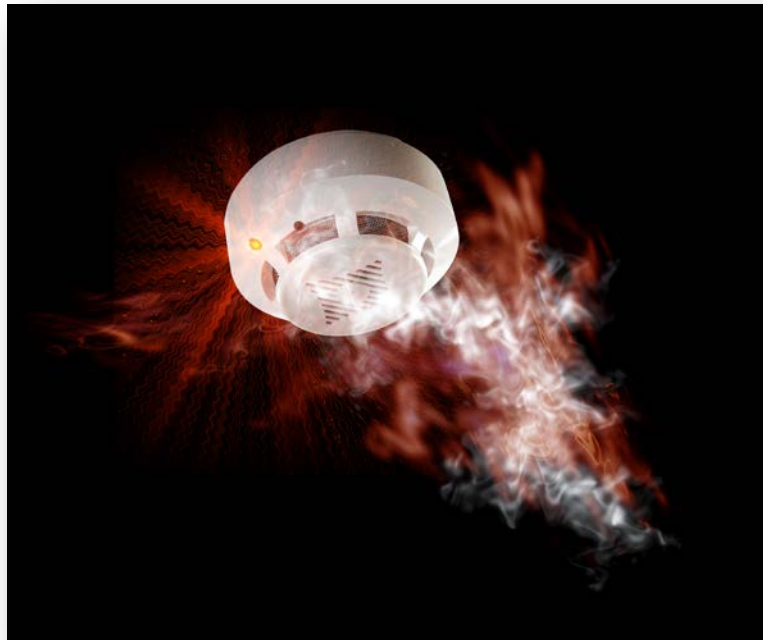


COLORADO SPRINGS FIRE DEPARTMENT, DIVISION OF THE FIRE MARSHAL

Fire Alarm Systems

General Requirements per Chapter 9 of the Locally Amended 2015 International Fire Code and the Applicable NFPA Codes.



Fire Construction Services
4/12/2019



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PURPOSE

This guidance document has been developed in an effort to provide the highest level of service to the customers of the CSFD. The major goal of plan reviews is to ensure the design of fire alarm systems meet the minimum requirements of the adopted codes, standards, and ordinances. To meet this goal, the submitted plans and supporting documentation must contain the information needed to conduct a thorough review.

SCOPE

This guidance document outlines the requirements set forth in the International Fire Code, local amendments, and departmental policies as they relate to the installation fire alarm systems. This guidance document is not intended to provide an all-inclusive listing of submittal and inspections requirements, as it would be virtually impossible to cover all situations. This guidance document only covers requirement set forth in the latest edition of NFPA 72. Also included is information covering items required to be included on the working drawings and supporting documents.

DEFINITIONS

ADS	Acoustically Distinguishable Space
CCP	Central Control Point
CSFD	Colorado Springs Fire Department
FACP	Fire Alarm Control Panel
FCC	Fire Command Center
FSA	Fire System Annunciator
IFC	International Fire Code
MNS	Mass Notification System
NFPA	National Fire Protection Association
PPRBC	Pikes Peak Regional Building Code
PPRBD	Pikes Peak Regional Building Department (RBD)
RME	Responsible Managing Employee

GUIDELINES

I. INTRODUCTION

A. Applicable Codes and Standards.

1. 2015 International Fire Code and local Amendments.
2. 2019 NFPA 72 National Fire Alarm Code.
3. 2017 NFPA 70 National Electrical Code.
4. 2017 International Mechanical Code
5. Colorado Springs City Ordinances.
6. CSFD Administrative Rulings and Interpretations.

B. Administrative Requirements.

1. **Approved Contractors.** All fire alarm contractors shall obtain a Colorado Springs Fire Alarm Contractor A (FAC-A) license in order to design, install, add to, alter, service or repair fire alarm systems, in accordance with the Pikes Peak Regional Building Code, Section 208. Please contact Regional Building Department, Contractor Licensing at 719-327-2887 for additional information on obtaining a license. Also see section 10.5 of NFPA 72 for additional requirements.

If you are interested only in the installation, service and repair of fire alarm systems, then you need to obtain the Fire Alarm Contractor B (FAC-B) license from the Regional Building Department.

