Deluge/Preaction Systems
Annotated Instructor's Guide

Module 18301-07

Module Overview

This module covers different types of preaction and deluge systems. It discusses deluge valves, auxiliary detection systems, release systems, and hydraulic and pneumatic activation. It also covers installation and troubleshooting techniques.

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.*

Objectives

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

1. Identify and explain differences between deluge and preaction systems.
2. Identify the critical components of a deluge system and a preaction system.
3. Explain where preaction systems and deluge systems are generally installed.
4. Trip and reset a deluge valve.
5. Identify the three types of discharge nozzles used with a deluge system.
6. Identify and explain various methods of activating electrical release and electrical supervision.
7. Demonstrate the procedures to place a Firecycle® system in service.
8. Identify and explain non-, single-, and double-interlocked preaction systems.
9. Explain the main precautions that must be observed when placing non-, single-, and double-interlocked systems into service and describe activation.
10. Perform a hydrostatic test.

Performance Tasks

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

1. Trip and reset a deluge valve.
2. Demonstrate the procedures to place a Firecycle® system in service.
3. Using charts provided by your instructor, identify the differences between double-air-locked, single air-locked, pneumatic, and electric preaction systems.
4. Perform a hydrostatic test.

Materials and Equipment

Multimedia projector and screen
Sprinkler Fitting Level Three PowerPoint® Presentation Slides (ISBN 978-0-13-272926-0)
Computer
Whiteboard/chalkboard
Markers/chalk
Pencils and scratch paper
Appropriate personal protective equipment
Basic trainee tools
Measuring tape
Calculator
Deluge valves
Manufacturers' literature on hydraulic release mechanisms
Standard sprinkler heads and associated manufacturers' literature
Fixed-temperature releases and associated manufacturers' literature
Rate-of-rise releases and associated manufacturers' literature
Deluge valve with a pneumatic release system
Electric release mechanisms and associated manufacturers' literature
Protectowire®, accessories, and manufacturer's literature
Electrical thermostats
Infrared detectors and manufacturers' literature

continued

Manufacturers' installation literature on preaction systems***
Discharge nozzles
Thermostatic release devices
Release setting tool kit
Heat-activated device
Various detectors
Mercury checks
Air tubing
Rate compensating valve
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.

*** Training graphics and posters are available from major manufacturers. For example, Viking corporation produces system posters that are available by making a Viking literature request, or by contacting the local sales office. Posters that are available include:

- Deluge system
- Preaction system
- Surefire™ single-interlock system
- Firecycle® III system
- Foam/water deluge sprinkler system

Safety Considerations

Ensure that trainees are equipped with appropriate personal protective equipment and know how to use it properly. This module may require that 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 sprinkler systems and perform hydrostatic testing. 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.

Automatic Fire Sprinkler Handbook, Latest Edition. Quincy, MA: National Fire Protection Association.
NFPA 13, Latest Edition. Quincy, MA: National Fire Protection Association.
NFPA 25, Latest Edition. Quincy, MA: National Fire Protection Association.
NFPA 72, Latest Edition. Quincy, MA: National Fire Protection Association.

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 40 hours are suggested to cover *Deluge/Preaction 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.

Topic	**Planned Time**
Sessions I through III. Introduction; Deluge Systems	
A. Introduction	_____
B. Deluge Systems	_____
C. Deluge System Components Using a Fixed Piping Network	_____
D. Deluge Valves	_____
E. Release Mechanisms for Deluge Systems	_____
F. Hanger Connecting Units and Attachments	_____

G. Detection Systems for Electric Release Mechanisms _____

H. Laboratory _____

Have trainees practice tripping and resetting a deluge valve. This laboratory corresponds to Performance Task 1.

Sessions IV through VI. Preaction Systems

A. Preaction Systems _____

B. Non-Interlocked Preaction Systems _____

C. Single-Interlocked Preaction Systems _____

D. Double-Interlocked Preaction Systems _____

E. Laboratory _____

Have trainees practice identifying the differences between different types of preaction systems. This laboratory corresponds to Performance Task 3.

Sessions VII through X. Firecyle® Systems

A. Firecyle® Systems _____

B. Core System Components _____

C. System Components _____

D. Maintenance _____

E. Firecyle® III _____

F. Laboratory _____

Have trainees practice demonstrating the procedures to put a Firecyle® system in service. This laboratory corresponds to Performance Task 2.

Sessions XI through XV. Trim; Installation Techniques; Troubleshooting

A. Packaged Trim and Packaged Systems _____

B. Installation Precautions _____

C. Preparation for Hydrostatic Testing _____

D. Hydrostatic Test Demonstration _____

E. Laboratory _____

Have trainees practice performing a hydrostatic test. This laboratory corresponds to Performance Task 4.

