



# Fire Alarm Systems

## Level IV 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.*

### 4.1 Submittal Preparation and Layout Tasks

*Questions related to this task make up 23 - 28% of the exam.*

#### 4.1.1 Determine the project occupancy and requirements.

**Knowledge:**

NFPA 101

IBC

Roles of various stakeholders

AIA A201

Construction Specifications Institute (CSI)

MasterFormat®

**Skills:**

Determine the codes and standards applicable to a project.

Correctly interpret applicable codes and standards.

Identify the correct stakeholders for consultation in developing aspects of the fire protection requirements.

Analyze and interpret the project documents.

#### 4.1.2 Evaluate and confirm contractual criteria.

**Knowledge:**

NFPA 72, 101

Purposes of standard clauses in business contracts

Scope of work documents

**Skills:**

Ensure compliance with requirements of the AHJ and applicable fire and life safety codes and standards.

Review project documents for special conditions.

Notify stakeholders and request clarification regarding conflicts or special conditions.

Document deficiencies and offer corrected or alternate design options.

Evaluate scope of work.

#### 4.1.3 Coordinate project requirements with end-user stakeholders.

**Knowledge:**

Roles of end-user stakeholders, such as contractors, clients, owners, insurance companies, and others

Process of establishing project requirements and documentation

**Skills:**

Identify end-user stakeholders for the specific project.

Coordinate project requirements with end-user stakeholders.

Review submittals with AHJ and end-user stakeholders.

Document all changes or modifications.

#### 4.1.4 Coordinate with design stakeholders.

**Knowledge:**

Roles of design stakeholders, such as architects, engineers, construction managers, and others

Process of establishing project requirements and documentation

**Skills:**

Negotiate a schedule for an on-time, on-budget project.

Coordinate with design stakeholders to resolve conflicts that arise.

Review submittals with AHJ and design stakeholders.

Document all changes or modifications.



#### 4.1.5 Identify and resolve conflicts during site visits.

**Knowledge:**

NFPA 70, 72, 101

IBC

Basic building geometry, features, structural elements, and materials

**Skills:**

Communicate and coordinate with stakeholders.

Read and interpret project documents.

Read and interpret manufacturers' equipment specifications.

Confirm the selected equipment is listed for the site's occupancy(ies) and conditions.

Apply relevant codes and standards to site conditions and occupancies.

Verify the project scope is appropriate for the entire life cycle of the fire alarm system, including installation, inspection, testing, maintenance, monitoring, and future expansion possibilities.

Resolve conflicts among site conditions, project specifications, and/or codes and standards.

Prepare written report documenting conflicts, submittal revisions, stakeholders, and applicable project requirements.

#### 4.1.6 Confirm identity of AHJ or other authority.

**Knowledge:**

IBC

**Skills:**

Identify the AHJ or other authority for a proposed scope of work.

Resolve code variance issues with governing authorities or approval agencies.

Where applicable, provide a formal code variance request to the AHJ.

#### 4.1.7 Review and approve shop drawings and documentation.

**Knowledge:**

IBC

NFPA 72

**Skills:**

Review plans for compliance with the jurisdictions' fire and life safety code requirements.

Lay out an evacuation system to ensure adequate occupant notification and instruction.

#### 4.1.8 Confirm results of power and battery calculations and system requirements.

**Knowledge:**

NFPA 70, 72

ANSI/UL 864

ANSI/UL 1971

**Skills:**

Confirm the power requirements.

#### 4.1.9 Analyze specifications and drawings for complex or unusual projects.

**Knowledge:**

NFPA 72, 101

IBC

**Skills:**

Apply expert knowledge of adopted building codes and fire alarm standards to shop drawings for installation.

Review plans for compliance with the jurisdictions' fire and life safety code requirements to ascertain system or equipment connections.

Interpret manufacturer's specifications for system-wide operation.

Read and explain intent of specifications.

Resolve discrepancies in specifications.

Approve drawing conventions.

#### 4.1.10 Interpret codes and standards.

**Knowledge:**

NFPA 70, 72, 101

IBC

**Skills:**

Ensure that a plan complies with the jurisdictions' fire and life safety code requirements.

Consult with stakeholders and the AHJ to establish compliance with codes and standards, including any special requirements of government agencies, and variances as needed.

Document any and all changes.



#### 4.1.11 Write and issue technical reports.

**Knowledge:**

NFPA 72

IBC

**Skills:**

Ensure that plans comply with the jurisdictions' applicable fire and life safety code requirements.

Document any and all changes.

Apply expert communication protocols in the dissemination of correspondence.

#### 4.1.12 Confirm legal authority.

**Knowledge:**

NFPA 72

**Skills:**

Determine and conform to legislated requirements of local, state, and federal regulations related to the project.

Resolve conflicts between contractual obligations and project conditions.

