(ISBN 978-0-13-605573-0)

Multimedia projector and screen

Computer

Appropriate personal protective equipment

An instructor-selected work plan reflecting the factors discussed in this module

Quick Quiz*

Module Examinations**

Performance Profile Sheets**

* Located at the back of this module.

** Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

Safety Considerations

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Ensure that trainees are briefed on site safety policies prior to any site visits.

Additional Resources

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 for task training.

- ANSI/ISO/ASW Q9001-2008: Quality Managements Systems–Requirements.* www.asq.org
- Coating Inspector Program Level 1* © NACE International, 2010.
- Coating Inspector Program Level 2* © NACE International, 2010.
- Corrosion Prevention by Protective Coatings.* Charles Munger. Houston, TX: NACE, 1999.
- IMO MSC.215(82) Performance Standard for Protective Coatings (PSPC).* www.imo.org.
- SSPC-PA 1, Shop, Field, and Maintenance Painting of Steel.* www.sspc.org.

Teaching Time For This Module

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 25 hours are suggested to cover *Work Planning and Quality Control*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of trainees may be noted during these exercises for Performance Testing purposes.

Topic	Planned Time
Sessions I and II. Introduction; The Work Plan	
A. Introduction	_____
B. The Work Plan	_____
1. Process Control	_____
2. Scheduling	_____
3. Equipment Assignments	_____
4. Safety Planning	_____
Session III. Quality Control and Quality Assurance	
A. Documentation	_____
B. Factors That May Affect Coating Quality	_____
C. Relationship Between Pressure, Temperature, and Volume	_____
Sessions IV-VI. Laboratory	
A. Laboratory	_____
Have trainees follow and execute a work plan, including the documentation of all processes. This laboratory corresponds to Performance Task 1.	
Session VII. Calculations for the Planning Process	
A. Ratios and VOCs	_____
B. Proportions	_____
C. Expressing Rules as Formulas	_____
D. Powers	_____
E. Roots	_____
F. Evaluating Formulas	_____

Sessions VIII and IX. Solving Area Problems

- A. Finding the Area of a Rectangle
- B. Finding the Area of a Triangle
- C. Finding the Area of a Circle
- D. Finding the Area of a Sphere
- E. Finding the Area of a Cylinder

Session X. Review and Testing

- A. Module Review
- B. Module Examination
 - 1. Trainees must score 70 percent or higher to receive recognition from NCCER.
 - 2. Record the testing results on Training Report Form 200, and submit the results to the Training Program Sponsor.
- C. Performance Testing
 - 1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.
 - 2. Record the testing results on Training Report Form 200, and submit the results to the Training Program Sponsor.

Module Overview

This module covers various aspects of the containment and ventilation systems used to manage the by-products of surface preparation and coating application.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Industrial Coating and Lining Application Specialist Level One* and *Industrial Coating and Lining Application Specialist Level Two*, Modules 69201-10 through 69203-10.

Objectives

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

1. Describe which level of containment would be appropriate for a specific operation.
2. Describe the general requirements of industry standards for containment erection and dust collection.
3. List the different types of containment systems and their applications.
4. Construct a containment system for a specific application.
5. Demonstrate the installation of ventilation and humidification or dehumidification systems.
6. Demonstrate methods for verifying containment effectiveness.
7. Demonstrate methods for addressing protrusions.
8. Demonstrate procedures for maintaining containment integrity.

Performance Tasks

Under the supervision of the instructor, the trainee should be able to do the following:

1. Construct a containment system for a specific application.
2. Install ventilation and humidification or dehumidification systems.
3. Using *SSPC Guide 6*, test the effectiveness of a given containment structure.
4. Install containment around protrusions.
5. Perform a repair on a perforated area.

Materials and Equipment

Markers/chalk

Pencils and scratch paper

Whiteboard/chalkboard

Industrial Coating and Lining

Application Specialist Level Two

PowerPoint® Presentation Slides

(ISBN 978-0-13-605573-0)

Multimedia projector and screen

Computer

Appropriate personal protective equipment

SSPC Guide 6

Typical MSDS for a coating

Manometers and magnehelic gauges

Handheld anemometers

Handheld personal lead monitoring unit

Smoke tubes

Temperature/humidity meter

Examples of the following instructor-selected materials:

Vacuum-shrouded tools

Type A2 containment materials

Type B containment materials

Type D joints

Pictures of Type E entryways

Pictures or examples of Type F air supply controls

Pictures of powered exhaust and filtration

systems connected to containment systems

(continued)

Duct fans and blowers, along with ductwork that can be connected to them
Sections of self-supporting scaffolding
Quantity of instructor-selected containment material for demonstrations and performance tasks, including the material manufacturer's recommended sealing and repair materials

Refrigerant and desiccant dehumidifiers
Four-foot sections of 6-inch OD plastic pipe
Quick Quiz*
Module Examinations**
Performance Profile Sheets**

* Located at the back of this module

** Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

Safety Considerations

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Trainees will be required to construct, install, and test the effectiveness of containment structures and to hook up ventilation and humidification or dehumidification systems. Ensure that the trainees are properly briefed on field safety and are familiar with all appropriate safety precautions and procedures. Ensure that trainees are briefed on site safety policies prior to any site visits.