F. Troubleshooting Auxiliary Detection Systems _____

Session XVI. 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.

Standpipes
Annotated Instructor's Guide

Module 18302-07

Module Overview

This module identifies and explains wet and dry standpipes; describes standpipe sizing, classification, and building codes; and reviews standards that must be followed for installation. It explains fire department connections, sleeves, bracing, and fire stopping.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Core Curriculum; Sprinkler Fitting Level One; Sprinkler Fitting Level Two;* and *Sprinkler Fitting Level Three,* Module 18301-07.

Objectives

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

1. Identify the different types and classifications of standpipes.
2. Explain the requirements for standpipes for buildings under construction.
3. Explain the basic requirements for sizing standpipes hydraulically and by schedule.
4. Describe a hose rack assembly and how it works.
5. Describe roof manifolds.
6. Identify and explain fire department connections.
7. Identify types of hose valves and adapters.
8. Demonstrate flow test procedures used to validate minimum pressure and flow capability.
9. Identify, test, and adjust a pressure-reducing valve (PRV).
10. Demonstrate LINK-SEAL® installation procedures.

Performance Tasks

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

1. Identify differences in valve size between Class I, II, and III standpipes.
2. Demonstrate flow test procedures used to validate minimum pressure and flow capability.
3. Identify standpipe components from schematics.
4. Pull hoses out of a cabinet and reassemble.
5. Identify different types of valves.
6. Adjust a PRV.

Materials and Equipment

Multimedia projector and screen
Sprinkler Fitting Level Three PowerPoint® Presentation Slides (ISBN 978-0-13-272926-0)
Computer
Whiteboard/chalkboard
Markers/chalk
Pencils and scratch paper
Appropriate personal protective equipment
Basic trainee tools
Measuring tape
Calculator
Standpipe schematics
NFPA 14
Building and fire codes
Hose racks
Cabinets
Roof manifolds
Fire department connections
Various styles of hose valves
Pressure-reducing valves and manufacturers' literature
Sleeves

continued

Clamps
Sway bracing
Link-Seal® assembly and instructions
Quick Quiz*
Module Examinations**
Performance Profile Sheets**

* Located in 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. This module may require that 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 sprinkler systems and pressure reducing valves. 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.

Automatic Fire Sprinkler Handbook, Latest Edition. Quincy, MA: National Fire Protection Association.

NFPA 13, Latest Edition. Quincy, MA: National Fire Protection Association.

NFPA 14, Latest Edition. Quincy, MA: National Fire Protection Association.

NFPA Fire Protection & Fire Service Reference Directory, Latest Edition. Quincy, MA: National Fire Protection Association.

Underwriters Laboratories Fire Protection Equipment Directory, Northbrook, IL: Underwriters Laboratories 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 25 hours are suggested to cover *Standpipes*. 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 and Standpipe Classification	
A. Introduction	_____
B. Standpipes	_____
C. Standpipe Classification	_____
D. Laboratory Have trainees practice identifying standpipe components from schematics. This laboratory corresponds to Performance Task 3.	_____
E. Standpipe System Types	_____
F. Standpipe Sizing	_____
G. Laboratory Have trainees practice identifying differences in valve sizes between Class I, II, and III standpipes. This laboratory corresponds to Performance Task 1.	_____

Sessions III and IV. Testing

A. Test Risers, Drains, and Main Drain Test Connections _____
B. Hydrostatic Tests _____
C. Flow Tests _____
D. Laboratory _____

Have trainees practice demonstrating flow test procedures. This laboratory corresponds to Performance Task 2.

E. Minimum Flow Capability _____

Session V. Standpipe Requirements

A. Standpipe Requirement Sources _____
B. Standpipe Requirements _____
C. Standpipe Installation _____

Session VI. Standpipe Appurtenances, Part One

A. Hose Racks _____
B. Cabinets _____
C. Laboratory _____

Have trainees practice pulling hoses out of cabinets and reassembling them. This laboratory corresponds to Performance Task 4.

D. Roof Manifold _____
E. Fire Department Connections _____

Sessions VII and VIII. Standpipe Appurtenances, Part Two

A. Valves _____
B. Laboratory _____

Have trainees practice identifying different types of valves. This laboratory corresponds to Performance Task 5.

C. Pressure-Reducing Valves _____
D. Laboratory _____

Have trainees practice adjusting a PRV. This laboratory corresponds to Performance Task 6.

