



Fire Alarm Systems Certification

Level II Content Outline

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 Submittal Preparation and Layout Tasks

Questions related to these tasks make up 15 - 20% of the exam.

2.1.1 Verify the occupancy classification and the requirements of applicable codes and standards for specified premises.

Knowledge:

- IBC, IFC, and IRC
- NFPA 1 and 101

Skills:

- Read and interpret commonly referenced code requirements.
- Identify code requirements that apply to specified occupancies.
- Verify that general site conditions are consistent with occupancy classifications designated by others.
- Communicate findings to project supervisor.

2.1.2 Assemble project information for shop drawings.

Knowledge:

- Elements of a shop drawing
- Types of information found on fire protection, architectural, mechanical, electrical, structural, and site plans
- Types of performance information found in contractual documents, including cutting and patching, site access, parking and test requirements, etc.
- Types of information found in project specifications

Skills:

- Read and interpret project specifications.
- Determine the scope of the project.
- Read and interpret drawings with basic information about the facility, the proposed fire alarm system, and other building systems.
- Derive facility and building system information from architectural, mechanical, electrical, structural, and site plans.

2.1.3 Task Deleted

2.1.4 Survey site conditions to verify that they support the requirements of the fire alarm system design and layout.

Knowledge:

- IBC, IFC, IRC, and NFPA 101
- NFPA 70 and 72
- Building features and construction materials
- Basic terminology of codes and standards
- Building construction and design (e.g. risers, electrical closets, etc.)

Skills:

- Measure lengths, heights, and ceiling pitch.
- Verify floor plans and collect information about building features, dimensions, and materials as relevant to a fire alarm system project.
- Verify that room identification and apparent use is consistent with floor plans.
- Record building features and details that must be considered in designing and installing a system to meet applicable standards.
- Inspect installation sites and study work orders, building plans, and installation manuals in order to determine materials requirements and installation procedures.

2.1.5 Draft simple shop drawings.

Knowledge:

- IBC, IFC, IRC, and NFPA 1 and 101
- NFPA 70, 72, 170, and applications of other NFPA standards
- Types of information found on architectural, fire protection, mechanical, electrical, structural, site plans, and related design drawings
- Types of information found in project specifications
- Use of architectural scales in preparation and reading of drawings
- Types of information presented in a shop drawing

Skills:

- Use computerized drafting tools.
- Draft a correctly oriented, scaled, lined, and dimensioned layout drawing with correct symbols, legend, and title block.
- Prepare basic fire alarm systems layouts in accordance with standards.
- Calculate the number and spacing of fire detection devices and notification appliances required for a given space.
- Prepare materials lists from project specifications.
- Deliver prepared drawings to supervisor for approval.

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2.1.6 Determine power supply and loading requirements for fire alarm systems.

Knowledge:

- NFPA 70 and 72
- Basic electrical circuits
- Basic mathematics
- Types of information found in project specifications

Skills:

- Determine the requirements of NFPA 72 for primary and secondary power for various types of fire alarm systems.
- Read and interpret manufacturers' published instructions.
- Read and interpret electrical plans and related design drawings
- Perform battery standby calculations.
- Perform voltage drop calculations.
- Perform circuit loading calculations.
- Confirm that power supply for the proposed layout and any related existing conditions comply with codes, standards, project specifications, and manufacturers' requirements.
- Determine the minimum wire size and maximum distance for the application.

2.1.7 Identify applicable codes, standards, and listings.

Knowledge:

- Purposes and applications of the IBC, IFC, and IRC, and NFPA 1, 70, 72, 101, and 170
- Roles of authorities having jurisdiction and industry professions in enforcing codes and standards
- Purposes and applications of NRTLs (Nationally Recognized Testing Laboratories) and associated standards
- Methods for review and testing of fire alarm signaling equipment

Skills:

- Identify the common codes and standards that address specific project activities or scopes of work.
- Identify and interpret the principles and requirements of standards for system alarm initiating devices, system control functions, and fire suppression systems.
- Identify requirements and listings for various system components.

2.2 Installation Tasks

Questions related to these tasks make up 44 - 49% of the exam.

2.2.1 Read fire alarm and other building system plans.

Knowledge:

- Construction symbols and terminology
- Elements of shop drawings
- Information contained in architectural, fire protection, mechanical, electrical, and structural site plans, and related design drawings and specifications

Skills:

- Review various plans (fire alarm and other trades) that may impact the fire alarm system installation to identify any changes, modifications, special conditions, or requirements that affect the project.
- Recognize the full scope of work at the site, and its impact on the fire alarm project.
- Identify all types of new and existing fire alarm equipment and initiating devices shown on plans.
- Identify the equipment installed by construction industry trades, such as architectural, mechanical, electrical, and structural, and its impact on fire alarm system installation.
- Determine the locations of structural obstructions and mechanical systems shown on plans.