Additional Resources

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 for task training.

Coating Inspector Program Level 1 © NACE International, 2010.

EPA Fact Sheet EPA-747-F-98-006, Generators' and Transporters' Responsibilities for Management and Disposal of Lead-Based Paint Debris. United States Environmental Protection Agency (7404), December 1998.

Industrial Lead Paint Removal Handbook. Vol. 1. 2nd ed. Kenneth A. Trimber. Pittsburgh, PA: The Society for Protective Coatings, 1993 [SSPC 93-02].

OSHA Standard 1910.1025, Toxic and Hazardous Substances, Appendix A, Substance data sheet for occupational exposure to lead. Occupational Safety & Health Administration.

OSHA Technical Manual. Controlling Lead Exposures in the Construction Industry; Engineering and Work Practice Controls. Occupational Safety & Health Administration, January, 1999.

PaintSquare: Portal to the *Journal of Protective Coatings and Linings* and the *Journal of Architectural Coatings* (JPCL and JAC). www.paintsquare.com.

Paints & Coatings Resource Center (PCRC). www.paintcenter.org.

Preventing Lead Poisoning in Construction Workers: NIOSH Alert. DHHS (NIOSH) Publication No. 91-116a, April 1992.

SSPC Course C-3, *Lead Paint Removal*. www.sspc.org.

SSPC Course C-5, *Lead Paint Removal Refresher*. www.sspc.org.

SSPC-Guide 6, *Guide for Containing Surface Preparation Debris Generated During Paint Removal Operations*. www.sspc.org.

SSPC-Guide 7, *Guide for the Disposal of Lead-Contaminated Surface Preparation Debris*. www.sspc.org.

SSPC Technology Update, *Specifiers Guide for Determining Containment Class and Environmental Monitoring*.

Teaching Time For This Module

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 60 hours are suggested to cover *Containment*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of trainees may be noted during these exercises for Performance Testing purposes.

Topic	Planned Time
Session I. Introduction	
A. Introduction	_____
1. Developing Containment and Ventilation Systems	_____
2. Health and Safety Considerations	_____
Sessions II and III. Industry Standards	
A. NACE/SSPC Standards	_____
1. <i>SSPC Guide 6, Guide for Containing Surface Preparation Debris Generated During Paint Removal Operations</i>	_____
B. Worker Safety Standards	_____
Sessions IV and V. Debris Containment	
A. Debris Collection Methods	_____
1. Localized Collection at Point of Cleaning	_____
2. General Area Collection	_____
Sessions VI and VII. Selecting Containment Systems	
A. Containment Classes	_____
B. Surface Preparation Technique Subclasses	_____
C. Selecting <i>SSPC Guide 6</i> Containment	_____
Sessions VIII–X. Containment Enclosure Components	
A. Containment Material (Type A)	_____
B. Containment Material Penetrability (Type B)	_____
C. Support Structure (Type C)	_____
D. Joints (Type D)	_____
E. Entryways (Type E)	_____
Sessions XI–XIII. Containment Ventilation System Components	
A. Air Supply (Type F)	_____
B. Input Airflow (Type G)	_____
C. Air Pressure Inside Containment (Type H)	_____
D. Air Movement Inside Containment (Type I)	_____
E. Powered Exhaust and Dust Filtration (Type J)	_____
Sessions XIV–XVI. Containment Effectiveness	
A. Method A – Visible Emissions	_____
B. Method B – Ambient Air Monitoring for PM-10	_____
C. Method C – Occupational Monitoring of Area Emissions for Lead	_____
D. Method D – EPA Ambient Air Monitoring for Toxic Metals	_____
E. Method E – Soil Analysis for Toxic Metals	_____
F. Method F – Water and Sediment Analysis for Toxic Metals	_____
G. Method G – Visual Assessment of Site Cleanliness	_____
H. Containment Integrity and Protrusions	_____

Session XVII. Environmental Humidity/Temperature Control

A. Dehumidifiers _____

B. Heating/Cooling Units _____

Sessions XVIII–XXIII. Laboratory and Performance Tasks

A. Laboratory (2 sessions) _____

Have trainees construct a containment system for a specific application. This laboratory corresponds to Performance Task 1.

B. Laboratory (1 session) _____

Have trainees install a ventilation and humidification or dehumidification system. This laboratory corresponds to Performance Task 2.

C. Laboratory (1 session) _____

Using *SSPC Guide 6*, have trainees test the effectiveness of a given containment structure. This laboratory corresponds to Performance Task 3.