#### 4.1.13 Coordinate the project schedule.

**Knowledge:**

Types of resources required during the course of a project

**Skills:**

Confirm that the project schedule and documentation are complete.

Approve the project schedule.

Monitor the development and implementation of the schedule and identify potential conflicts with the work of other trades or with resource availability.

Negotiate the schedule with other trades and stakeholders to ensure that all time, budget, workforce, and material requirements are met.

## 4.2 Installation Tasks

*Questions related to this task make up 13 - 18% of the exam.*

#### 4.2.1 Review, revise, and approve installation strategies.

**Knowledge:**

NFPA 72, 101

**Skills:**

Coordinate and resolve design conflicts and related special circumstances.

Determine whether changes in schedule warrant change orders.

#### 4.2.2 Analyze, modify, and approve purchase orders.

**Knowledge:**

Schedule and budget impacts of purchase orders

**Skills:**

Determine material needs.

Issue purchase orders.

Resolve major exceptions.

*Note: The former "4.2.3 Resolve on-site scheduling conflicts" has been renumbered as 4.5.2, and the former "4.2.4 Develop written policies and procedures for personnel conflict resolution" has been renumbered as 4.5.7. The former 4.2.5 and 4.2.6 have been renumbered as 4.2.3 and 4.2.4.*

#### 4.2.3 Review and approve as-builts.

**Knowledge:**

NFPA 70, 72, 101

ICC codes

ANSI/ASME standards

Construction drawings

Computer-aided design (CAD) standards and drawing concepts

**Skills:**

Confirm the accuracy of the as-built drawings.

Identify and resolve conflicts among drawings and project documents.

Coordinate with CAD personnel.

Distribute completed as-built drawings to authorities as needed.

#### 4.2.4 Develop a schedule of work involving combination and integrated systems and other trades.

**Knowledge:**

Work scheduling concepts and practices

Factors that impact a schedule of work, including but not limited to labor rates, construction requirements and material distribution

Combination system concepts

Functional concepts of HVAC systems, building automation systems (BAS), fire safety functions, and other systems

NFPA 70, 72, 101

ICC codes

ANSI/ASME standards

**Skills:**

Identify combination and integrated system requirements with other trades.

Develop a coordinated schedule of work with other trades.

Coordinate the installation of combination systems with other trades.

Coordinate the installation of integrated systems with other trades.



## 4.3 Maintenance Tasks

*Questions related to this task make up 13 - 18% of the exam.*

### 4.3.1 Oversee inspection, testing, and maintenance program(s).

**Knowledge:**

NFPA 72

IBC

IFC

ANSI/UL 864

Manufacturers' published instructions

Procedures for troubleshooting equipment and circuit problems

Requirements for documentation

Requirements and methods for testing of system components and devices

**Skills:**

Identify changes to existing conditions and/or the system environment that affect system performance.

Oversee inspection, testing, and maintenance tasks, and assist with the identification, troubleshooting, and repair of problems as needed.

Develop inspection, testing, and maintenance procedures.

Prepare written documentation of inspection, testing, and maintenance results.

Develop corrective action plan to resolve system deficiencies.

Communicate inspection, testing, and maintenance results to the appropriate stakeholders.

## 4.4 Education/Communication Tasks

*Questions related to this task make up 13 - 18% of the exam.*

### 4.4.1 Train and mentor subordinates.

**Knowledge:**

Communication skills for target audience

Codes and standards

Project requirements (including project documents)

Standard construction practices

Roles of stakeholders

Documentation procedures

Company policies and procedures

Safety codes, standards, and practices

NICET Code of Ethics

**Skills:**

Communicate effectively with subordinates in understanding and applying all industry- and project-related knowledge.

Communicate with subordinates and analyze training needs.

Provide hands-on demonstrations and presentations.

Organize information for training purposes.

Coordinate training opportunities.

Analyze subordinate performance and provide constructive feedback.

Evaluate the readiness of subordinates for additional responsibilities.

### 4.4.2 Educate staff.

**Knowledge:**

Common training methods

Communication skills for target audience

Performance appraisal criteria and procedures

Codes and standards

Project requirements (including project documents)

Standard construction practices

Roles of stakeholders

Documentation procedures

Company policies and procedures

Safety codes, standards, and practices

NICET Code of Ethics

**Skills:**

Identify training needs of company and staff.

Analyze needs and develop training plan(s).

Create plan(s) to evaluate training effectiveness.

Develop method(s) to monitor staff performance after training.

Deliver training.

Evaluate staff performance and training effectiveness.

Document the results of training.