2.2.2 Develop an installation plan based upon field conditions and project requirements.

Knowledge:

- NFPA 70 and 72
- Names, functions, and requirements of the types of fire alarm systems (including cabling requirements, initiating devices, control functions, alarm notification appliances, type of power required, signaling services, and automatic detectors in use)
- Names and functions of the types of fire alarm signaling systems
- Types of mounting devices and fasteners, and their applications
- Structure and types of information in shop drawings
- Structure and types of information in the project schedule

Skills:

- Coordinate contracted work with the project manager.
- Coordinate labor requirements with the project supervisor.
- Identify critical project milestones with the project supervisor.
- Communicate changed site conditions to the project supervisor.
- Use standard plans and specifications of jobs to identify dimensions, type of materials, elevations, and locations.
- Plan the installation requirements for manual fire alarm boxes, automatic fire detection devices, audible signaling appliances, visible signaling appliances, control components, and annunciators.
- Plan the installation requirements for terminations at the control panel for electrical, initiation, and NAC circuits, and for supervising station communication pathways in order to connect components.
- Communicate the project plan to the project supervisor.

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2.2.3 Accept delivery of materials.

Knowledge:

- Basic logistics terminology
- Documents used in the delivery, acceptance, and storage of materials

Skills:

- Coordinate delivery schedule and storage requirements with other trades or projects.
- Determine where, and how urgently, the materials are needed.
- Confirm the delivery of materials and record them as inventory.
- Coordinate the storage of delivered materials on-site and off-site.
- Follow established procedures from order placement to installation of equipment.
- Communicate with supervisor relative to project needs.

2.2.4 Install fire alarm systems.

Knowledge:

- NFPA 70 and 72
- Types of fire alarm systems (including electrical requirements, initiating devices, control functions, alarm indicating appliance, power requirements, signaling services, and automatic detectors in use)
- Names, functions, and requirements of the types of fire alarm systems (including cabling requirements, initiating devices, control functions, alarm notification appliance, type of power required, signaling services, and automatic detectors in use)
- Names and functions of the types of fire alarm signaling systems
- Types of mounting devices and fasteners, and their applications
- Listing requirements and limitations
- Information obtained from contract documents
- Information obtained from the project schedule

Skills:

- Coordinate installation requirements with the project supervisor.
- Read and interpret manufacturers' literature.
- Determine conduit, raceway, and conductor requirements in accordance with project specifications, installation documents, and standards.
- Connect fiber-optic cable.
- Verify the correct cable type, or substitution, for the application.
- Use standard plans and specifications of jobs to identify dimensions, type of materials, elevations, and locations.
- Oversee the mounting of devices and appropriate fasteners to mount control panels and other system components.
- Install manual fire alarm boxes, automatic fire detection devices, audible signaling appliances, visible signaling appliances, control components, and annunciators.
- Perform functional terminations at the control panel for electrical, initiation, and NAC circuits, and for telephone wiring in order to connect components.
- Use bar-code readers, dip switches, rotary switches, and configuration IR tools to address field devices.

2.2.5 Conduct a system start-up and diagnostics.

Knowledge:

- NFPA 72
- Roles of owner, authorities, other professions and stakeholders
- Operation and functions of various system components
- Required documentation

Skills:

- Read and interpret manufacturers' requirements.
- Read and interpret project specifications, drawings, and other contract documents.
- Read and interpret a sequence-of-operations matrix.
- Prepare a testing checklist and criteria.
- Read and follow manufacturers' specifications.
- Perform the tasks on the pre-power-up checklist.
- Use diagnostic tools, such as ohmmeters, VOMs, and manufacturers' software, to confirm power-up and operation of system components.
- Monitor functionality and response of fire alarm system components.
- Provide required notifications and documentation.
- Coordinate start-up requirements with project supervisor.

2.2.6 Use computer applications to program a system.

Knowledge:

- NFPA 72
- Fire Alarm System devices and their functions
- Basic programming concepts
- System manufacturer's programming certifications, where applicable
- Matrix of operation, project specifications and related project documents
- Site's environmental and operational conditions
- Requirements for acceptance testing and maintenance that may affect programming
- Computer/device connections, interfaces, and I/O port designations

Skills:

- Read and interpret manufacturers' software specifications and instructions.
- Interpret system drawings, specifications, and sequence-of-operations matrices.
- Use project specifications and AHJ (Authority Having Jurisdiction) communications to determine functional requirements, including sensitivity settings.
- Assign and document addresses of field devices.
- Coordinate programming, download, and Pre-Test requirements with project supervisor.
- Perform site-specific programming.
- Use programming tools to adjust the sensitivity of units.
- Coordinate proper operation of all interfaced equipment and building systems of other trades.
- Provide required programming documentation.