2. **Approved Installers.** A Colorado Springs Licensed Installer (FAI) shall be on-site for all installations, additions, alterations, repair and inspections of fire alarm systems, in accordance with Pikes Peak Regional Building Code, Section 208. Please contact Pikes Peak Regional Building Department, Contractor Licensing at 719-327-2887 for additional information on obtaining a license.
3. **Code/Standard Editions.** Fire alarm systems shall meet the criteria of the adopted IFC as amended and all applicable requirements of the most recent edition of the NFPA standards. NFPA standards are effective on January 1st of the year following the effective date printed in the standard.
4. **Permits/Inspections.** Required plan submittal with approvals and permits must be secured through CSFD prior to the start of any work. Permitted work must be inspected by CSFD. A Regional Building Electrical Rough-in Permit must be obtained in addition to the required permits obtained from CSFD.
5. **Special Circumstances.** Depending upon the scope of work, different types of submittals may be required; therefore, you may want to contact Fire Construction Services for additional information.
6. **Alternative Methods.** If special building conditions and/or restrictions exist that may prohibit any of the requirements set forth in this guidance document from being met, approval from CSFD for an alternative means and methods approach is required. The alternative means and methods must be approved before installation of the system begins.
7. **Non-Required Systems.** All non-required fire sprinkler systems shall meet the requirements of adopted codes and standards. Additionally, they shall be submitted for review and approval to CSFD (IFC 901.2).
8. **Revisions.** All revisions after approval shall be clouded and identified with a sequential numbering or lettering system, such as Revision A, B, etc. or Revision 1, 2, etc. Revisions are date sensitive, thus each revised sheet must bear the date of the revision.
9. **As-Built Plans.** All deviations from approved plans shall be documented and submitted to CSFD for archiving. Reviews will not be conducted on as-built plans, unless specifically required by the fire inspector, as these field changes are often verified as compliant by the fire inspector. All as-built plans shall be conspicuously marked as such.

II. SUBMITTAL INFORMATION

This section of the guidance document provides information regarding documentation and shop drawings that shall be provided at the time of plan submittal. This documentation is required to assure the plan submittal package contains the necessary information for a complete plan review. Also reference the documentation requirements of Chapter 7 of NFPA 72.

A. Minimum Requirements of submittal.

1. **Drawing Size.** Drawings shall be submitted on sheets no less than 24x36 inches and shall be drawn to 1/8" or 1/4" scale. Other scales may be accepted on an as-needed basis, please contact CSFD Construction Services if you have questions regarding the use of

different scales. Plans shall contain the information and/or details indicated in the checklist in the appendix.

2. **Plan Review Number.** Submittals associated with a construction project shall be provided with the CSFD Plan Review Number. This number is an eight digit numeric code located on the back of the construction plans. Suppression system work only projects shall be indicated as such on the submittal so that it can be assigned a plan review number.
3. **Number of Drawing Sets.** A minimum of two (2) sets of fire alarm plans shall be submitted to the CSFD. A maximum of three (3) original sets will be stamped with CSFD approval. All plan sheets shall be signed/sealed by an RME of the licensed submitting contractor.
4. **Design Professional.** RMEs for all FAC-A and FAC-B contractors involved on the project shall be declared on the plans and cut sheets/specifications through their signature and date and the appropriate certification number.

The RME for the contractor designing the fire alarm system must sign all plan sheets. If a separate contractor is performing the installation, then they only need to sign the top plan sheet.

5. **Cut Sheets/Specifications.** One (1) set of the manufactures product information (cut sheets) shall be provided. This is to include the information on all devices that are part of, or being connected to, the fire alarm system. When cut sheets show multiple models/type of devices, the specific item being installed shall be highlighted. As an example, the use of multi-candela horn/strobes shall have the specific model number highlighted and the current draws associated with that model and candela rating highlighted.

A table of contents shall be provided and specifications package shall be tabbed with the following sections: Control panels, power supplies and annunciators; Initiating devices; notification appliances; other system components, modules and relays; Wire type w/ resistance values; Compatibility listings (matrix, table or information showing compatibility); Fire Department Operating instruction for the entire system (including copy of instructions to be posted next to the panel); Manufacturer approved testing instructions. Stamped cut sheets will be returned to the contractor and must remain on the job site with the approved plans. The cover of the cut sheets shall be signed/sealed by an RME of the licensed submitting contractor. Stamped cut sheets will be returned to the contractor and must remain with the approved plans, on the job site.