**4.4.3 Present information verbally and in writing.**

**Knowledge:**

Standard English, business, and technical language usage

Communication protocols according to contract specifications, codes and standards, company policies, and common industry practice

Presentation methods (such as use of computer software to create and provide documents, spreadsheets and visual aids)

Proper documentation methods and formats (such as letters, memos, Letters of Transmittal, Request for Information, spreadsheets, and charts)

Fire Alarm and construction industry terminology

**Skills:**

Evaluate the audience's need for information.

Evaluate external factors (such as stakeholders, pending deadlines, and contract requirements).

Identify best communication method for each situation to satisfy audience needs.

Communicate clearly using the appropriate format and proper English, business, and technical language.

**4.4.4 Communicate with AHJs and other authorities.**

**Knowledge:**

Approval processes and criteria

Procedures for requesting formal interpretations from codes and standard governing bodies

Standard English, business, and technical language usage

Communication protocols according to contract specifications, codes and standards, company policies, and common industry practice

Proper documentation methods and formats (such as letters, memos, Letters of Transmittal, Request for Information, spreadsheets, and charts)

Construction industry protocols for communicating with stakeholders

Regulatory agencies' policies and procedures for communication

**(Task continued in next column)**

**(Task 4.4.4 continued)**

**Skills:**

Identify issues which require the AHJ or other authorities to be involved.

Evaluate the roles of the AHJ and other authorities, and their need for information.

Identify best communication method for each situation to satisfy the needs of the AHJ and other authorities.

Accurately present the issue(s) in the proper context with supporting code interpretations and authoritative research.

Communicate clearly using the appropriate format and proper English, business, and technical language.

Clarify and interpret any issues for the AHJ or other authority using the appropriate communication format.

Educate the AHJ on the latest technology available.

**4.4.5 Communicate code requirements to nontechnical stakeholders.**

**Knowledge:**

Fire Alarm and construction codes, standards, and regulations

Liability, life safety, civil and legal penalties, and other ramifications of code violations

Standard English, business, and technical language usage

Communication methods

Process of codes and standards development by governing bodies

Proper documentation methods

**Skills:**

Explain code requirements to nontechnical stakeholders.

Document code issues according to industry standards and project requirements.

Explain code issues to nontechnical stakeholders.

Communicate the potential ramifications of code violations to nontechnical stakeholders.



## 4.5 Management/Supervision Tasks

Questions related to this task make up 25 - 30% of the exam.

### 4.5.1 Oversee management of simultaneous projects.

**Knowledge:**

Methods for scheduling and monitoring multiple projects in complex work environments  
Software or other project management tools  
Advanced project management principles  
Communication protocols according to contract specifications, codes and standards, company policies, and common industry practice  
Proper documentation methods and formats (such as letters, memos, Letters of Transmittal, Request for Information, spreadsheets, and charts)  
Construction industry protocols  
Regulatory agencies' policies and procedures  
Basic business financial principles

**Skills:**

Develop and monitor schedules for simultaneous projects.  
Organize and prioritize project tasks and schedules.  
Communicate schedules and any changes to all staff and stakeholders.  
Coordinate project schedules and changes with other trades.  
Develop system for project documentation.  
Disseminate project documentation to all stakeholders.  
Oversee profit and loss (P&L ) statements.

*Note: The task numbers below have been changed from the October 8, 2008 version due to the insertion of tasks 4.2.3 (now task 4.5.2) and 4.2.4 (now task 4.5.7).*

### 4.5.2 Resolve on-site scheduling conflicts.

<<Previously 4.2.3>>

**Knowledge:**

Sources of, and ways to reduce, liability related to performance and payment bonds, liquidated damages, hold harmless clauses, and insurance coverage  
Powers and responsibilities of various project personnel and stakeholders related to scheduling

**Skills:**

Negotiate scheduling procedures so as to find solutions to various issues that may arise during installation.  
Document conflicts, their resolutions, and any third-party assistance or intervention.

### 4.5.3 Determine personnel requirements.

**Knowledge:**

Skills and abilities required for various fire alarm systems roles  
Labor estimating principles  
Labor resources (provided by company employees and outside contractors)  
Project specifications  
Installation requirements for project completion  
Labor laws and regulations

**Skills:**

Analyze a scope of work to determine personnel needs.  
Analyze labor requirements for each job, applying appropriate time elements and unit cost factors.  
Match skills required for project tasks with personnel knowledge, personality and capabilities.  
Coordinate with other project leadership (such as the General Contractor) regarding labor decisions.  
Engage the required and qualified personnel.  
Document personnel decisions.  
Track labor utilization to meet project budget.



#### 4.5.4 Prepare a response to an RFP (Request for Proposal) or RFQ (Request for Quotation).

##### **Knowledge:**

Special requirements, such as bonds, federal and state labor standards, affirmative action, Buy America clauses, and their potential impacts on a project's costs and liabilities

Project systems and applications

Construction standards

Labor and materials estimating

Installation criteria of requested systems and applications

Typical insurance and bonding requirements

Sources of insurance and bonding information

Sources of information about national and locally-adopted codes and standards

Regulatory authorities (such as the local AHJ and insurance underwriters)

##### **Skills:**

Review and analyze RFP or RFQ documentation to determine project specification requirements.

