Module Overview

This module identifies and describes strength/spacing requirements, types, and installation of pipe hangers, supports, restraints, and guides. It covers earthquake bracing, sleeving, and firestopping. Cutting hangers to specified lengths is also included.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed the Core Curriculum and Sprinkler Fitting Level One.

Objectives

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

1. Identify and describe strength requirements of pipe hangers, supports, restraints, and guides.
2. Identify and describe spacing requirements of pipe hangers, supports, restraints, and guides.
3. Identify and describe types of pipe hangers, supports, restraints, and guides.
4. Install pipe hangers, supports, restraints, guides, and anchors.
5. Identify and explain types of earthquake bracing.
6. Install earthquake bracing.
7. Describe and explain sleeving and firestopping.
8. Cut a hanger rod to a specified length.

Performance Tasks

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

1. Install a drop-in anchor.
2. Install a hanger on a wood joist.
3. Make up and install an earthquake brace.
4. Cut a hanger rod to a specified length.

Materials and Equipment

Multimedia projector and screen
Sprinkler Fitting Level Two
   PowerPoint® Presentation Slides
Computer
Whiteboard/chalkboard
Markers/chalk
Pencils and scratch paper
Appropriate personal protective equipment
Various pipe hangers:
   Adjustable ring/band hangers
   Adjustable clevis
   Trapeze hangers
Manufacturer’s literature on load ratings for pipe hangers and supports
Various pipe hanger connecting units:
   Eye rods
   All-thread rods
   Rod couplings
   Beam clamps
   Wall support straps
   Various pipe supports and attachments:
      Ceiling flanges
      U-bolts
      Toggle bolts
      Pipe stands
      Riser clamps
   Various types of hangers for wood:
      Lag bolts and coach screw rods
      Drive screws
      Specialty fasteners
      U-hooks
   Various types of concrete fasteners:
      Concrete inserts
      Expansion shields and drop-in anchors
      Powder-driven tool training program (optional)
      Powder-driven tools and accessories (optional)
      NFPA 13
      Earthquake bracing
      Mechanical firestopping

continued
Various firestopping products
Samples of pipe
Hacksaws
Vises
Cutting oil
Templates
½-inch hammer drill
¾-inch drill motor
Masonry drill bits
Standard drill bits
Extension cords
Grout

Screwdrivers
Adjustable wrenches
Channel locks
Torpedo level
Soapstones
Measuring tapes
Rigging devices
Ladders or scaffolding
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. This module may require that the trainees visit job sites. Ensure that trainees are briefed on site safety policies prior to any site visits. This module requires trainees to work with pipe hangers and supports. Ensure all trainees are briefed on hand tool safety and shop safety procedures. This module may require trainees to work with powder-driven tools. Ensure all trainees are briefed on appropriate safety procedures.

Additional Resources

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

Pipe Hanger Catalog. Portsmouth, NH: Anvil International Inc.
Pipe Hanger Design and Engineering. Portsmouth, NH: Anvil International Inc.
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 2 1/2 hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 15 hours are suggested to cover Hangers, Supports, Restraints, and Guides. 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 the trainees may be noted during these exercises for Performance Testing purposes.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
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</thead>
<tbody>
<tr>
<td><strong>Sessions I and II. Introduction; Requirements for Pipe Hangers and Supports</strong></td>
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<tr>
<td>A. Introduction</td>
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<tr>
<td>B. Strength and Spacing Requirements for Pipe Hangers</td>
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<tr>
<td>C. Field Placement of Hangers</td>
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<tr>
<td>D. General Rules</td>
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<tr>
<td>E. Identification of Pipe Hangers and Supports</td>
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<tr>
<td>F. Hanger Connecting Units and Attachments</td>
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</tbody>
</table>
| G. Laboratory  
  Have trainees practice cutting hanger rods. This laboratory corresponds to Performance Task 4. | |  
| H. Hangers for Wood | |  
| I. Laboratory  
  Have trainees practice installing a hanger on a wood joist. This laboratory corresponds to Performance Task 2. | |  
| **Session III. Installation of Pipe Hangers and Supports** | |  
| A. Pipe Supports and Attachments | |  
| B. Hangers for Concrete | |  
| C. Laboratory  
  Have trainees practice installing a drop-in anchor. This laboratory corresponds to Performance Task 1. | |  
| **Session IV. Earthquake Bracing** | |  
| A. Types of Earthquake Bracing | |  
| B. Floor and Wall Penetrations | |  
| C. Seismic Separation Assembly | |  
| D. Bracing and Other Concerns | |  
| E. Laboratory  
  Have trainees practice installing earthquake bracing. This laboratory corresponds to Performance Task 3. | |  
| **Session V. Firestopping** | |  
| A. Firestopping Materials and Devices | |  
| B. Floor and Wall Penetrations | |  
| C. Specifications | |  
| D. Specific Products | |  