CSFD accepts cut sheets on CD. The CD must have the individual cut sheets for the materials specific to the job – we will not accept manufacturer's CD's! If this option is chosen, the CSFD will stamp, date and initial the CD – it is then the contractor's responsibility to provide the means of reviewing that disk in the field upon the fire inspector's request.

6. **Secondary Power Calculations (Battery Calculations).** A minimum of two (2) sets of the secondary power (battery) calculations shall be provided for all power supplies being installed within the system. This is to include the voltage and amperage information on all batteries being installed within the main panel and any supplemental power panels being provided. Battery calculations shall include the following information:
 - a. Standby and Alarm current draws for each device/appliance connected to the fire alarm system. The current draw of each device.
 - b. The Model number of each device/appliance
 - c. Description of each device/appliance
 - d. Standby Time (i.e. 24 hours, 60 hours, etc.)

- e. Alarm Time (i.e. 5 minutes, 15 minutes, etc.)
- f. Total current draw of the system
- g. Battery size and whether wired in series or parallel

Battery calculations for communication panels do not have to be provided as long as battery size provided is the same as the listed battery size provided in cut sheets. Provide a note of the communicator battery size on the riser diagram.

- 7. **Voltage Drop Calculations.** Two (2) sets of voltage drop calculations shall be submitted with the plans. These calculations shall include the following information:
 - h. The total number of devices on each wiring circuit
 - i. The current draw of each device
 - j. The maximum length of wire utilized on each circuit
 - k. The wire size being used
 - l. The voltage remaining at the last device
 - m. Intelligent Horn/Strobes must show the manufactures information of how the voltage drops shall be calculated
 - n. Adjustable Multi-Candela Horn/Strobes - the battery calculations shall be calculated according to the candela rating on the fire alarm plans. For example, if the fire alarm plans indicate the candela rating is 110, the battery calculation shall calculate for a 110 candela
 - o. Indicate method used and show all formulas/equations
- 8. **Sequence of Operations.** The sequence of operation of the fire alarm system shall be provided in matrix format. An example of the typical input/output matrix format is provided in NFPA 72: Figure A.14.6.2.4.
- 9. **Acoustically Distinguishable Spaces and Intelligibility.** The plans for each fire alarm system incorporating emergency communication/voice alarm features shall identify all ADS and whether or not each ADS requires intelligibility (NFPA 72: 18.4.11).
- 10. **Scope of Work.** A detailed narrative indicating the intent of the system, auxiliary functions or features and any non-required components, functions or features, as well as the extent of work (on existing systems) shall be provided. Be sure to include whether or not initiating and/or notification appliances are provided throughout or just in specific areas.

B. CONSTRUCTION DOCUMENTS.

- C. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in it conforms to the provisions of the IFC, NFPA standards, relevant laws, ordinances, rules and regulations as adopted by the City of Colorado Springs.

Plans shall be legible, dark-lined and reproducible with conventional copying equipment. Please do not use colored highlighting as these are frequently not reproducible. Also do not use colored or gray back ground shading as these interfere with archiving.

When a project is associated with a building permit, alarm plans shall reflect the scopes of work as approved under the building permit. This is especially crucial when you have multiple permits within the same building.

When working on an existing system, you must provide details on that system such as original installation date, original requirements of the system or its intent, requirements based on occupancy and occupant load, etc.

III. GENERAL INFORMATION AND REQUIREMENTS

A. Control Equipment and Annunciators.

1. The Fire alarm control panel shall be located at the main entrance to the building. If the FACP is not located at the entry, a Fire Alarm Annunciator shall be provided at the main entrance (NFPA 72:10.18.3). Annunciators should be mounted at approximately eye level. Remote fire alarm annunciators are not required for dedicated function water flow fire alarm systems.
2. Automatic smoke detection shall be provided at the location of each control unit, power extender, and supervising station transmitting equipment in accordance with NFPA 72: 10.4.5.
3. New fire alarm control panels shall be addressable per IFC 907.6.3 unless following exceptions are met:
 - a) Fire alarm systems in single-story buildings less than 22,500 square feet in area.
 - b) Fire alarm systems that only include manual fire alarm boxes, water flow initiating devices and not more than 10 additional alarm-initiating devices.
 - c) Special initiating devices that do not support individual device identification.
 - d) Fire alarm systems or devices that are replacing existing devices.