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2.2.7 Troubleshoot system problems.

Knowledge:

- NFPA 70
- NFPA 72
- Functions and operation of control and field devices
- Connection, operation, and application of basic test equipment

Skills:

- Determine the characteristics of specific field service components.
- Interpret system drawings, specifications, and sequence-of-operations matrices.
- Read and follow manufacturers' specifications and instructions for cleaning, inspecting, operating, testing, and adjusting the system and/or its components for continuing, maximum operability.
- Calculate equivalent resistances and voltage, current, and resistance in/across components or branches of series and parallel circuits.
- Operate the system's controls.
- Use diagnostic tools such as ohmmeters, VOMs and software.
- Select basic electrical and electronic tests; apply them at the correct points in the system to determine the cause of a system problem.
- Test equipment and circuits for expected operation and nominal electrical characteristics.
- Identify and correct fire alarm system troubles.

2.2.8 Task renumbered as 2.5.6

2.2.9 Perform system commissioning.

Knowledge:

- NFPA 72
- Roles of owner, stakeholders, authorities, and other professions
- Types of information found in manufacturer's literature
- Types of information found in project specifications, drawings, and other contract documents
- Operation and functions of various system components
- Required documentation
- Operation and application of testing devices and equipment

Skills:

- Implement established commissioning procedures.
- Read and interpret a sequence-of-operations matrix.
- Prepare a testing checklist and criteria.
- Read and follow manufacturers' specifications.
- Monitor functionality and response of fire alarm system components.
- Provide required notifications and documentation.
- Coordinate testing requirements with project supervisor.

2.2.10 Compile test completion data.

Knowledge:

- NFPA 72
- Roles of owner, authorities, and other stakeholders, and what test results should be communicated to them
- Types of system documentation and the types of information recorded in each

Skills:

- Provide content of test results in legible, industry format in accordance with fire codes, standards, and guidelines.
- Record test results in the appropriate document.
- Identify code deficiencies and inform the owner and AHJ in writing.
- Complete a Record of Completion form.
- Provide required documentation to the appropriate individuals at the appropriate time.

2.2.11 Create as-built documentation.

Knowledge:

- NFPA 72 requirements for as-built documentation
- Purpose and types of information included on fire alarm system as-built drawings
- Representation of information on fire alarm system as-built drawings

Skills:

- Determine variations of the installation that deviate from the layout or design drawings.
- Use correct symbols and techniques to represent the current state of the system.
- Mark up (redline) drawings on site.
- Prepare, compile, and distribute as-built documentation.
- Maintain accurate records on site.

2.2.12 Provide training to the customer/end user.

Knowledge:

- NFPA 72
- Types of documents and information that should be conveyed and explained to the end user

Skills:

- Identify the relevant design details that are applicable to the project.
- Determine the inspection, testing, maintenance, and records retention requirements for the system.
- Determine the training needs of the customer/end user, in accordance with the equipment manufacturer's specifications and the AHJ's requirements and procedures, including approval authorities, location of system components, and care and maintenance procedures.
- Develop and conduct a training course, using appropriate resources and communication formats.
- Post instructions for the fire alarm system.
- Document end user training.
- Communicate clearly and accurately, both verbally and in writing.



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2.2.13 Apply firestopping practices.

Knowledge:

- NFPA 72
- IBC
- Firestopping requirements, principles, and techniques for various applications such as fire doors, fire walls, partitions, etc. and for each penetration size and type

Skills:

- Read and interpret manufacturers' published and NRTL-listed installation instructions and testing procedures.
- Apply firestopping for all fire alarm related penetrations of fire rated construction.
- Provide required documentation of firestopping installation, including sign off and AHJ approval.
- Communicate about firestopping requirements with project supervisor.

2.2.14 Mitigate worksite safety hazards.

Knowledge:

- Typical safety practices derived from OSHA
- OSHA 1910.164 (Fire Detection Systems)
- OSHA 1910.165 (Employee Alarm Systems)
- Employ specific safety standards and requirements
- Classification of fires and fire extinguishers
- Appearance and meaning of a lockout device/tag
- Hazards associated with confined spaces

Skills:

- Identify potential hazards in the workplace.
- Identify safety features of equipment and verify that these are in place and the equipment is in good condition.
- Select appropriate personal protective equipment for specific tasks and worksite conditions, and verify that it is in good condition.
- Verify electrical safety at the project site.
- Prepare proper documentation.
- Communicate safety issues with project supervisor.

2.3 Maintenance Tasks

Questions related to these tasks make up 21 - 26% of the exam.

