



Special Hazards Systems

Level I Certification Content Outline Standard Model Program with Computer-Based Testing

The candidate for NICET certification as a Level I Special Hazards Systems technician should have the knowledge and experience to:

Under direct supervision, identify wiring and devices and their purposes; read and measure quantities; read drawings; and mount and remove devices and piping.

Note: For each exam, the skills and knowledge listed under each task are suggestive of those involved in that task, but are not intended to constitute an exhaustive listing.

1.1 Inspection, Testing, and Maintenance Tasks

(Approximately 43-49% of the exam)

1.1.1 Identify system type and components.

Knowledge:

Special hazards drawing symbols in NFPA 170
Special hazard system component characteristics and functions
System types and components as defined in the "Definitions" sections of NFPA 11, 12, 12A, 13, 16, 17, 17A, 68, 69, 79, 70, 72, 750, 2001, 2010.
Names and classifications of common extinguishing agents

Skills:

Visually identify system types and components.
Interpret drawings to identify system components.

1.1.2 Check the locations of an existing system's detection, control, and mechanical components for changes.

Knowledge:

Fire protection symbols in NFPA 170

Skills:

Interpret as-built drawings.
Compare current device layout to the layout in the record drawings.
Document discrepancies in field report and on the record drawings.

1.1.3 Visually inspect a site's construction features for changes.

Knowledge:

General architectural symbols
General drafting methods
Ability of construction changes to affect the protected area's square footage and volume

Skills:

Interpret as-built drawings.
Use a drawing legend to identify symbols.
Compare existing area conditions to previous drawings to identify discrepancies.
Check for holes in walls or ceilings.
Redline as-built drawings, and report changes to design department.

1.1.4 Activate alarm initiating devices of a special hazard system.

Knowledge:

Initiating device types, their characteristics, and their functions
Water-based system switches, their characteristics, and their functions

Skills:

Apply testing material to activate smoke alarm.
Use heat source to activate heat detector.
Apply IR, UV/IR light source to activate flame detector.
Activate water-based system switches.
Activate initiation devices according to manufacturer instructions.
Reset activated initiating devices according to manufacturer instructions.
Verify activation of notification devices.
Confirm device's operation to the lead technician.
Document results.

1.1.5 Determine whether container's agent quantity and/or pressure is within the documented range.

Knowledge:

Accepted methods for determining agent quantities

Skills:

Follow proper procedures for measuring agent quantities.
Properly use listed measuring devices.
Read pressure gauge.
Use thermometer to measure ambient temperature.
Determine current agent quantity.
Document quantities on system inspection form and on system container.

**1.1.6 Inspect cylinders and their discharge hoses for corrosion, physical damage, and hydrotest status.****Knowledge:**

Symptoms of corrosion or physical damage

Skills:

Recognize corrosion in accordance with Compressed Gas Association (CGA) pamphlet C-6.

Recognize physical damage (dents, bulges, pits) in accordance with Compressed Gas Association (CGA) pamphlet C-6.

Document relevant information about the cylinder and its conditions.

Recognize site's numbering/labeling scheme for cylinders.

1.1.7 Visually inspect piping and hangers for physical damage.**Knowledge:**

Conditions that cause corrosion or physical damage
Piping and hanger types, their purpose, and their physical characteristics

Skills:

Recognize corrosion.

Recognize physical damage.

Recognize obstructions to nozzles.

Determine whether other building services are using special hazard system piping for support.

Document inspection results.

1.2 Repair and Recharge Tasks

(Approximately 6-12% of the exam)

1.2.1 Replace damaged wires.**Knowledge:**

Proper methods for connecting wires

Proper methods for pulling wires

Wire gauge classifications and their impact on circuit operation

Skills:

Use a multimeter to test for shorts and opens in replaced wire.

Verify that the wire is not energized.

Use the appropriate tools to pull and connect wire.

1.2.2 Replace damaged mechanical system components.**Knowledge:**

Names, functions, and visual appearances of mechanical components and fasteners

Procedures for connecting mechanical components

Fastener types and their applications

Fitting types and classes and their applications

Pipe types and schedules

Skills:

Use manufacturers' recommendations and guidelines to identify component replacements.

Use hand and power tools to measure, remove, insert, and connect components.

Identify and correctly attach appropriate mechanical fasteners for the application.

1.3 Installation Tasks

(Approximately 22-28% of the exam)

1.3.1 Obtain installation information from shop drawings.**Knowledge:**

Basic measurement units and conversions

Terminology used to describe components and systems in special hazard system specifications

Arithmetic

Basic geometry

Drawing scale, wiring legend, and other drawing components and their purposes

Types of drawings and their purposes

Skills:

Use system plans to determine the correct mounting location and arrangement of special hazard system components.

Use a legend to interpret a shop drawing.

Read and understand installation notes and diagrams.

Read and interpret shop drawings to determine installation requirements.

1.3.2 Install raceways and conduit.**Knowledge:**

Conduit types and their characteristics

Skills:

Use system plans to determine the location and routing of raceways and conduit.

Coordinate with other trades.