Session VI. Review and Testing

A. Review
B. Module Examination
   1. Trainees must score 70% 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 the various types of valves and valve applications used in the sprinkler industry, including service procedures for standard valves. The trainee learns how to install OS&Y valves, butterfly grooved valves, and tamper switches. Procedures to disassemble, service, and reassemble check valves are also included.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed Core Curriculum; Sprinkler Fitting Level One; and Sprinkler Fitting Level Two, Module 18201-13.

Objectives

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

1. Identify the basic types of valves.
2. Demonstrate the ability to service different types of valves.
3. Define the general purpose of a backflow preventer.
4. Install outside screw and yoke (OS&Y) valves.
5. Install a tamper switch.
6. Install butterfly grooved valves.
7. Disassemble, service, and reassemble a check valve.

Performance Tasks

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

1. Install outside screw and yoke (OS&Y) valves.
2. Install a tamper switch.
3. Install butterfly grooved valves.
4. Disassemble, service, and reassemble a check valve.

Materials and Equipment

Multimedia projector and screen
Computer
Whiteboard/chalkboard
Markers/chalk
Pencils and scratch paper
Appropriate personal protective equipment
Indicating valves
Gate valves
Post indicators
Wall-post indicators
Outside screw and yoke (OS&Y) valves
Ball lever valves
Globe valves
Sample discs
Clappers
Angle valves
Y-type valves
Butterfly grooved valves
Safety valves
Check valves
Swing check valves
Hose valves
Hose-gate valves
Pressure-reducing valves
Pressure-relief valves
Manufacturers’ literature on pressure-relief valves
Backflow preventer
Supervisory switches and manufacturer’s instructions
Tamper switches
Piping drawings
Pipe stands
Packing puller
Packing

continued
Safety Considerations

Ensure that trainees are equipped with appropriate personal protective equipment and know how to use it properly. This module may require trainees to visit construction sites or utility areas. Ensure that they are briefed on site safety procedures. This module requires trainees to work with hand tools and valves. Ensure that all trainees are properly briefed on hand tool and lifting safety.

Additional Resources

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


American Water Works Association (AWWA), Denver, CO.


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 15 hours are suggested to cover General Purpose Valves. 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.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Planned Time</th>
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<tbody>
<tr>
<td><strong>Sessions I and II. Introduction; Valve Identification</strong></td>
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<tr>
<td>A. Introduction</td>
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<tr>
<td>B. Indicating Valves</td>
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<td>C. Globe Valves</td>
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<td>D. Check Valves</td>
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<tr>
<td>E. Laboratory</td>
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<tr>
<td>Have trainees practice disassembling, servicing, and reassembling a check valve. This laboratory corresponds to Performance Task 4.</td>
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<tr>
<td>F. Hose, Pressure-Reducing, and Pressure-Relief Valves</td>
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<tr>
<td><strong>Sessions III and VI. Installing Valves</strong></td>
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<tr>
<td>A. Installing Threaded Valves</td>
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<tr>
<td>B. Installing Grooved Valves</td>
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<td>C. Laboratory</td>
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<tr>
<td>Have trainees practice installing butterfly grooved valves. This laboratory corresponds to Performance Task 3.</td>
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<tr>
<td>D. Installing Flanged Valves</td>
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<tr>
<td>E. Laboratory</td>
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</tr>
<tr>
<td>Have trainees practice installing OS&amp;Y valves. This laboratory corresponds to Performance Task 1.</td>
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<tr>
<td><strong>Session V. Installing Supervisory Switches</strong></td>
<td></td>
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<tr>
<td>A. Installing a Supervisory Switch</td>
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<tr>
<td>B. Laboratory</td>
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<tr>
<td>Have trainees practice installing a tamper switch. This laboratory corresponds to Performance Task 2.</td>
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<tr>
<td>C. Summary</td>
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<tr>
<td><strong>Session VI. Review and Testing</strong></td>
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<tr>
<td>A. Module Review</td>
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<tr>
<td>B. Module Examination</td>
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</tr>
<tr>
<td>1. Trainees must score 70% or higher to receive recognition from NCCER.</td>
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<tr>
<td>2. Record the testing results on Training Report Form 200, and submit the results to the Training Program Sponsor.</td>
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<tr>
<td>C. Performance Testing</td>
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</tr>
<tr>
<td>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.</td>
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</tr>
<tr>
<td>2. Record the testing results on Training Report Form 200, and submit the results to the Training Program Sponsor.</td>
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</tbody>
</table>
Module Overview