2.3.1 Follow applicable maintenance standards and procedures.

Knowledge:

- IFC
- NFPA 72
- Manufacturer's requirements
- Owner's site-specific operational procedures
- Procedures and test equipment associated with required maintenance testing of fire alarm systems, components, power supplies, and cables

Skills:

- Determine inspection, testing, and maintenance requirements stated in NFPA standards or in manufacturers' specifications.
- Verify current calibration of equipment.
- Operate specialized test equipment.
- Identify potential problems or failures and report them to the appropriate individual.
- Notify appropriate parties of impairments.
- Follow impairment procedures established by authorities, owner, and supervisor.
- Document inspection, testing, and maintenance activities and results, and communicate record retention requirements to document holders.

2.3.2 Troubleshoot and repair system faults.

Knowledge:

- NFPA 70 and 72
- Functions and operation of system components
- Actions or conditions required for correct operation of system components

Skills:

- Determine requirements and procedures for conducting tests per manufacturer's published instructions.
- Perform periodic equipment and circuit testing according to standards and/or manufacturer's specifications.
- Perform basic electrical and electronic tests for circuitry and component function.
- Operate the system's controls.
- Identify problems that arise in a fire alarm system.
- Determine the cause of the problem and take correct actions.
- Identify potential issues and refer to the appropriate person.



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2.3.3 Prepare, distribute, and maintain documentation.

Knowledge:

- NFPA 72 requirements for documentation
- Responsibilities of owners, contractors, authorities, and other professions for the preparation, distribution, and retention of documentation

Skills:

- Prepare technical reports.
- Communicate to the document holder the requirements for retention.
- Gather applicable job documentation.
- Communicate status of documents with supervisor.

2.4 Education and Communication Tasks

This exam does not contain questions based upon this domain.

2.4.1 Train and mentor Level I technicians.

Knowledge:

- Standard business practices
- Applicable codes and standards

Skills:

- Communicate standard business practices to subordinates.
- Convey the requirements of codes and standards to subordinates.

2.5 Management and Supervision Tasks

Questions related to these tasks make up 10 - 15% of the exam.

2.5.1 Provide on-site coordination for simultaneous installation activities.

Knowledge:

- Hierarchy of authority on the job site
- Reasons for performing certain installation tasks before others, and before or after work performed by other trades

Skills:

- Gather information about personnel and resource availability, worksite status, and progress of work.
- Prioritize and coordinate project tasks.
- Communicate with Level I technicians, the project supervisor, and the project manager.

2.5.2 Provide on-site coordination of available personnel to maintain established schedules.

Knowledge:

- Hierarchy of authority on a project
- Skills and qualifications needed for various fire alarm system installation tasks

Skills:

- Coordinate tasking with staff on-site.
- Communicate with on-site personnel.
- Communicate staffing needs to supervisor.
- Coordinate project timing and scheduling.

2.5.3 Coordinate the technical aspects of a job on-site.

Knowledge:

- Responsibilities of owners, contractors, authorities, and other professions for system plans and installation procedures.
- Computer terminology and basic operations.

Skills:

- Prepare basic technical reports.
- Operate a computer (navigate directories; download, install, and back-up software; prepare simple text documents and enter data into spreadsheets; and prepare email correspondence).
- Recognize technical issues in need of resolution.
- Communicate with supervisor(s) to resolve technical issues.
- Explain the scope of the fire alarm job and any other work being performed at the site.

2.5.4 Identify and report personnel issues.

Knowledge:

- Indicators of drug or alcohol abuse, lack of job qualifications, lack of initiative, unreliable attendance, insubordination, harassment, or interpersonal conflict

Skills:

- Identify on-site personnel issues.
- Recommend action to immediate supervisor.

2.5.5 Promote a safe work environment.

Knowledge:

- Typical safety practices derived from OSHA
- OSHA 1910.164 (Fire Detection Systems)
- OSHA 1910.165 (Employee Alarm Systems)
- Sources of MSDS and worksite safety information
- Work site hazards and their mitigation

Skills:

- Distinguish between safe and unsafe practices.
- Explain worksite safety requirements and practices to team members.
- Gather pertinent MSDS information and ensure that all OSHA regulations and site safety guidelines are adhered to.

2.5.6 Identify and report on-site problems or conflicts that impact the project schedule. (Formerly 2.2.8)

Knowledge:

- Roles and responsibilities of various contractors, professionals, and authorities on a typical job site
- Factors that can impact work progress

Skills:

- Establish communication with all project trades.
- Determine the impact that a change in some part of a fire alarm project's planning, permitting, resources, performance, or completion is likely to have on the project schedule.
- Determine the impact that a change in another contractor's work plans or work product is likely to have on a fire alarm project schedule.
- Determine the individual who can resolve the problem and/or the individual to whom the problem should be reported.