Use NFPA 70 Annex C to determine how many conductors may be placed within a conduit.

Use NFPA 70 314.16 to select proper junction box size based on number of conductors.

Install supports for raceways and conduit.

Use a conduit bender and/or threading machine.

Use hand and power tools to cut, thread, bend, and install conduit.



1.3.3 Install piping for a special hazard system.

Knowledge:

Fastener types and their physical characteristics
Fitting types and their physical characteristics
Pipe bracing system types
Pipe types and materials and their characteristics related to installation
Weights, forces, bracing involved in restraining discharge/distribution piping

Skills:

Use hand and power tools to install piping.
Use mechanical components to install discharge piping systems.
Apply fittings to piping.
Apply joining techniques to piping.
Apply pipe joint dressing.
Identify pipe type and schedule, and ensure that it complies with the drawing notes.
Create redline drawings.
Read and interpret isometric drawings.
Recognize physical obstructions that make a part of the planned pipe routing difficult or impossible.

1.3.4 Install air sampling piping.

Knowledge:

Pipe hanger types and their characteristics
Pipe hanger fasteners and fittings and their characteristics
Pipe types and materials and their characteristics related to installation

Skills:

Install piping according to the installation documents
Read and interpret system drawings.
Read and interpret isometric drawings.
Use a pipe cutter, drills, and hand tools to install air sample piping.
Create redline drawings.
Connect pipe to high-sensitivity smoke detector (HSSD) detector inlet.
Obtain piping limitations from system drawings and manufacturer specifications.
Recognize site conditions that require a change to the drawings and/or design.

1.3.5 Mount special hazard system components.

Knowledge:

Suppression system components and their physical characteristics
Bracing systems and their physical characteristics
Wall, ceiling, and floor construction and their weight-bearing capacities

Skills:

Use hand and power tools to mount components.
Interpret plans to determine component locations.
Select the appropriate fasteners for mounting components on various types of wall, ceiling, or floor construction.
Install bracing reinforcements.
Mount components in accordance with manufacturers' recommendations.

1.4 System Design and Configuration Tasks

(Approximately 11-17% of the exam)

1.4.1 Derive installation information from architectural and engineering plans and specifications.

Knowledge:

Common architectural graphic standards
Basic units of measurement and metric conversions
Terminology used to describe components and systems in special hazard system specifications
Basic mathematics and geometry
Specification sections related to special hazards and related work
Drawing scale, wiring legend and other drawing components and their purpose
Types of drawings (floorplan, riser, elevation, wiring diagrams, schematics, etc.) and their purpose

Skills:

Use NFPA 170 to interpret fire protection symbols.
Read and interpret system drawings, plans, and specifications to determine dimensions, types of materials, elevations, locations, and other information pertaining to the design of a special hazard suppression system.
Perform area and volume calculations based on scaled dimensional data presented on plans and specifications or data obtained from site surveys.
Identify points on the job site from information in the plans.

1.4.2 Identify basic electrical units and components.

Knowledge:

Basic electrical units Ohm's Law formula variables and their relationship to each other
Functions of basic electronic components Circuit types

Skills:

Identify basic electronic components on a circuit schematic.
Identify how either a steady voltage or current, or a changing voltage or current, in a simple series circuit would be affected by the presence of a single basic electronic component.
Identify how either a steady voltage or current, or a changing voltage or current, in a simple parallel circuit would be affected by the presence of a single basic electronic component.



1.4.3 Identify the purposes of standards, codes, specifications, and manufacturer-specific listings and what professions or roles are involved in establishing and enforcing their use.

Knowledge:

Purposes of standards, codes, product and project specifications, and listings
Roles of the AHJ, the owner, and the project engineer

Skills:

Retrieve the correct standard(s) for a particular agent or hazard.
Identify the authorities who require the application of standards, codes, specifications, and listings.
Interpret terminology and statements found in standards, project specifications, and manufacturers' literature.

1.5 Work Management Tasks

No tasks at this Level.

1.6 Safety Tasks

(Approximately 11-17% of the exam)

1.6.1 Practice personal safety on the job site.

Knowledge:

OSHA workplace safety regulations
Safety practices for handling and transporting cylinders according to OSHA 49 CFR Part 177.840
Safety requirements for hearing protection according to 29 CFR Part 1910.95
PPE requirements according to 29 CFR Part 1910.132
Safe scaffold usage according to 29 CFR Part 1926.453
Terminology associated with toxic and hazardous substances in OSHA 29 CFR Part 1910.1200
Safety guidelines for exposure to blood-borne pathogens according to 29 CFR Part 1910.1030
Safety requirements for using ladders, scissor lifts, and boom lifts per OSHA
PPE and their purposes
Basic first aid procedures
Purpose of MSDS

Skills:

Interpret cylinder placard information according to OSHA and DOT guidelines.
Safely use step ladders, scissor and boom lifts, and fall protection.
Safely use electrically and pneumatically powered tools.
Identify and report site hazards.
Recognize confined spaces as defined by OSHA.
Apply basic first aid.
Locate, read, and interpret MSDS.