This module explains basic math principles and how to solve everyday problems, including converting quantities from the English system to the metric system and vice versa. It covers specific sprinkler fitting problems such as calculating 45-degree offsets and tank volume; centering sprinkler heads using the target, square offset, and geometric methods; and problems relating to changes in elevation, sprinkler discharge, and hanger sizing.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed the Core Curriculum; Sprinkler Fitting Level One; and Sprinkler Fitting Level Two, Modules 18201-13 and 18202-13.

Objectives

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

1. Use basic math principles to solve problems.
2. Convert fundamental measurement quantities from the English system to the metric system, and from metric to English.
3. Recognize the effects of temperature on sprinkler systems.
4. Use temperature scales to solve sprinkler rating problems.
5. Calculate 45-degree offsets and tank volume.
6. Center sprinkler heads using the target, square offset, and geometric methods.
7. Solve sprinkler system problems relating to changes in elevation, sprinkler discharge, and hanger sizing.

Performance Task

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

1. Fill in a time sheet.

Materials and Equipment

Multimedia projector and screen
Sprinkler Fitting Level Two
PowerPoint® Presentation Slides
Computer
Whiteboard/chalkboard
Markers/chalk
Pencils and scratch paper
Measuring devices
Graph paper
Containers to demonstrate units of measure:
   Bottle of oil or soda
   Paper
Scissors
Rulers (English and metric)
Architect’s rule
Measuring tape
Temperature-pressure chart
Scientific calculator
Pressure gauges with SI and English units
Tables commonly used by sprinkler fitters
Thermometers
Copies of the Quick Quiz*
Module Examinations**
Performance Profile Sheet**

* 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.
Additional Resources

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


*Handbook of Applied Mathematics*, D. Van Nostrand Co., Inc.

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 *General Trade Math*. 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.

<table>
<thead>
<tr>
<th>Topic</th>
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<tbody>
<tr>
<td><strong>Sessions I and II. Introduction; General Trade Math</strong></td>
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<td>A. Introduction</td>
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<tr>
<td>B. Mathematical Symbols</td>
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<tr>
<td>C. Laboratory</td>
<td>Have trainees practice filling out a time card. This laboratory corresponds to Performance Task 1.</td>
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<tr>
<td>D. Higher Functions</td>
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<td>E. Geometry</td>
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<tr>
<td><strong>Sessions III and IV. Measurement Systems</strong></td>
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<tr>
<td>A. Basic and Practical Measures</td>
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<tr>
<td>B. The U.S. English System of Measurement</td>
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<tr>
<td>C. The Metric System</td>
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<td>D. The International System of Units</td>
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<td>E. Using Tables</td>
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<td><strong>Session V. Temperature Scales and Applications</strong></td>
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<td>A. Thermometers</td>
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<tr>
<td>B. Thermometer Scales</td>
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<td>C. Temperature Conversion</td>
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<td><strong>Sessions VI and VII. Mathematical Applications</strong></td>
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<td>A. Centering Methods</td>
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<td>B. Calculating Floor Area</td>
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<td>C. Calculating Sprinkler Head Spacing</td>
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<tr>
<td>D. Calculating Pitch</td>
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<td>E. Calculating the Third Side of a Triangle</td>
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<tr>
<td>F. Discharge of a Sprinkler</td>
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<tr>
<td>G. Calculating the Volume of a Piping System</td>
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</tr>
</tbody>
</table>
Session VIII. Review and Testing