D. Laboratory (1 session) _____

Have trainees install containment around protrusions. This laboratory corresponds to Performance Task 4.

E. Laboratory (1 session) _____

Have trainees perform a repair on a perforated area. This laboratory corresponds to Performance Task 5.

Session XXIV. Review and Testing

A. Module Review _____

B. Module Examination _____

1. Trainees must score 70 percent or higher to receive recognition from NCCER.
2. Record the testing results on Training Report Form 200, and submit the results to the Training Program Sponsor.

C. Performance Testing _____

1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.
2. Record the testing results on Training Report Form 200, and submit the results to the Training Program Sponsor.

Module Overview

This module explains how to examine various surfaces and determine the methods to use to achieve the proper surface profile and cleanliness. It also covers how to maintain surface-preparation equipment.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Industrial Coating and Lining Application Specialist Level One* and *Industrial Coating and Lining Application Specialist Level Two*, Modules 69201-10 through 69204-10.

Objectives

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

1. Identify and document surface conditions of steel substrates as depicted in the SSPC/NACE/ISO visual guides.
2. Examine and document preparation requirements for steel, nonferrous metals, nonmetallic surfaces, synthetic coatings, and existing coatings.
3. Demonstrate the use of a dull putty knife to confirm compliance with *SSPC-SP 2*, *SSPC-SP 3*, *NACE No. 4/SSPC-SP 7*, and *NACE No. 8/SSPC-SP 14*.
4. Demonstrate proper procedures for selecting, verifying the cleanliness of, and storing abrasives, including abrasive additives.
5. Explain how to maintain and troubleshoot abrasive blasting field equipment, and demonstrate field procedures for verifying cleanliness of abrasives and related documentation procedures.
6. Demonstrate procedures for measuring and documenting nozzle aperture, nozzle air pressure, and compressed air cleanliness.
7. Demonstrate the procedures for determining surface profile and surface cleanliness and associated documentation using a visual comparator, visual guide, dial surface profile gauge, replica tape, transparent tape test according to *ISO 8502-3*, ultraviolet light for detection of hydrocarbon contamination, and commercially available equipment to test for soluble salts.
8. Use the written standard and the accompanying visual guides (*NACE VIS 9/SSPC-VIS 5* and *NACE VIS 7/SSPC-VIS 4*) to classify various examples of surface profiles.
9. Demonstrate the use and documentation of inspection procedures for concrete coating work using moisture meters, RH probes, anhydrous CaCl *ASTM F1869*, plastic sheet method *ASTM D4263*, ICRI surface roughness comparators, and concrete profiler putty.
10. Describe and demonstrate the proper use and documentation of environmental monitoring procedures using psychrometers, thermometers, and psychrometric tables.

Performance Tasks

Under the supervision of the instructor, the trainee should be able to do the following:

1. Identify and document surface conditions of steel substrates as depicted in the SSPC/NACE/ISO visual guides.
2. Demonstrate the use of a dull putty knife to confirm compliance with *SSPC-SP 2*, *SSPC-SP 3*, *NACE No. 4/SSPC-SP 7*, and *NACE No. 8/SSPC-SP 14*.
3. Demonstrate field procedures for verifying cleanliness of abrasives (*SSPC-AB2*) and related documentation procedures.
4. Demonstrate the procedures for measuring and documenting:
 - Nozzle aperture
 - Nozzle air pressure
 - Compressed air cleanliness

continued

5. Demonstrate the procedures for determining anchor profile and associated documentation using:
 - Visual comparator
 - Dial surface profile gauge
 - Replica tape
6. Demonstrate the procedures for determining surface cleanliness and associated documentation using one or more of the following:
 - Transparent tape test according to *ISO 8502-3*
 - Ultraviolet light for detection of hydrocarbon contamination
 - Commercially available equipment to test for soluble salts
7. Use the written standard and the accompanying visual guides (*NACE VIS 9/SSPC-VIS 5* and *NACE VIS 7/SSPC-VIS 4*) to classify various examples of surface profiles.
8. Demonstrate the use and documentation of inspection procedures for concrete coating work using one or more of the following moisture tests:
 - Moisture meters
 - RH probes
 - Anhydrous CaCl *ASTM F1869*
 - Plastic sheet method *ASTM D4263*
9. Demonstrate the use and documentation of inspection procedures for concrete coating work using one of the following surface profiles:
 - ICRI surface roughness comparators
 - Concrete profiler putty
10. Demonstrate the proper use and documentation of environmental monitoring procedures using:
 - Psychrometers
 - Thermometers
 - Psychrometric tables