B. Monitoring.

1. In accordance with the IFC, all required fire alarm systems shall be monitored by an approved supervising station. CSFD considers all UL listed or FM approved central, remote or proprietary supervising stations as approved supervising stations.
2. All communication methods shall be clearly identified on the plans.
3. **Changes in service.** CSFD shall be notified within 30-days of any scheduled change in service that results in signals from a protected premises being handled by a different supervising station. Notice shall be made in writing to the CSFD, prior to termination of monitoring service (2015 IFC 901.9).

C. Signage.

1. Approved signage must be provided on the door of the enclosure in which any fire alarm control panels are located stating "Fire Alarm Control Panel" in 2-inch high block letters with a stroke of not less than ¼-inch and a color contrasting with its background.
2. Signs shall be permanent, weatherproof and appropriately secured.

D. TENANT FINISHES/ADDITIONS.

Whenever a system is modified or updated, it is imperative that system designer have a thorough understanding of the existing equipment, including its capabilities and the system's wiring.

If the project includes notification appliances or smoke detection, submittals shall include the entire tenant area including adjacent spaces, devices and complete circuits as necessary to show proper device coverage. New, relocated, and existing equipment shall be designated with "N", "R", and "E" subscripts.

Deficiencies caused by tenant finish or remodel work shall be corrected prior to final inspection. This means if the scope of work causes a deficiency in the system, that deficiency becomes your responsibility to correct. For example, a demising wall is erected for a new tenant and that demising wall creates a spacing issue of notification appliances or detection outside the new tenant space, you must correct that spacing issue prior to final inspection. CSFD will consider that as part of your scope of work.

Please keep in mind that systems installed a few decades ago, may have had the intent of notifying everyone in the building, but no longer meet that intent, when determining requirements of a system undergoing modifications.

1. **Audible.** CSFD may allow the new addition or the tenant finish to be the same tone as the existing audible devices. A mixture of different types of evacuation signals (will not be permitted as it lends to confusion of the occupants. The intent is to provide consistency throughout the tenant space and/or the building. Contact Fire Construction Services if you have questions.
2. **Visual.** The new strobe devices are required to be synchronized amongst each other. The new strobe devices do not have to be synchronized with existing strobe devices, unless there are more than two visible notification appliances in the same room or adjacent space within the field of view (NFPA 72:18.5).
3. **5-Device Letters.** If the work consists of 5 devices or fewer, the work may be submitted to CSFD as a 5-device letter. See the Administrative Permit section for the submittal requirements for a 5-Device letter.
4. **Modifications involving Control Functions.** Any modifications of 5 or fewer devices having control functions, such as smoke detectors for door release, elevator recall, duct detectors, etc. can still be submitted via a letter as described above. The difference is a permit will be issued and an inspection is required.
5. **Panel Replacements.** Control panel replacements due to damage and relocations may take place under a letter submitted to the CSFD for review and acceptance.

Panel replacements due to age will require an upgrade to the system if parts are no longer available or the system is no longer serviceable. All components not compatible with the new panel must be replaced or upgraded as well.

You must provide information on the intent of the panel replacement, and if your intent is to meet current standards or the original installation standard and the edition of that standard.

Formal plans will not be required to be drafted and submitted for review; however, the following shall be submitted for review:

- a. A letter describing the project location, scope of work and the location of the panel.
- b. Specification sheets.
- c. Proof of compatibility with existing devices.
- d. Revised battery calculations.
- e. Existing Sequence of Operation.
- f. Provide original installation date in order to determine code edition which system was installed under.
- g. State the intent of the original design and the area the fire alarm system control panel serves.

All functions shall be pre-tested by the installing contractor at the time of the replacement. CSFD will witness a reacceptance test of the system and a permit fee will be collected.

6. **Panel Re-Programming** Control panel re-programming due to mother board replacement or re-zoning of notification devices may take place under a letter submitted to the CSFD for review and acceptance.

You must provide information on the intent of the re-programming, and if your intent is to meet current standards or the original installation standard and the edition of that standard.

All functions shall be pre-tested by the installing contractor at the time of the replacement. CSFD will witness a reacceptance test of the system and a permit fee will be collected.

Re-programming of panel for device labels, or to change the phone number for monitoring would not require submittals or permitting through CSFD.