Session IX. Sleeves, Clamps, Sway Bracing, and Link-Seal®

A. Sleeves _____
B. Clamps _____
C. Earthquake Protection _____
D. Link-Seal® _____

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 identifies the chemical and physical properties of water and covers the different water supplies available for automatic sprinkler systems. It describes the types of tanks, water main configurations, flow test procedures, system meters, fire department connections, and split pit requirements.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Core Curriculum*; *Sprinkler Fitting Level One*; *Sprinkler Fitting Level Two*; and *Sprinkler Fitting Level Three*, Modules 18301-07 and 18302-07.

Objectives

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

1. Recognize federal, state, and jurisdictional requirements for supply and disposal of fire sprinkler system water.
2. Identify different water supplies for automatic sprinkler systems.
3. Explain the three qualities that are critical to the water supply for fire sprinkler systems.
4. Identify types of water storage and explain their usage.
5. Describe different water main configurations.
6. Perform flow test procedures.
7. Plot residual and static pressure on a graph.
8. Read a flow test results sheet and determine the number of outlets flowed, hydrant outlet size, and static and residual pressure.
9. Fill out a flow test summary sheet.
10. Identify and describe backflow preventers and methods of installation.
11. Identify and describe meters used in fire sprinkler systems.

Performance Tasks

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

1. Perform flow test procedures.
2. Plot residual and static pressure on a graph.
3. Read a flow test results sheet and determine the number of outlets flowed, hydrant outlet size, and static and residual pressure.
4. Fill out a flow test summary sheet.

Materials and Equipment

Multimedia projector and screen
Sprinkler Fitting Level Three PowerPoint® Presentation Slides (ISBN 978-0-13-272926-0)
Computer
Whiteboard/chalkboard
Markers/chalk
Pencils and scratch paper
Appropriate personal protective equipment
Basic trainee tools
Measuring tape
Calculator
Standpipe schematics
Hydrant wrenches
Tapped hydrant caps
Air chambers
Detector check valves
Backflow preventers
Check valve assembly

continued

Water supply maps
Fire department connections
Municipal water supply map
Flow test reports
Pitot tubes
Static/residual pressure gauges
Pitot tube pressure gauges
Hydrant diffusers
Disc-type meter
Compound meter
Turbine meter
Quick Quizzes*
Module Examinations**
Performance Profile Sheets**

* Located in 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. This module may require that 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 sprinkler systems. 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.

Automatic Fire Sprinkler Handbook, Latest Edition. Quincy, MA: National Fire Protection Association.

Manual M-14, Latest Edition. Denver, CO: American Water Works Association.

NFPA 13, Latest Edition. Quincy, MA: National Fire Protection Association.

NFPA 22, Standard for Water Tanks for Private Fire Protection, Latest Edition. Quincy, MA: National Fire Protection Association.

Recommended Practice for Backflow Prevention and Cross-Connection Control, Latest Edition. Norwood, MA: FM Global Engineering & Research.

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 *Water Supplies*. 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 to Water Supplies	
A. Introduction	_____
B. Water Chemistry	_____
C. Water Supplies	_____
D. Tank Types	_____
E. Infrastructure	_____

Sessions III and IV. Testing

A. Measuring Water Supply Capability _____

B. Flow Tests _____

C. Laboratory _____

Have trainees practice performing flow test procedures. This laboratory corresponds to Performance Task 1.

D. Plotting Information _____

E. Laboratory _____

Have trainees practice plotting residual and static pressure on a graph. This laboratory corresponds to Performance Task 2.

F. Laboratory _____

Have trainees practice reading a flow test results sheet, determining the number of outlets flowed, hydrant outlet size, and static and residual pressure. This laboratory corresponds to Performance Task 3.

G. Laboratory _____

Have trainees practice filling out a flow test summary sheet. This laboratory corresponds to Performance Task 4.

Session V. Water Supply Appurtenances

A. Water Purveyor _____

B. Meters _____

C. Detector Check Valves _____

D. Backflow Preventers _____

E. Fire Department Connections _____

F. Pits _____

Session VI. 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.

Fire Pumps
Annotated Instructor's Guide

Module 18304-07

Module Overview

This module identifies and explains various fire pump systems, pumps, and drivers, controllers, and sensing lines. It describes supervision and project requirement checklists. Testing, maintenance, and troubleshooting are discussed, as well as inspection and maintenance in existing pump rooms and frequently encountered problems.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Core Curriculum*; *Sprinkler Fitting Level One*; *Sprinkler Fitting Level Two*; and *Sprinkler Fitting Level Three*, Modules 18301-07 through 18303-07.