Materials And Equipment

Markers/chalk	Plastic wrap
Pencils and scratch paper	Duct tape
Whiteboard/chalkboard	<i>ASTM D4263</i>
<i>Industrial Coating and Lining</i>	<i>ASTM F1869</i>
<i>Application Specialist Level Two</i>	<i>ASTM D4417</i>
PowerPoint® Presentation Slides	<i>NACE SP 0287</i>
(ISBN 978-0-13-605573-0)	Liquid penetrant kits including developer
Multimedia projector and screen	Nonporous surfaces with discontinuities
Computer	Visual comparators with lighted magnifier
Appropriate personal protective equipment	Dial surface profile gauges
<i>SSPC VIS 1 through SSPC VIS 3, NACE VIS 7,</i>	Digital surface profile gauge
<i>NACE VIS 9, and ISO 8501-1 through ISO 8501-4</i>	Dull putty knives
Various steel surfaces representing surfaces	ICRI comparators
depicted in the SSPC/NACE/ISO visual guides	Concrete profiler putty kits
and described in the written standards	Psychrometric tables
Steel surfaces prepared to <i>SSPC-SP 2, SSPC-SP 3,</i>	<i>SSPC-AB2</i> tests for recycled abrasives
<i>NACE No. 4, and NACE No. 8</i>	Small vials
Surfaces contaminated with dust, hydrocarbons,	Distilled water
and soluble salts	Quantity of pH paper
<i>ISO 8502-3</i> transparent tape test kits	Silver nitrate solution 5 percent
Replica tapes	<i>ASTM D4285</i> blotter test
Ultraviolet test lights for hydrocarbon contamination and for liquid penetrants	Pressure blast analyzer (orifice) gauge
Commercial soluble salts test kits	Needle pressure gauge
Moisture meters and RH meters	Small operating abrasive blast system
Psychrometers	New and worn blast nozzles of the same size
Thermometers	Quick Quiz*
Anhydrous CaCl	Module Examinations**
	Performance Profile Sheets**

* Located at the back of this module

** Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

Safety Considerations

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Trainees will be required to demonstrate the use and documentation of various surface preparation procedures. Emphasize the hazards and safety precautions associated with surface preparation. Ensure that the trainees are briefed on the proper site or shop safety precautions and procedures.

Additional Resources

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 for task training.

Coating Inspector Program Level 1 © NACE International, 2003.

Coating Inspector Program Level 2 © NACE International, 2004.

“In Pursuit of Precision Blasting.” J.C. Carson. *Products Finishing Magazine*, August, 2007. Cincinnati, OH: Gardner Publications, Inc. www.pfonline.com

ISO 8501-1 through ISO 8501-4, Preparation of Steel Substrates Before Application of Paints and Related Products – Visual Assessment of Surface Cleanliness.

ISO 8502-3, Preparation of Steel Substrates Before Application of Paints and Related Products – Tests for the Assessment of Surface Cleanliness.

Monitoring Environmental Conditions. David Beamish, DeFelsko Corporation. NACE Resource Center website. Coating Instrument Series from Materials Performance 2003. <http://events.nace.org>

NACE VIS 7/SSPC-VIS 4, Guide and Visual Reference Photographs for Steel Cleaned by Waterjetting.

NACE VIS 9/SSPC-VIS 5, Guide and Reference Photographs for Steel Surfaces Prepared by Wet Abrasive Blast Cleaning.

Painting: New Construction and Maintenance. EM 1110-2-3400. Department of the Army, April 30, 1995.

Reclothing the First Lady of Metals – Repair Concerns. Copper Development Association. www.copper.org

SSPC-VIS 1, Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning.

SSPC-VIS 2, Standard Method of Evaluating Degree of Rusting on Painted Steel Surfaces.

SSPC-VIS 3, Guide and Reference Photographs for Steel Surfaces Prepared by Hand and Power Tool Cleaning.

Surface Preparation of the Concrete Substrate. N. P. Mailvaganam, G. B. Pye, and M. R. Arnott. Construction Technology Update No. 24, December 1998.

Zinc Coatings. Centennial, CO: American Galvanizers Association, 2006 www.galvanizeit.org

Teaching Time For This Module

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 80 hours are suggested to cover *Surface Preparation Two*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of trainees may be noted during these exercises for Performance Testing purposes.

Topic	Planned Time
Sessions I and II. Introduction	
A. Introduction	_____
B. Laboratory (1 session)	_____
Have trainees identify, classify, and document surface conditions of steel substrates as depicted in the SSPC/NACE/ISO visual guides and written standards. This laboratory corresponds to Performance Tasks 1 and 7.	

Sessions III–XII. Surface Preparation One

A. Dull Putty Knife Test _____

B. Laboratory (2 sessions) _____

Have trainees demonstrate the use of a dull putty knife to confirm compliance with *SSPC-SP 2*, *SSPC-SP 3*, *NACE No. 4/SSPC-SP 7*, and *NACE No. 8/SSPC-SP 14*. This laboratory corresponds to Performance Task 2.

