Water-Based (formerly Automatic Sprinkler) Systems Layout

Level II Content Outline Standard Model/CBT

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.

2.1 Safety

Questions related to this task make up 2 - 5% of the exam.

2.1.1 Locate information in Materials Data Safety Sheets (MSDS).

Knowledge:
Purpose and parts of MSDS

Skills:
Read and interpret MSDS.
Identify critical parts of MSDS.
Recognize situations requiring MSDS information and take appropriate action.
Locate the MSDS documents on a job site.

2.2 Contract Documents

Questions related to this task make up 4 - 7% of the exam.

2.2.1 Apply plans and specifications.

Knowledge:
Types of plans and specifications (e.g. mechanical, architectural, electrical) and their relevance to sprinkler system layout requirements

Skills:
Cross-reference various applicable sections of specs.
Identify specified/planned building features that will impact sprinkler system layout.

2.3 Research

No tasks at this level

2.4 Survey Existing Conditions

Questions related to these tasks make up 10 - 12% of the exam.

2.4.1 Verify and update plans for the project site.

Knowledge:
Purposes and contents of construction plans and documents

Skills:
Survey the project site for existing conditions and structures.
Identify and note differences between the plans and the actual structures and conditions on the site.
Transfer information to drawings.

2.4.2 Verify and update documentation on the existing fire protection system on the project site.

Knowledge:
Purposes and contents of fire protection system plans and documents

Skills:
Identify and detail existing fire protection systems.
Transfer information to drawings.

2.4.3 Survey building components that could impact a sprinkler system layout.

Knowledge:
NFPA 13

Skills:
Identify and note relevant building construction components (e.g. joists, decking, walls, fire areas, etc.).
Identify obstructions and construction features as applicable to the fire protection system.

2.5 Codes and Standards

Questions related to this task make up 5 - 8% of the exam.

2.5.1 Recognize relationships among codes and standards.

Knowledge:
NFPA 13, 13R, 13D, 101
IBC, IRC
Hierarchy of codes and standards

Skills:
Recognize the functions of, and hierarchy among, applicable codes, building codes, and standards.

2.6 System Layout

Questions related to these tasks make up 68 - 71% of the exam.

2.6.1 Apply basic system types.

Knowledge:
NFPA 13

Skills:
Properly apply the four basic types of water-based systems.
Identify benefits and limitations of each of the four basic types of systems.

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2.6.2 Apply hazards and occupancies to basic system layout.

Knowledge:
NFPA 13

Skills:
Apply hazard classifications to a basic system layout.
Identify the differences between various commodity classifications for storage occupancies.

2.6.3 Identify the impact of construction types on the selection and layout of sprinklers.

Knowledge:
NFPA 13

Skills:
Recognize types of combustible construction requiring protection.
Properly match sprinkler system applications to different types of construction.
Identify unobstructed and obstructed construction.

2.6.4 Apply sprinklers to spaces that include various basic building features.

Knowledge:
NFPA 13, 13R, 13D

Skills:
Recognize the impact of basic building features on system layout.
Identify special building features (e.g. concealed spaces, obstructions, unusual ceilings, irregular walls, etc.).

2.6.5 Incorporate water supply in a basic system layout.

Knowledge:
NFPA 13, 13R, 13D

Skills:
Utilize different types of water supplies and distribution systems, their features and devices in a system layout.
Perform a flow test.
Gather water supply data, including local municipalities' restrictions, etc.
Select components and layout a 13D tank and pump system.

2.6.6 Lay out standpipe systems.

Knowledge:
NFPA 13, 14

Skills:
Identify various types of standpipe systems, their features, and applications.
Properly lay out the components of a standpipe system.

2.6.7 Lay out fire pump systems.

Knowledge:
NFPA 20

Skills:
Identify various types of fire pumps, their features, and applications.
Properly lay out the components of a fire pump system.
Properly size a fire pump for a 13R system.

2.6.8 Lay out basic sprinkler systems.

Knowledge:
NFPA 13, 13R, 13D
Roles of other trades

Skills:
Read and interpret definitions in NFPA 13+.
Select appropriate sprinkler system features and devices, and apply them to a system layout, including residential systems.
Identify the characteristics and restrictions of various types of sprinklers.
Identify the characteristics and restrictions of various types of pipes and tubes.
Apply obstruction rules.
Recognize appropriate locations for sprinklers.
Apply basic rules for omission of sprinklers.
Coordinate with other trades.
Select appropriate piping size and material.
Route the pipe for connecting the sprinklers.

2.6.9 Perform basic hydraulic calculations.

Knowledge:
NFPA 13, 13D, 13R, 20
Elements of basic hydraulics
Hydraulic formulas (e.g. Hazen-Williams, pressure loss or gain through elevation, pressure flow from orifice, equivalent length of fittings and valves)

Skills:
Read and interpret manufacturers' technical bulletins.
Determine whether the water supply is sufficient to meet the demand.
Manually perform basic hydraulic calculations for a tree sprinkler system.
Manually perform basic hydraulic calculations for a standpipe system.
Determine the hydraulic remote area as defined by NFPA 13,13R, and 13D, including adjustments.
Properly apply churn pressures, pressure limitations, and pump curves.
Calculate hydraulic equivalent pipe length for fittings and valves.

2.6.10 Apply system features required for inspection, testing, and maintenance.

Knowledge:
NFPA 13, 25

Skills:
Incorporate advanced (e.g. backflow, drain risers, relief valve, etc.) inspection, testing, and maintenance device requirements into a system layout.

2.6.11 Incorporate basic fire stopping requirements in a system layout.

Knowledge:
IBC
Sources of fire ratings (UL directories, data sheets, etc.)

Skills:
Identify manufacturers' recommendations.
Identify and apply simple fire stopping requirements including appropriate details.

2.6.12 Confirm that plans and layout are ready for review.

Knowledge:
NFPA 13

Skills:
Complete a layout checklist.

2.6.13 Determine the location and sizing of hangers, bracings, and restraints.

Knowledge:
NFPA 13

Skills:
Research manufacturers' listing data.
Apply NFPA requirements for basic hangers, bracings, and restraints.
Select hangers, bracings, and restraints for a routine system layout.
Size trapeze hangers.

2.6.14 Prepare a materials and fabrication stocklist.

Knowledge:
Fabrication terminology and processes

Skills:
Review project specific submittal data.
Prepare a stocklist for a basic system.
Determine cut pipe length required for a fabrication list.

2.7 Submittal and Approval Process

Questions related to this task make up 1 - 4% of the exam.

2.7.1 Prepare a submittal package.

Knowledge:
Purposes and contents of various contract documents
Purposes and contents of various types of project specific materials

Skills:
Identify the project specific materials required to support the submittal.
Determine AHJ requirements for a submittal package.
Prepare a complete submittal package.

2.8 Project Management

Questions related to these tasks make up 3 - 6% of the exam.

2.8.1 Prepare closeout documents.

Knowledge:
NFPA 13, 13R, 14, 20
Purposes and contents of various types of project specific materials
Test certificates (above-ground, underground) for various types of systems

Skills:
Determine AHJ requirements for closeout documentation.
Prepare a complete closeout package.
Prepare the record drawings.

2.8.2 Follow a project schedule.

Knowledge:
Purpose and structure of a Gantt chart

Skills:
Read and interpret a Gantt chart.
Read and interpret a construction schedule related to water-based fire protection systems installation and testing.
Use a project schedule to plan your related activities.