E. Alarm Verification and Positive Alarm Sequence.

Alarm verification is permitted in the City of Colorado Springs with prior approval from CSFD. This feature is not to be initially enabled unless anticipated conditions or occupant activities are expected to cause nuisance alarms in protected areas.

Positive alarm sequence is permitted in the City of Colorado Springs with prior approval from CSFD. A letter of request shall be submitted to CSFD for review and approval prior to the use of this feature.

All devices approved and programmed with alarm verification or positive alarm sequence shall be identified on the plans and tested with these features in place.

F. Emergency Communication Systems (Voice), ADS' and Intelligibility.

When voice evacuation systems (aka Emergency Communications Systems) are installed, there is need for a "command center" to be provided. Emergency workers will need room to coordinate the evacuation and relocation of building occupants in the event of an emergency. This center or room need not meet the requirements of a Fire Command Center as outlined in the IFC, unless a formal FCC is required by other code sections. However, every effort should be made to install the FACP in a location away from the noise and congestion of the path of evacuation.

An ADS is defined as a notification zone or subdivision thereof, or a space that is acoustically different from other spaces. An ADS could be a single room, a group of rooms or even an entire building. Each space having different acoustical, environmental or use characteristics is considered as an ADS. It is the designer's responsibility to define each ADS on the plans being submitted. ADS is not limited to mass notification systems, but apply to every system using voice evacuation or instruction.

Each ADS shall be identified as requiring or not requiring intelligibility. Intelligibility may not be required in every space, and there will be some spaces the intelligibility cannot be achieved. It is recommended you consult with an acoustic engineer for an intelligibility analysis and further recommendations on finish materials. You may also reference Annex D of NFPA 72 for more information.

The following requirements shall be met for layout and design of speakers:

1. Speaker layout shall be designed to ensure intelligibility and audibility.
2. Intelligibility shall first be determined by ensuring that all areas in the building have the required level of audibility

Where wall mounted speakers are used, manufacturer recommendations shall be reviewed and or computer modeling should be employed. One of the goals of speaker placement is to provide the shortest practical distance from the source to the recipient. Locate speakers away from hard surfaces and point toward soft absorbent surfaces. Extreme cases of acoustically challenging ADS where intelligibility is not attainable, may be acceptable if there is an ADS within 30-feet, where intelligibility is deemed acceptable.

G. Mag-locks, Door Releasing Service and Delayed Egress/Egress Control.

Magnetic-held door locks shall drop/release upon activation of the fire alarm system.

Door releasing for high ceiling areas (>15-ft) where the depth of the lintel exceeds 60 inches on both sides of the door will require an engineering evaluation to be conducted in accordance with NFPA 72.

Delayed egress and/or egress control requires prior approval from the Pikes Peak Regional Building Department before fire alarm plans indicating this feature can be approved by the Fire Department.

H. Communications.

1. EXISTING FIRE ALARM SYSTEMS.

- a. If a dialer or communicator is being added to an existing, previously unmonitored system, a permit and inspection is required. A letter must be submitted to the CSFD to document the work that is taking place. A permit will be issued and a CSFD inspector must witness the acceptance testing of the communicator.
- b. If the communications technology is changing (i.e. from phone lines to radio or cellular) a permit and inspection is required.
- c. Permits are required for changes to monitoring equipment. If it is replaced with a "like kind, same for same" product, the work will be considered maintenance and will not require a permit or test by CSFD. The contractor is still held to the testing and documentation requirements of NFPA 72 and must notify CSFD that a replacement has occurred.
- d. If the system was not previously monitored and/or there is not an existing Knox Box on the building, one will have to be ordered and placed on the building with the appropriate keys. Contact CSFD for more information regarding Knox Boxes for existing structures.

2. New Fire Alarm Systems.

- a. If the system installer has included communications in their scope of work, it will fall under their construction permit. If the communications panel is being installed by a third party, they will have to obtain their own permit.

In all cases, a letter must be submitted to CSFD to document the work that is taking place. A permit will be issued and a CSFD inspector must witness the testing of the communicator as required by NFPA 72.

I. Emergency Repair Work

Emergency repair work is defined as that minimum work necessary to return a damaged or impaired system to satisfactory and fully functional status.

Emergency repair work may proceed without a permit provided the system is repaired to its original configuration. A permit application (with submittals) shall be submitted by the next business day after the work is completed.