C. Cleanliness _____

D. Soluble Salt Tests _____

E. Laboratory (3 sessions) _____

Have trainees demonstrate the procedures for determining surface cleanliness and associated documentation using one or more of the following:

- Transparent tape test according to *ISO 8502-3*
- Ultraviolet light for detection of hydrocarbon contamination
- Commercially available equipment to test for soluble salts

This laboratory corresponds to Performance Task 6.

F. Moisture Tests and Controls _____

G. Laboratory (3 sessions) _____

Have trainees demonstrate the use and documentation of inspection procedures for concrete coating work using one or more of the following moisture tests:

- Moisture meters
- RH probes
- Anhydrous CaCl *ASTM F1869*
- Plastic sheet method *ASTM D4263*

This laboratory corresponds to Performance Task 8.

H. Nonporous Surface Discontinuity Tests _____

Sessions XIII–XXI. Surface Preparation Two

A. Surface Profile Tests _____

B. Laboratory (2 sessions) _____

Have trainees demonstrate the procedures for determining anchor profile and associated documentation using:

- Visual comparator
- Dial surface profile gauge
- Replica tape

This laboratory corresponds to Performance Task 5.

C. Laboratory (2 sessions) _____

Have trainees demonstrate the use and documentation of inspection procedures for concrete coating work using one of the following surface profiles:

- ICRI surface roughness comparators
- Concrete profiler putty

This laboratory corresponds to Performance Task 9.

D. Environmental Conditions _____

E. Laboratory (2 sessions) _____

Have trainees demonstrate the proper use and documentation of environmental monitoring procedures using:

- Psychrometers
- Thermometers
- Psychrometric tables

This laboratory corresponds to Performance Task 10.

Sessions XXI–XXII. Pre-Preparation Inspection and Work Plan

A. Steel

1. Galvanized Steel
2. Weathering Steel
3. Stainless Steel

B. Copper and Aluminum

C. Masonry and Concrete

D. Synthetic Substrates

E. Existing Coatings

Sessions XXIII–XXIX. Dry Abrasive Cleaning

A. Dry Abrasive Media

B. Laboratory (2 sessions)

Have trainees demonstrate field procedures for verifying cleanliness of abrasives (*SSPC AB2*) and related documentation procedures. This laboratory corresponds to Performance Task 3.

C. Maintaining Dry Abrasive Equipment

1. Nozzle Orifice Check
2. Nozzle Operating Pressure

D. Low-Volume Water Abrasive Blasting

E. Laboratory (2 sessions)

Have trainees demonstrate the procedures for measuring and documenting:

- Nozzle aperture
- Nozzle air pressure
- Compressed air cleanliness

This laboratory corresponds to Performance Task 4.

Sessions XXX–XXXI. Waterjetting

A. Safety Guidelines

B. Environmental Issues

C. Waterjetting Equipment

D. Waterjetting Preparation

E. Dump Valve

F. Waterjetting Procedure

G. Shotgunning

H. Tanks

I. Cleanup

J. Other Waterjetting Equipment

Session XXXII. Review and Testing

A. Module Review

B. Module Examination

1. Trainees must score 70 percent or higher to receive recognition from NCCER.
2. Record the testing results on Training Report Form 200, and submit the results to the Training Program Sponsor.

C. Performance Testing

1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.
2. Record the testing results on Training Report Form 200, and submit the results to the Training Program Sponsor.

Module Overview

This module provides detailed information about industrial protective coatings and linings. It also covers pipeline coatings, fire-resistant/fire-retardant coatings, and powder coatings.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Industrial Coating and Lining Application Specialist Level One* and *Industrial Coating and Lining Application Specialist Level Two*, Modules 69201-10 through 69205-10.

Objectives

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

1. Describe physical coating properties.
2. Describe the characteristics of basic nonconvertible and convertible coatings.
3. Describe basic curing mechanisms and methods of film formation.
4. Describe basic pipeline coatings along with their advantages, disadvantages, and application methods.

Performance Tasks

This is a knowledge-based module; there are no performance tasks.

Materials and Equipment

Markers/chalk	Appropriate personal protective equipment
Pencils and scratch paper	Short sections of new and/or corroded coated pipelines
Whiteboard/chalkboard	Short section of ARO pipeline
<i>Industrial Coating and Lining Application Specialist Level Two</i>	Samples of cold-applied pipeline tapes
PowerPoint® Presentation Slides (ISBN 978-0-13-605573-0)	Examples of shrink-fit sleeves
Multimedia projector and screen	Fire protection insulation materials
Computer	Quick Quiz*
	Module Examinations**

* Located at the back of this module

**Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

Safety Considerations

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Ensure that the trainees are briefed on the proper site or shop safety precautions and procedures.

Additional Resources

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 for task training.

NACE International, for corrosion control resources and information. www.nace.org.

The Protective Coating User's Handbook. Dr. Louis D. Vincent. Houston, Texas: NACE Press, 2004.