Objectives

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

1. Explain the basic components and types that make up a fire pump system.
2. Identify the NFPA standard that covers the installation of fire pumps.
3. Explain the minimum residual pressure in pounds per square inch (psi) that can be used when pumping from a municipal water supply.
4. Convert pressure ratings from psi to feet of head and vice versa.
5. Explain how to set and align a pump.
6. Discuss the different types of and requirements for fire pump controllers.
7. Discuss monitoring requirements for fire pumps.
8. Describe acceptance testing of fire pumps.
9. Perform a mechanical check of a fire pump system.
10. Measure the flow of a system.
11. Identify potential causes for a malfunctioning fire pump.

Performance Tasks

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

1. Identify different fire pump elements such as pumps, drivers, strainers, pump controllers, bypasses, test headers, and flow meters.
2. Identify potential causes for a malfunctioning fire pump.
3. Perform a mechanical check of a fire pump system.
4. Measure the flow of a system.
5. Troubleshoot the cause and give corrective action for a malfunctioning fire pump.

Materials and Equipment

Multimedia projector and screen
Sprinkler Fitting Level Three PowerPoint® Presentation Slides (ISBN 978-0-13-272926-0)
Computer
Whiteboard/chalkboard
Markers/chalk
Pencils and scratch paper
Appropriate personal protective equipment
Basic trainee tools
Measuring tape
Calculator
Standpipe schematics
Hydrant wrenches
Alignment tools
Pumps
Drivers
Meters
Nozzles
Mercoid switches
Controllers

continued

NFPA 20
Flow meters
Jockey pumps
Eccentric suction reducers
Concentric discharge increasers
Pump casing relief valves
Automatic air release valves
Relief valves
String and weight or other centrifugal device
Centrifugal pump and rotor
Horizontal split-case pump
Vertical in-line pumps
Vertical turbine pumps
Electric driver
Pump performance curves
Civil checklists
Mechanical and electrical checklists
Operating and maintenance manuals
Various types of flow meters
Quick Quizzes*
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 trainees are equipped with appropriate personal protective equipment and know how to use it properly. This module may require that 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 fire pumps. 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.

NFPA 13, Latest Edition. Quincy, MA: National Fire Protection Association.
NFPA 13D, Latest Edition. Quincy, MA: National Fire Protection Association.
NFPA 20, Latest Edition. Quincy, MA: National Fire Protection Association.
NFPA 70, Latest Edition. Quincy, MA: National Fire Protection Association.

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 40 hours are suggested to cover *Fire Pumps*. 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 to Fire Pump Systems	
A. Introduction	_____
B. Fire Pump Categories and System Functions	_____
C. Rated Enclosure	_____
D. Fire Pump System Elements	_____
E. Fire Pump Performance Requirements	_____
F. Fire Pump Alignment	_____

Sessions III through V. Pumps and Drivers

A. Centrifugal Pumps _____
B. Pump Types _____
C. Driver History _____
D. Driver Types (Electric, Gas, Diesel, Steam) _____
E. Laboratory _____

Have trainees practice identifying different fire pump elements. This laboratory corresponds to Performance Task 1.

F. Pump Performance Curves _____

Sessions VI and VII. Controllers, Sensing Lines, and Supervision

A. Controller Functions _____
B. Cabinet Styles _____
C. Controllers _____
D. Starting Mechanisms _____
E. Transfer Switches _____
F. Sensing Controls _____
G. Supervision _____

Session VIII. Project Checklists, Installation, and Startup

A. Civil Checklist _____
B. Mechanical and Electrical Checklists _____
C. Environmental Issues _____
D. Introduction to Pump Room Equipment _____

Sessions IX and X. Installation and Testing

A. The Test Header _____
B. Flow Meters _____
C. Pre-Startup Procedures _____
D. Electric Fire Pump Checklist _____
E. Laboratory _____

Have trainees practice measuring the flow of a system. This laboratory corresponds to Performance Task 4.

F. Diesel Fire Pump Installation Checklist _____
G. Laboratory _____

Have trainees practice performing a mechanical check of a fire pump system. This laboratory corresponds to Performance Task 3.

Sessions XI and XII. Periodic Maintenance and Troubleshooting

A. Weekly Test Procedures _____
B. Six-Month Preventive Maintenance _____
C. Troubleshooting _____
D. Laboratory _____

Have trainees practice troubleshooting a system. This laboratory corresponds to Performance Task 5.

Sessions XIII through XV. Existing Pump Rooms

A. Inspection of Existing Pump Rooms _____
B. Frequently Encountered Problems _____
C. Laboratory _____

Have trainees practice identifying potential causes for a malfunctioning fire pump. This laboratory corresponds to Performance Task 2.