- J. **Decommissioning Systems.** When systems are to be removed from service, a letter shall be submitted to Fire Construction Services detailing the reason(s) for the system being removed. Information on the building, occupancy classification and occupant load shall be included (IFC 105.7.21). This documentation shall show why the fire alarm system is no longer required and can be removed.

IV. DEDICATED FUNCTION SYSTEMS

A dedicated function system is a type of system that is installed specifically to perform fire safety function(s) where a building fire alarm system is not required. These systems are not required to be interconnected with each other, so you can have a separate elevator recall panel and waterflow alarm panel within the same facility. If a building fire alarm system were added to a facility, the dedicated function systems must be interconnected with the fire alarm system.

A. Elevators/Elevator Recall (NFPA 72: 21.3)

Automatic detection (smoke or heat) in elevator shafts when required must be listed for this environment.

Elevator Recall functions shall include a 3rd circuit to indicate to emergency responders the elevator is no longer safe to use. When the elevator machine room smoke detector activates, it shall cause the firefighters hat in the elevator cars controlled by that machine room to flash.

In facilities without a building fire alarm system, automatic smoke detection shall be connected to a dedicated fire alarm system control unit that shall be designated an "Elevator Recall Control/Supervisory Panel" permanently identified on the control unit via signage or a placard. The control unit for the elevator recall system shall be located in a normally occupied area. The LED's and piezo's on the panel provide the required notification of supervisory and trouble conditions. No form of general notification or evacuation is intended by a dedicated function elevator recall system. Monitoring of this system is also not required in buildings without a building fire alarm system.

See flow chart in appendix section for additional guidance for fire alarm requirements for elevator equipment.

B. WATER FLOW ALARM SYSTEMS.

All valves controlling the water supply for automatic sprinkler systems and water-flow switches on all sprinkler systems shall be electrically monitored where the number of sprinklers exceeds six (6) for all occupancies. There are exceptions to this, please refer to the IFC and local amendments for these exceptions.

One interior audible and visual notification device to alert occupants shall be provided from the water flow alarm system. Multi-tenant buildings that each have their own exterior access (i.e. strip mall) do not need to be equipped with an interior notification device.

A single pull station shall be located next to the sprinkler riser or FACP as it is intended to be used only by the building owner or system technician.

There must be an exterior horn/strobe within 20 feet of the FDC. The exterior horn/strobe shall activate upon a water flow alarm only, and de-activate when the water flow stops. No other devices are required to be monitored by a water flow alarm system.

The intent of the water flow alarm system is merely to monitor the status of the suppression systems. Thus duct detectors or kitchen hood suppression systems are not required to be tied into these systems. No form of general notification or evacuation is intended by a water flow alarm system. Connecting duct detection to a waterflow alarm system exceeds the intent of said system and it then becomes a fire alarm system.

C. Duct Detectors and Fire/Smoke Damper Detectors.

Duct detectors required by the provisions of the 2015 International Mechanical Code shall be connected to the building fire alarm system, where provided, in accordance with the requirements of NFPA 72. Duct detectors are not required to be connected to a dedicated function system.

If the fire alarm panel is monitoring smoke damper detectors, these detectors shall initiate a supervisory signal, not a general alarm signal. Remote test switches shall be labeled to designate which air handling unit they correspond with.

Unless duct detectors are tied into the fire alarm system, CSFD does not test them. Contact your Regional Building Mechanical Inspector for testing.

D. Two-Way Emergency Communication Systems.

Two way communication systems in areas of refuge and/or elevator lobbies, as required by IFC 1009.8 shall be submitted to and approved by CSFD. This submittal can be either part of the fire alarm submittal or a separate submittal.

NEW! A Fire Alarm Contractor A license is required to design these systems. A Fire Alarm Contractor A or B license is required to install these systems.

NEW! All functions shall be pre-tested by the installing contractor prior to inspection. CSFD will witness an acceptance test of the system and a permit fee will be collected.