Teaching Time For This Module

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 20 hours are suggested to cover *Industrial Coatings Two*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources.

Topic	Planned Time
Session I. Introduction	
A. Industrial Protective Coating and Lining Uses	_____
B. Protection Mechanisms of Industrial Protective Coatings	_____
1. Barrier Coatings	_____
2. Inhibitive Coatings	_____
3. Sacrificial Coatings	_____
Sessions II and III. Desirable Properties of Industrial Protective Coatings/Linings	
A. Types of Coatings	_____
B. Composition of Liquid/Liquefiable Coatings	_____
1. Pigment	_____
2. Solvents	_____
3. Additives	_____
4. Resins	_____
C. Coating Curing Mechanisms	_____
1. Convertible Coatings	_____
2. Hydration-Cure Coatings	_____
3. Nonconvertible Coatings	_____
Session IV. Coating Methods for Some Non-Steel Substrates	
A. Cementitious Substrates	_____
1. Penetrating Primers	_____
2. Thin-Film Coatings	_____
3. Liquid Rigid-Barrier Thick-Film Coatings	_____
4. Elastomeric Membranes	_____
5. Protective Barrier Laminate and Bonded Thermoplastic Liners	_____
B. Aluminum Substrates	_____
1. Organic Coatings	_____
2. Anodic and Conversion Coatings	_____
3. Porcelain Enamels and Electroplating	_____
C. Stainless Steel	_____

Sessions V and VI. Pipeline Coatings

- A. Fusion-Bonded Epoxy Pipeline Coatings _____
 - 1. FBE Coating Advantages and Disadvantages _____
 - 2. Plant-Applied FBE Coatings _____
 - 3. Field Joint FBE Coating Application _____
- B. Coal-Tar Pipeline Coatings _____
 - 1. CTE Coating Advantages and Disadvantages _____
 - 2. Plant-Applied CTE Coatings _____
 - 3. Field Joint CTE Coating Application _____
- C. Extruded Polyolefin Pipeline Coatings _____
 - 1. PO Coating Advantages and Disadvantages _____
 - 2. Plant-Applied Extruded PO Coatings _____
 - 3. Joint Coating and Field Repair of PO Coatings _____
- D. Abrasion-Resistant Overlay (ARO) Pipeline Coatings _____
- E. Cold-Applied Pipeline Tapes _____
 - 1. Advantages and Disadvantages of Cold Tape Coatings _____
 - 2. Petrolatum Cold Tape Application _____
 - 3. Polyethylene Cold Tape Application _____
- F. Shrink-Fit Pipeline-Joint Sleeves _____
 - 1. Advantages and Disadvantages of Shrink-Fit Sleeves _____
 - 2. Shrink-Fit Sleeve Application _____
- G. Pipeline Weight Coatings _____
- H. Liquid Pipeline Coatings _____

Session VII. Fire-Resistant/Retardant Coatings; Powder Coatings; Pipeline and Specialty Coatings Standards

- A. Fire-Resistant/Retardant Coatings _____
 - 1. Cementitious-Based Materials _____
 - 2. Non-Cementitious Materials _____
 - 3. Insulation-Based Materials _____
- B. Powder Coatings _____
- C. Pipeline and Specialty Coatings Standards _____

Session VIII. Review and Testing

- A. Module Review _____
- B. Module Examination _____
 - 1. Trainees must score 70 percent or higher to receive recognition from NCCER.
 - 2. Record the testing results on Training Report Form 200, and submit the results to the Training Program Sponsor.

Module Overview

This module covers coating application products, equipment, and procedures, as well as coating safety and how to calculate coating coverage.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Industrial Coating and Lining Application Specialist Level One* and *Industrial Coating and Lining Application Specialist Level Two*, Modules 69201-10 through 69206-10.

Objectives

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

1. Demonstrate the use of a PDS to extract the following information:
 - Storage requirements
 - Mixing and thinning procedures
 - Induction time requirements
 - Pot life
 - Viscosity control requirements
 - Application equipment requirements
 - Recoat/curing times
 - WFT
 - DFT
 - Ambient condition requirements
 - VOC data
 - Repair procedures
 - Cleanup procedures
2. Employ procedures for visual verification of stripping processes.
3. Select, demonstrate, and document setup, operation, adjustment, troubleshooting, maintenance, and cleanup of basic spray equipment on simple and complex structures, including:
 - Conventional air-spray
 - Airless spray
 - Air-assisted airless spray
 - HVLP
4. Analyze the need for auxiliary heating, humidification/dehumidification and/or ventilation to aid coating drying/curing.
5. Select appropriate repair procedures for application defects.
6. Measure and document, prior to coating application, appropriate inspection procedures utilizing the following:
 - Psychrometer
 - Thermometers (air and coating temperatures)
 - Anemometer
7. Document batch/lot numbers and identify defective material.
8. Measure and document coating film quality, during and/or after coating application, using the following:
 - WFT gauge
 - DFT gauge
 - Low-voltage and high-voltage holiday detectors
 - Hardness test instrument
 - Solvent sensitivity test
9. Demonstrate the appropriate procedures for overcoating existing coating systems.
10. Identify common field and laboratory methods used for evaluating coatings and conducting coating failure investigations.
11. Demonstrate proper mixing and thinning methods.
12. Demonstrate coating coverage calculations using a calculator.