A. Review

B. Module Examination

1. Trainees must score 70% 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 read the drawing legend and identify drawing symbols, including common structural and standard sprinkler system symbols. It covers how to read drawings to identify materials, calculate the square footage and number of sprinklers required, lay out sprinkler hanger locations, and identify sprinkler orifice sizes from drawings. It describes how to identify pipe sizes and cut lengths shown on installation drawings.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed the Core Curriculum; Sprinkler Fitting Level One; and Sprinkler Fitting Level Two, Modules 18201-13 through 18203-13.

Objectives

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

1. Identify common structural symbols on a shop drawing.
2. Identify cut lengths and sizes of pipe on an installation drawing.
3. Identify the materials to perform an installation from drawings.
4. Identify standard sprinkler system symbols.
5. Interpret a legend and calculate the number of sprinklers to be used in an installation.
6. Identify the orifice size of a sprinkler from drawings.
7. Identify the temperature rating of a sprinkler from a drawing.
8. Calculate the square footage and the number of sprinklers required for a given area.
9. Identify and match the NFPA standards to the title.

Performance Tasks

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

1. Interpret a legend.
2. Calculate the number of sprinklers to be used in an installation.
3. Calculate the square footage and the number of sprinklers required for a given area.
4. Lay out sprinkler hanger locations.

Materials and Equipment

- Multimedia projector and screen
- Computer
- Whiteboard/chalkboard
- Markers/chalk
- Pencils and scratch paper
- Appropriate personal protective equipment
- Shop drawings
- Measuring tape
- Architectural drawings
- Blueprints
- Change order
- *NFPA 13*
- Legends from several drawings
- Copies of the Quick Quiz *
- Module Examination**
- Performance Profile Sheet**

* 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. Emphasize basic site safety. This module may require trainees to visit job sites. Make sure that all trainees are briefed on site safety procedures.

**Additional Resources**

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


**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 3½ hours are suggested to cover *Shop Drawings*. 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 the trainees may be noted during these exercises for Performance Testing purposes.

<table>
<thead>
<tr>
<th>Topic</th>
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<tbody>
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<td><strong>Sessions I and II. Introduction; The Drawing Set</strong></td>
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<tr>
<td>A. Introduction</td>
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<tr>
<td>B. Types of Drawings</td>
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<td>C. Content of a Sprinkler Drawing Package</td>
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<tr>
<td>D. Understanding and Using Drawings</td>
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<td>E. Dimensioning</td>
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<td>F. Shop Drawings</td>
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<td>G. Plans</td>
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<tr>
<td><strong>Sessions III and IV. Sprinkler System Symbols</strong></td>
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<tr>
<td>A. Sprinkler Symbols</td>
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<td>B. Valves, Devices, and Fitting Symbols</td>
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<tr>
<td>C. Hangers, Supports, and Underground Symbols</td>
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<tr>
<td>D. Miscellaneous Notations</td>
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<tr>
<td>E. Laboratory</td>
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<tr>
<td>Have trainees practice reading a legend. This laboratory corresponds to Performance Task 1.</td>
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<tr>
<td><strong>Sessions V through VII. Sprinkler System Layout, Part One</strong></td>
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<tr>
<td>A. Technical Layout Procedure</td>
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<tr>
<td>B. Sprinkler Layout Planning</td>
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<td>C. Hazard Classification</td>
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<td>D. Maximum Sprinkler Spacing</td>
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<tr>
<td>E. Calculating the Number of Sprinklers</td>
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<tr>
<td>F. Laboratory</td>
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<tr>
<td>1. Have trainees practice calculating the number of sprinklers to be used in an installation. This laboratory corresponds to Performance Task 2.</td>
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<tr>
<td>2. Have trainees practice calculating square footage and the number of sprinklers to be used in a given area. This laboratory corresponds to Performance Task 3.</td>
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</tbody>
</table>
Sessions VIII through X. Sprinkler System Layout, Part Two

A. Laying Out Sprinklers
B. Branching
C. Selecting and Sizing Piping
D. Water Supply
E. Hangers
F. Laboratory
   Have trainees practice laying out sprinkler hanger locations. This laboratory corresponds to Performance Task 4.