NEW! Design Requirements:

1. Two-way communication systems shall be designed and installed in accordance with NFPA 72: 24.10 the International Fire Code, and the CSFD amendments. Other standards also contain design/installation criteria for specific life safety related equipment. These other standards are referred to in NFPA 72.
2. Two-way communication systems shall have a pathway survivability of per NFPA 72, section 24.3.14.10.
3. Two-way communication systems shall provide communication between each required location and the fire command center or a central control point (CCP) location approved CSFD. It is recommended that the CCP be in a normally occupied location. Where the CCP is not constantly attended (24/7/365), a two-way communication system shall have an automatic voice dial-out capability to a remote monitoring location providing 24-hour service. An approved central, proprietary or remote service, which will provide effective means of conversation for immediately summoning assistance at all hours in case of emergency, shall monitor the two-way communication system. THE SYSTEM SHALL NOT CALL 911!
4. The two-way communication system shall include both audible and visible signals. A button in the area of refuge and/or elevator landings shall activate both a light in the area of refuge and/or elevator landings indicating that rescue has been requested and a light at the CCP indicating that rescue is being requested. A button at the CCP shall activate both a light at the CCP and a light in the area of refuge and/or elevator landings indicating that the request has been received.
5. Each two-way communication system initiating device (Call Box) shall indicate its location to the FCC/CCP.
6. Directions for the use of the two-way communication system, directions for summoning assistance via the two-way communication system and written identification of the location shall be posted adjacent to the call box.
7. There shall be no more than one two-way communication system in a building. Likewise, there shall be no more than one supervising station providing service to a building.
8. Monitoring for Integrity shall comply with section 24.10.4 of NFPA 72, 2019 edition.

NEW! Submittal Requirements:

1. Cut sheets on complete system including required signs per IFC
 - a. Manufacturer's specification sheets for all equipment and materials to be used shall be submitted, including the transponder to the supervising station. Highlight on the cut sheet which device or equipment is being used, the listing information, and the application per listing.
2. Floor plan showing the location of all devices
3. Device legend identifying all devices shown on the plans
4. Sequence of operation that shows that the call boxes will automatically contact the owner's monitoring company after a set time delay
5. Pathways are being monitored for integrity by either the emergency communication system or by the fire alarm system. This will need to be reflected on the sequence of operation for the emergency communication system and/or the fire alarm system.
6. Riser diagram for complete system showing the following:

- a. Single-line wiring diagram (riser diagram) that shows the interconnection of each device and equipment of the whole system
 - b. Number of conductors in each wiring segment and the type and size of wire or conductor to be used
 - c. The class for initiating, signaling line and notification device circuits. As well as circuit number or identification
7. Battery calculation for power supply and the proposed size of battery to be provided.
 - a. Secondary power calculation- provide calculations to verify that standby batteries or other approved secondary power source has 24 hours of back-up and will operate for 5 minutes on stand-by power.
 8. Master control unit must be shown in a location that is normally occupied.

V. ADDITIONAL SYSTEMS.

A. Residential Fire Alarm System Requirements - Hillside (IFC and NFPA 72 Chapter 29).

Residential fire alarm systems vary somewhat from commercial grade fire alarm systems. This section of the guidance document attempts to indicate the differences and similarities while providing the basic requirements.

Audible fire alarm signals shall meet the performance requirements of NFPA 72: 18.4.4, and 18.4.6 which provide the following levels – 15 dB above average ambient sound levels and 75 dB at the pillow level in all sleeping areas, with any and all intervening doors closed.

If visible appliances are provided, they shall meet the requirements of NFPA 72:18.5.

When a smoke detector activates and is provided with a sounder base, they shall be so interconnected such that if one sounds, they all sound, and it shall be audible in all occupiable dwelling areas.

For homes constructed within the Broadmoor Resort Community or Cedar Heights Subdivision, monitoring of all required fire alarm systems shall report to the respective guard shack of that community. Off-site monitoring is not prohibited should the owner choose this feature.

Residential fire alarm systems in the Wildland Urban Interface (WUI) shall comply with the following in addition to the above requirements:

1. Smoke detectors installed on all levels, within all bedrooms, and hallways near bedrooms
2. Rate-of-rise, 190-200 degree F fixed temperature detectors in kitchen and garage areas
3. An outside strobe unit to be visible from roadway
4. A listed, low-voltage residential alarm control panel
5. Wiring meeting Article 760 of the National Electrical Code
6. Horn circuits in the interior of the residence, or smoke detectors with built in sounders may be used to meet this requirement as long as they are interconnected
7. Monitoring of the system by an approved agency
8. Allowed communication method as per NFPA 72.