Performance Tasks

Under the supervision of the instructor, the trainee should be able to do the following:

1. Demonstrate the use of a PDS (provided by instructor) to extract the following information:
 - Storage requirements
 - Mixing and thinning procedures
 - Induction time requirements
 - Pot life
 - Viscosity control requirements
 - Application equipment requirements
 - Recoat/curing times
 - WFT
 - DFT
 - Ambient condition requirements
 - VOC data
 - Repair procedures
 - Cleanup procedures
2. Measure and document, prior to coating application, appropriate inspection procedures utilizing the following:
 - Psychrometer
 - Thermometers (air and coating temperatures)
 - Anemometer
3. Document batch/lot numbers and identify defective material.
4. Demonstrate proper mixing and thinning procedures.
5. Demonstrate the proper technique for brush application of stripe coat.
6. Demonstrate the setup, operation, cleaning, and disassembly of conventional and airless spray equipment.
7. Measure and document coating film quality, during and/or after coating application, using WFT and DFT gauges.
8. Demonstrate the appropriate procedures for overcoating existing coating systems.
9. Demonstrate coating coverage calculations using a calculator.

Materials and Equipment

Markers/chalk

Pencils and scratch paper

Whiteboard/chalkboard

Industrial Coating and Lining

Application Specialist Level Two

PowerPoint® Presentation Slides

(ISBN 978-0-13-605573-0)

Multimedia projector and screen

Computer

Appropriate personal protective equipment

Coating mixing equipment

Various types of viscometers

Handheld advanced-function calculators

Examples of mechanical, hydraulic, and air-motor powered spray equipment with guns

Copies of two or more instructor-selected PDSs

Anemometers

Psychrometers

Thermometers

Supply of various instructor-selected single-component coatings, along with the required primers

Supply of various instructor-selected multi-component coatings and/or coating kits with long pot lives, along with required primers

Shipping manifest for the above coating materials

Quantity of instructor-selected industrial pressure-fed conventional spray systems and airless spray systems, both with appropriate guns

Large quantity of flat, angular, small and large cylindrical, and irregular metal surfaces for demonstration and laboratory purposes

WFT gauges

DFT Type 1 and Type 2 gauges

Low- and a high-voltage holiday/pinhole detectors

Pencil hardness test kit

Indentation hardness tester

Power sanders and sanding discs of various grades

Sandpaper of various grades

Quick Quiz*

Module Examinations**

Performance Profile Sheets**

* Located at the back of this module

** Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

Safety Considerations

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. Trainees will be required to mix and thin coatings and to set up, operate, and troubleshoot coating application equipment. Emphasize the special safety precautions associated with coating application. Ensure that the trainees are briefed on the proper site or shop safety precautions and procedures.

Additional Resources

This module presents thorough resources for task training. The following resource material is suggested for further study.

ASTM D4227, Standard Practice for Qualification of Coating Applicators for Application of Coatings to Concrete Surfaces. Latest edition. West Conshohocken, PA: ASTM International.

ASTM D4228, Standard Practice for Qualification of Coating Applicators for Application of Coatings to Steel Surfaces. Latest edition. West Conshohocken, PA: ASTM International.

NACE International, for corrosion control resources and information. www.nace.org:

SSPC-PA 2, Measurement of Dry Coating Thickness With Magnetic Gages. Pittsburgh, PA: Society for Protective Coatings, 2004.

The Protective Coating User's Handbook. Dr. Louis D. Vincent. Houston, Texas: NACE Press, 2004.

Teaching Time For This Module

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 100 hours are suggested to cover *Coating Applications Two*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of trainees may be noted during these exercises for Performance Testing purposes.

Topic	Planned Time
Session I. Introduction; Coating Safety; Mixing and Thinning	
A. Introduction	_____
B. Coating Safety	_____
C. Mixing and Thinning	_____
1. Mixing Equipment	_____
2. Mixing Guidelines	_____
3. Thinning Coatings	_____
Sessions II–IV. Calculating Coating Coverage	
A. How to Calculate Coating Coverage	_____
B. Laboratory (2 sessions)	_____
Have trainees demonstrate coating coverage calculations using a calculator.	
This laboratory corresponds to Performance Task 9.	