Sessions XI and XII. Layout and Coordination of Existing Systems

A. Three-Dimensional Perspective
B. Sprinkler Spacing
C. Installation Information
D. Coordinating Installations
E. Fitting Pipe
F. Layout for Existing Systems
G. Layout Sequence
H. Summary

Session XIII. Review and Testing

A. Review
B. Module Examination
   1. Trainees must score 70% 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 obstructed and unobstructed sprinkler installations. Standard spray sprinklers are discussed relative to occupancies and maximum coverage calculations. Sprinkler spacing is calculated using the small room rule and the protection area rule. Identification of spray sprinklers using a sprinkler identification number (SIN) is also covered.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed the Core Curriculum; Sprinkler Fitting Level One; and Sprinkler Fitting Level Two, Modules 18201-13 through 18204-13.

Objectives

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

1. Identify unobstructed and obstructed construction on a drawing and explain why these construction types are obstructed or unobstructed.
2. Calculate maximum coverage area of standard sprinklers for various occupancies.
3. Calculate spacing using the small room rule.
4. Determine sprinkler temperatures by examining different sprinklers.
5. Calculate the maximum spacing of sidewall sprinklers using the protection area rule.
6. Referencing a sprinkler identification number (SIN), identify the manufacturer and sprinkler type.

Performance Tasks

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

1. Calculate maximum coverage area of standard sprinklers for various occupancies.
2. Calculate spacing using the small room rule.
3. Calculate the maximum spacing of sidewall sprinklers using the protection area rule.

Materials and Equipment

- Multimedia projector and screen
- Computer
- Whiteboard/chalkboard
- Markers/chalk
- Pencils and scratch paper
- Appropriate personal protective equipment
- Sprinkler wrenches
- Sprinkler fitter hand tools
- Manufacturer’s data sheets
- Design drawings
- Construction drawings
- Sprinkler blueprints
- Calculators
- Standard spray sprinklers
- NFPA 13
- Sidewall sprinklers
- Copies of the Quick Quiz *
- Module Examination**
- Performance Profile Sheet**

* 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 trainees are equipped with appropriate personal protective equipment and know how to use it properly. Emphasize basic site safety. This module may require trainees to visit job sites. Make sure that all trainees are briefed on site safety procedures.

Additional Resources

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


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 2 1/2 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 Standard Spray Fire Sprinklers. 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.

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<td><strong>Session III. Types of Construction</strong></td>
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<td>B. Obstructed</td>
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Sessions IV and V. Standard Coverage Upright and Pendent Sprinklers

A. Maximum Coverage Area
B. Laboratory
Have trainees practice calculating maximum coverage area of standard sprinklers for various occupancies. This laboratory corresponds to Performance Task 1.
C. Determining Correct Spacing
D. Small Room Rule
E. Laboratory
Have trainees practice calculating spacing using the small room rule. This laboratory corresponds to Performance Task 2.
F. Minimum Spacing Requirements
G. Sprinkler Position and Deflector Distance
H. Obstructions

Session VI. Standard Coverage Sidewall Sprinklers

A. Written Specifications
B. Area of Coverage and Maximum Spacing
C. Laboratory
Have trainees practice calculating the maximum spacing of sidewall sprinklers using the protection area rule. This laboratory corresponds to Performance Task 3.
D. Positioning Sidewall Sprinklers
E. Clearance and Other Considerations
F. Summary

Session VIII. Review and Testing

A. Review
B. Module Examination
1. Trainees must score 70% 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 the purpose, function, and operations of wet system components. It describes riser check valves, alarm check valves, and trim; flow, tamper, and pressure switches; fire department connections and hose stations; antifreeze systems; faulty pressure gauges; inspector’s test connections and auxiliary drains; and hydrostatic testing and test pumps. The trainee learns how to trim an alarm check valve, perform a hydrostatic test, calculate the specific gravity of an antifreeze solution, and complete a contractor’s materials and test certificate.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed the Core Curriculum; Sprinkler Fitting Level One; and Sprinkler Fitting Level Two, Modules 18201-13 through 18205-13.