Assemble a team or teams to assist with proposal or quotation development.

Interpret the requirements of all national and locally-adopted building codes and standards as they apply to project.

Identify all special requirements that may affect cost and company liability (such as bonds, federal and state labor standards, affirmative action, and Buy America clauses).

Review insurance and bonding requirements and their impacts on project costs.

Develop project plan and scope of work.

Develop supporting budgetary information.

Identify and resolve conflicts between general specifications, mechanical specifications, and fire protection requirements.

Assemble the proposal package with all required documentation.

#### 4.5.5 Oversee the technical aspects of a job (those related to system components, applications, and configurations).

##### **Knowledge:**

System logic of computer-based fire alarm systems

Building- or campus-wide systems integration (as a function of interfacing with other technologies and as a function of the physical installation of the different systems)

Compatibility requirements of different systems

Basic performance-based design concepts

Functions of complex systems (for fire alarms and other integrated systems)

Technical documentation procedures

Procedures for revising and/or adapting system functionality

##### **Skills:**

Document technical issues and resolutions.

Read and interpret construction and systems integration schedules for a single building or a campus.

Coordinate system integration tasks and requirements with other trades and all stakeholders.

Analyze and communicate programming requirements for a fire alarm system for a stand-alone configuration, or for a networked systems integration project.

Translate technical requirements for nontechnical staff and stakeholders.

#### 4.5.6 Manage the resolution of interpersonal conflicts.

##### **Knowledge:**

Methods for documenting conflicts and resolutions

Company, contract, and/or project procedures for handling interpersonal conflicts

Basic interpersonal conflict resolution concepts

Basic concepts of personnel management

Legal requirements and liabilities regarding personnel management

##### **Skills:**

Identify, analyze, and monitor any interpersonal conflicts.

Identify and analyze potential legal and liability issues.

Communicate effectively with impacted parties and with staff regarding sensitive personnel issues.

Document interpersonal conflicts, actions taken to resolve them, and the results.

**4.5.7 Develop written policies and procedures for personnel conflict resolution.** <<Previously 4.2.3>>**Knowledge:**

Types of conflicts that can occur among employees

**Skills:**

Investigate existing conflict resolution policies and determine whether additional policies are needed.

Gather information about the potential consequences to individuals and companies related to various types of personnel conflicts.

In consultation with appropriate professionals and managers, develop conflict reporting, escalation, and resolution procedures.

Ensure the documentation and distribution of any new policies or procedures.

**4.5.8 Review and document resolution of contractual, regulatory, and ethical issues.****Knowledge:**

Best practices for identifying, handling, and documenting ethical problems that arise during the execution of contracts

Legal bid practices and procedures

Contract standards

Federal laws and regulations applicable to fire alarm system contracting and construction

Resources for determining state and local laws, codes, and regulations applicable to fire alarm system contracting and construction

NICET Code of Ethics

Best practices for maintaining proper records

**Skills:**

Analyze contract documents to meet any regulatory requirements.

Review and determine actions necessary based upon any recommendations provided by the site foreman.

Review and implement any regulatory requirements.

Document actions taken and maintain records.

Establish reporting channels with stakeholders and regulatory agencies relative to conforming to requirements of federal, state, and local laws and regulations.

**4.5.9 Develop and implement company-specific and contract-specific policies to ensure a safe work environment.****Knowledge:**

NFPA 70E

OSHA CFR 29 Part 1910

Federal, state, and local safety regulations

Work-site equipment safety requirements

Work-site materials safety requirements (specifically, special handling procedures)

Work-site incident documentation procedures for safety issues

First aid procedures and safety requirements

**Skills:**

Develop safety-conscious culture for work environments.

Implement and oversee work-site safety programs.

Coordinate and oversee regular safety review meetings.

Document results of safety review meetings.

Document all cases of safety violations, including their resolution.

Determine the safety equipment needed for a specific site.

**4.5.10 Develop, manage, and document project budgets.****Knowledge:**

Contract standards (e.g., AIA, CSI)

Project requirements

Impact of equipment, materials, scheduling, and staffing requirements on the project budget

Contract modification documentation and procedures

Contract schedules, time lines and schedule of values

Project management principles

**Skills:**

Develop project scope and budget.

Identify and manage project costs throughout the project.

Identify and manage contractual requirements for billing.

Manage and supervise materials purchasing and handling.

Manage equipment and installation warranty issues.

Ensure staffing and materials meet project needs within budget.

Coordinate project closeout procedures.

Document all necessary budget changes.

Negotiate contract modifications.