Sessions V–VIII. Selection of Application Equipment

- A. Product Data Sheets _____
- B. Laboratory (1 session) _____

Have trainees demonstrate the use of a PDS (provided by instructor) to extract the following information:

- Storage requirements _____
- Mixing and thinning procedures _____
- Induction time requirements _____
- Pot life _____
- Viscosity control requirements _____
- Application equipment requirements _____
- Recoat/curing times _____
- WFT _____
- DFT _____
- Ambient condition requirements _____
- VOC data _____
- Repair procedures _____
- Cleanup procedures _____

This laboratory corresponds to Performance Task 1.

- C. Environmental/Facility Restraints and Monitoring _____
- D. Laboratory (2 sessions) _____

Have trainees measure and document, prior to coating application, appropriate inspection procedures utilizing the following:

- Psychrometer _____
- Thermometers (air and coating temperatures) _____
- Anemometer _____

This laboratory corresponds to Performance Task 2.

- E. Size and Configuration of Surfaces _____
- F. Production Considerations _____

Sessions IX–XII. Pre-Application Preparations

- A. Surface Preparation _____
 - 1. Masonry and Concrete Surfaces (*SSPC-SP13/NACE 6*) _____
 - 2. Steel Surfaces _____
 - 3. Existing Coatings _____

- B. Coating Materials Preparation _____
 - 1. Coating Mixtures _____
 - 2. Coating Viscosity _____

- C. Laboratory (2 sessions) _____

Have trainees demonstrate proper mixing and thinning procedures. This laboratory corresponds to Performance Task 4.

- D. Preparation of Application Equipment _____
 - 1. Brushes and Rollers _____
 - 2. Spray Equipment (Conventional and Airless) _____

- E. Documentation Requirements _____

- F. Laboratory (1 session) _____

Have trainees document batch/lot numbers and identify defective material. This laboratory corresponds to Performance Task 3.

Sessions XIII–XIX. Application Procedures

- A. Spray Gun Application Techniques _____
- B. Laboratory (1 session) _____
Have trainees demonstrate the proper technique for brush application of a stripe coat. This laboratory corresponds to Performance Task 5.
- C. General Equipment Setup and Operation _____
- D. Conventional Spray System Setup, Operation, and Shutdown _____
- E. Airless Spray System Setup, Operation, and Shutdown _____
- F. Air-Assisted Airless Spray System Setup, Operation, and Shutdown _____
- G. HVLP Spray System Setup, Operation, and Shutdown _____
- H. Troubleshooting _____
 - 1. Conventional and HVLP Spray Systems _____
 - 2. Airless and Air-Assisted Airless Guns _____

Session XX. Specialty Coatings

- A. Electrostatic Spray and Powder Coatings _____
 - 1. Electrostatic Spray Gun Coating _____
 - 2. Fluidized Bed Coating _____
- B. Plural-Component Spray Systems _____
- C. Thermal Spray _____

Session XXI. Auxiliary Equipment

- A. Humidity and Ferrous Surfaces/Substrates _____
 - 1. Humidity Control for Ferrous Surfaces/Substrates _____
 - 2. Selection of Dehumidification Equipment _____
- B. Environmental Dehumidification and Conditioning Equipment _____
 - 1. Desiccant and Refrigerant Dehumidifiers _____
 - 2. Chillers and Cooling Coils _____
 - 3. Direct-Fired, Indirect-Fired, and Steam/Hot Water Heaters _____
 - 4. Electric and Infrared Heaters _____

Sessions XXII–XXIII. Quality Control and Evaluation; Waste Management

- A. Inspection Gauges, Instruments, and Tests _____
 - 1. Wet Film Thickness (WFT) Gauge _____
 - 2. Dry Film Thickness (DFT) Gauge _____
 - 3. Low- and High-Voltage Holiday/Pinhole Detectors _____
 - 4. Hardness Testers _____
 - 5. Solvent Resistance Test _____
- B. Overcoating and Coating Repair _____
- C. Coating Application Failures and Remedies _____
- D. Non-Hazardous and Hazardous Waste Disposal _____

Sessions XXIV–XXXIX. Laboratory and Performance Testing

- A. Laboratory (14 sessions) _____
Have trainees demonstrate the setup, operation, cleaning, and disassembly of conventional and airless spray equipment. Also have trainees measure and document coating film quality, during and/or after coating application, using WFT and DFT gauges. This laboratory corresponds to Performance Tasks 6 and 7.

B. Laboratory (2 sessions)

Have trainees demonstrate the appropriate procedures for overcoating existing coating systems. This laboratory corresponds to Performance Task 8.

Session XXXX. Review and Testing

A. Module Review

B. Module Examination

1. Trainees must score 70 percent or higher to receive recognition from NCCER.
2. Record the testing results on Training Report Form 200, and submit the results to the Training Program Sponsor.

C. Performance Testing

1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.
2. Record the testing results on Training Report Form 200, and submit the results to the Training Program Sponsor.