Objectives

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

1. Describe riser check, alarm check valves, and trim.
2. Trim an alarm check valve and replace the faceplate gasket.
3. Identify and describe flow switches, tamper switches, and pressure switches.
4. Install a tamper switch and a flow switch and set the retard device on a flow switch.
5. Identify and explain fire department connections and hose stations.
6. Explain inspector’s test connections and auxiliary drains.
7. Explain hydrostatic testing and test pumps.
8. Perform a hydrostatic test using a pump.
9. Describe antifreeze systems.
10. Calculate the specific gravity of an antifreeze solution.
11. Complete a contractor’s material and test certificate.

Performance Tasks

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

1. Trim an alarm check valve and replace the faceplate gasket.
2. Install a flow switch and set the retard device.
3. Perform a hydrostatic test using a pump.
4. Calculate the specific gravity of an antifreeze solution.
5. Complete a contractor’s material and test certificate.
6. Identify a faulty pressure gauge and replace it.

Materials and Equipment

Multimedia projector and screen  
Sprinkler Fitting Level Two  
PowerPoint® Presentation Slides  
Computer  
Whiteboard/chalkboard  
Markers/chalk  
Pencils and scratch paper  
Appropriate personal protective equipment  
Wall-mounted fire department connection  
Hose station components and accessories  
Manufacturer’s literature on hose stations  
Inspector’s test connection  
Sprinkler fitter hand tools  
Drill  
Catch basin  
Continuity tester  
Hydrometer  
Fluid measuring device

continued
Safety Considerations

Ensure that trainees are equipped with appropriate personal protective equipment and know how to use it properly. Emphasize basic site safety. This module may require trainees to visit job sites. Make sure that all trainees are briefed on site safety procedures. This module requires trainees to perform a hydrostatic test. Ensure all trainees are properly briefed on safety procedures. This module requires trainees to work with valves. Ensure all trainees are briefed on proper tool and lifting safety.

Additional Resources

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


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 Wet Fire Sprinkler Systems. 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.

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<td>E. Shotgun Riser Assembly</td>
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<tr>
<td>Have trainees practice trimming an alarm check valve and replacing the faceplate gasket. This laboratory corresponds to Performance Task 1.</td>
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<tr>
<td>Have trainees practice installing a flow switch and setting the retard device. This laboratory corresponds to Performance Task 2.</td>
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<td>C. Auxiliary Drains</td>
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</tbody>
</table>
Sessions VII and VIII. Hydrostatic Testing; Test Pumps

A. NFPA 13 Requirements

B. Laboratory

Have trainees practice completing a contractor’s material and test certificate. This laboratory corresponds to Performance Task 5.

C. Purpose of Testing

D. System Inspection

E. Preliminary Testing

F. Testing Hazards

G. Test Pumps

H. Testing Procedures

I. Laboratory

Have trainees practice performing a hydrostatic test using a pump. This laboratory corresponds to Performance Task 3.

Session IX. Antifreeze Systems; Troubleshooting

A. Antifreeze System Components and Limitations

B. Filling the Antifreeze System

C. System Maintenance

D. Laboratory

Have trainees practice calculating the specific gravity of an antifreeze solution. This laboratory corresponds to Performance Task 4.

E. Troubleshooting

F. Laboratory

Have trainees practice identifying a faulty pressure gauge and replacing it. This laboratory corresponds to Performance Task 6.