Session XVI. 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.

Application-Specific Sprinklers and Nozzles Annotated Instructor's Guide

Module 18305-07

Module Overview

This module introduces special sprinklers and nozzles. It covers various types of sprinklers and nozzles and the area of coverage, positioning, and obstruction requirements.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed the *Core Curriculum*; *Sprinkler Fitting Level One; Sprinkler Fitting Level Two*; and *Sprinkler Fitting Level Three*, Modules 18301-07 through 18304-07.

Objectives

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

1. Identify, describe, and explain application-specific sprinklers.
2. Explain areas of coverage, positioning, and obstruction requirements.
3. Select correct types of sprinklers based on occupancy and obstruction requirements.
4. Select proper escutcheon for recess sprinklers.
5. Identify and explain nozzles.
6. Describe different types of nozzles.
7. Size and install dry sprinklers.
8. Size and install an attic sprinkler.

Performance Tasks

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

1. Select correct types of sprinklers based on occupancy and obstruction requirements.
2. Select the proper escutcheon for recess sprinklers.
3. Size and install dry sprinklers.
4. Install an attic sprinkler on a swing joist so as to align with the pitch of the roof.

Materials and Equipment

Multimedia projector and screen
Sprinkler Fitting Level Three PowerPoint® Presentation Slides (ISBN 978-0-13-272926-0)
Computer
Whiteboard/chalkboard
Markers/chalk
Pencils and scratch paper
Appropriate personal protective equipment
Basic trainee tools
Measuring tape
Calculator
Extended coverage upright and pendent sprinklers
Extended coverage sidewall sprinklers
Residential sprinklers and manufacturers' literature
Control mode specific application (CMSA) sprinklers
Early suppression fast response (ESFR) sprinklers
Intermediate level sprinklers
Dry sprinklers
Hangers and supports
Pipe
Tools and supplies for installing sprinklers
Institutional sprinklers
On-off sprinklers
Attic sprinklers
Combustible concealed space sprinklers
Nozzles
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 trainees are equipped with appropriate personal protective equipment and know how to use it properly. This module may require that 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 sprinkler systems. 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.

Automatic Sprinkler Handbook, Latest Edition. Quincy, MA: National Fire Protection Association.

A Reference Guide to Automatic Sprinklers, Latest Edition. Dallas, TX: American Fire Sprinkler Association.

FM Global Approval Guide, Latest Edition. Norwood, MA: FM Global.

NFPA 13, Latest Edition. Quincy, MA: National Fire Protection Association.

NFPA 13R, Latest Edition. Quincy, MA: National Fire Protection Association.

NFPA 15, Latest Edition. Quincy, MA: National Fire Protection Association.

NFPA 16, Latest Edition. Quincy, MA: National Fire Protection Association.

NFPA 214, Latest Edition. Quincy, MA: National Fire Protection Association.

Underwriters Laboratories Fire Protection Equipment Directory, Latest Edition. Northbrook, IL: Underwriters Laboratories 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 27½ hours are suggested to cover *Application-Specific Sprinklers and Nozzles*. 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 through IV. Introduction; Special Sprinklers	
A. Introduction	_____
B. Extended Coverage Upright and Pendent Sprinklers	_____
C. Extended Coverage Sidewall Sprinklers	_____
D. Residential Sprinklers	_____
E. CMSA Sprinklers	_____
F. Early Suppression Fast Response Sprinklers	_____
G. Intermediate Level Sprinklers	_____
H. Laboratory Have trainees practice selecting the correct type of sprinklers based on occupancy and obstruction requirements. This laboratory corresponds to Performance Task 1.	_____
I. Laboratory Have trainees practice selecting proper escutcheon for recess sprinklers. This laboratory corresponds Performance Task 2.	_____

Sessions V and VI. Dry and Institutional Sprinklers

A. Dry Sprinklers _____

B. Dry Sprinklers in Freezers _____

C. Laboratory _____

Have trainees practice sizing and installing dry sprinklers. This laboratory corresponds to Performance Task 3.

D. Institutional Sprinklers _____

Sessions VII through IX. Periodic Maintenance and Troubleshooting

A. On-Off Sprinklers _____

B. Special Sprinklers _____

C. Attic Sprinklers _____

D. Laboratory _____

Have trainees practice installing an attic sprinkler. This laboratory corresponds to Performance Task 4.

Session X. Nozzles and Coatings

A. Nozzles _____

B. Corrosion-Resistant Coatings _____

Session XI. 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.