G. Summary

Session X. Review and Testing

A. Module Review

B. Module Examination

1. Trainees must score 70% 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 the purpose, function, and operation of components used in a dry-pipe system. It discusses dry-pipe valves and trim, air supplies, accelerators and exhausters, and fire department connections. It covers installation of pressure gauges on alarm valves and accelerators, setting up and adjusting air maintenance devices, and resetting and troubleshooting dry-pipe systems. Dry-pipe pitch is also covered.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed: Core Curriculum; Sprinkler Fitting Level One; and Sprinkler Fitting Level Two, Modules 18201-13 through 18206-13.

Objectives

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

1. Identify and explain dry-pipe systems and why and where dry-pipe systems are used.
2. Identify dry-pipe valves and trim.
3. Install pressure gauges on an alarm valve.
4. Identify and explain air supplies.
5. Identify and explain accelerators and exhausters.
6. Perform an installation of an accelerator.
7. Explain why an exhauster is a quick-opening device (QOD) and identify possible locations where an exhauster could be installed in a dry-pipe system.
8. Explain pitching sprinkler piping and auxiliary drains in dry-pipe systems.
9. Calculate pitch for dry-pipe systems.
10. Identify and explain fire department connections with respect to dry-pipe systems.
11. Install, set, and adjust an air maintenance device.
12. Reset and troubleshoot a dry-pipe system.
13. Remove and install a faceplate and faceplate gasket.

Performance Tasks

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

1. Fill out an Aboveground Test Certificate for a hydrostatic test.
2. Install pressure gauges on an alarm valve.
3. Perform an installation of an accelerator.
4. Calculate pitch for dry-pipe systems.
5. Connect an air compressor to a dry-pipe system.
6. Reset and troubleshoot a dry-pipe system.
7. Remove and install a faceplate gasket.

Materials and Equipment

Multimedia projector and screen
Sprinkler Fitting Level Two
PowerPoint® Presentation Slides
Computer
Whiteboard/chalkboard
Markers/chalk

Pencils and scratch paper
Appropriate personal protective equipment
Dehydrators
Compressors
Fire department connections
Inspector’s test valve
Dry valve spare parts

continued
Safety Considerations

Ensure that trainees are equipped with appropriate personal protective equipment and know how to use it properly. Emphasize basic site safety. This module may require trainees to visit job sites. Make sure that all trainees are briefed on site safety procedures. This module requires trainees to work with pressure gauges and air supply equipment. Ensure all trainees are briefed on proper tool and lifting safety.

Additional Resources

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


* Located at the back of this module.
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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 2 1/2 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 Dry-Pipe Systems. 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.

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<tr>
<td>Have trainees practice installing pressure gauges on an alarm valve. This laboratory corresponds to Performance Task 2.</td>
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<td>C. Normal Dry-Pipe Valve Conditions</td>
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<td>E. Laboratory</td>
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<td>Have trainees practice removing and installing a faceplate gasket. This laboratory corresponds to Performance Task 7.</td>
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<td>F. Maintaining and Testing Components</td>
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<td>G. Laboratory</td>
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<tr>
<td>Have trainees practice filling out an Aboveground Test Certificate. This laboratory corresponds to Performance Task 1.</td>
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<tr>
<td>Have trainees practice installing an accelerator. This laboratory corresponds to Performance Task 3.</td>
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<td>E. Laboratory</td>
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<tr>
<td>Have trainees practice calculating pitch for dry-pipe systems. This laboratory corresponds to Performance Task 4.</td>
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Sessions VII and VIII. Fire Department Connections and Air Devices

A. Fire Department Connections
B. Basics of Compressed Air
C. Air Maintenance Devices
D. Tanks and Air Sources
E. Use of Nitrogen Tanks
F. Laboratory
   Have trainees practice connecting an air compressor to a dry-pipe system. This laboratory corresponds to Performance Task 5.

Session IX. Troubleshooting

A. Determining the Problem
B. Collecting and Analyzing Data
C. Deciding on Action
D. Performing the Action
E. Laboratory
   Have trainees practice resetting and troubleshooting a dry-pipe system. This laboratory corresponds to Performance Task 6.
F. Summary

Session X. Review and Testing

A. Module Review
B. Module Examination
   1. Trainees must score 70% 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.