B. Combination Fire/Burglary Systems (NFPA 72: 23.8.4).

Combination fire/burg system control units shall be listed for their intended use.

Short and open circuits, ground faults in fire and non-fire alarm equipment shall not interfere with the monitoring for integrity of the fire alarm system or prevent alarm, supervisory or fire safety control signal transmissions. Ground faults shall at least indicate a trouble signal, even if the panel is not capable of specifying what the trouble is caused by.

Fire Alarm signals shall be distinctive, clearly recognizable and take precedence over any other signal, even if the non-fire alarm system was initiated first. The monitoring company must be able to distinguish between fire and burglar alarms, as well as the panel. The signals to the monitoring company report as a burglar alarm when it is a fire alarm and vice versa.

You must be a licensed fire alarm contractor to work on combination commercial fire/burglary systems!

Residential security system with a non-required fire zone on them will not be regulated by CSFD. If issues, such as nuisance alarms begin to arise from these installations, CSFD will contact the homeowner on a case-by-case basis to ensure timely resolution of these issues.

C. Special Hazard Extinguishing Systems.

Dry/wet chemical, carbon dioxide, halon, clean agent systems shall be connected to the building fire alarm system, if provided, in accordance with the requirements of NFPA 72. The actuation of the extinguishing system must sound the fire alarm as well as provide the function of the extinguishing system. (Reference the NFPA standard applicable to the type of system).

Please note that a pre-action fire sprinkler system is a NOT special hazard extinguishing systems. Please do not attempt to design the alarm and detection portion of preaction systems as if they were.

D. Mass Notification Systems (MNS).

MNS is a specialized signaling system designed to get information to a wide area or population. The installation of a MNS is voluntary! However, there are restrictions and requirements that must be met should you choose to include this in your scope of work. Because the system design is based on a risk analysis, you must contact CSFD to coordinate a stakeholders meeting **prior to beginning your design.**

VI. INSTALLATION

A. Administrative Permits.

1. **Work at Risk.** If you need to start work prior to issuance of a permit, approval shall be obtained from CSFD Fire Construction Services to begin work. A letter is to be submitted to CSFD requesting the work at risk, and defining the justification for the request. The approved work at risk letter shall be posted on the job site until such time the installation permit is issued (IFC 105.3.4.1). The work at risk should be the last option you turn to, to avoid abuse of the system.
 - a. Request for Work at Risk (WAR) shall be submitted to CSFD Fire Construction Services on the fire alarm contractor's letter head.
 - b. The letter must include the name and address of the project, CSFD plan review number, proposed date that work will begin, the proposed work that will be performed prior to issuance of a permit, justification for the work at risk request, and the signature of the company's Responsible Managing Employee (RME).
 - c. Other considerations that will be taken in to account will be: the backlog of plans waiting for review and the number of expedited review requests currently in the office. Contractor performance history in both quality of plans and installations will be considered in granting a work at risk.

- d. The holder of the work at risk shall be authorized to proceed at their own risk with the installation or modification of the fire sprinkler system, but shall not entitle them to any required inspections of the system or work until drawings are approved and the required construction permit is posted on site.
 - e. Any work performed on fire alarm systems will be done at the risk of the installing contractor. Any required changes or modifications based upon approved plan review or inspection activities will be the responsibility of the contractor.
 - f. The granting of a work at risk does not eliminate the contractor's responsibility to maintain up to date red line drawings on site. Any red line modifications made prior to the contractor receiving approved plans and permit must be transcribed onto the approval plans in a timely fashion (prior to initial inspection).
 - g. An individual work at risk, a company's ability to participate in the work at risk program, or the entire work at risk program can be suspended at any time at the discretion of the Fire Code Official.
 - h. Removal of devices as apt of the demolition for a tenant remodel requires either a work at risk or approved plans on site.
 - i. Rough in of conduit and back boxes can be performed under a PPRBD Electrical Rough In permit and does not require a work at risk. The rough in permit does not allow you to set devices prior to CSFD approval.
1. **Demolition Permit.** Approval shall be obtained from CSFD to permanently remove a fire alarm system from a building. The approval shall be posted on the job site until such time the final inspection is completed. See decommissioning of system section of this guidance document for additional information.
 2. **5-Device Letters.** Any additions or remodels to an existing commercial fire alarm system involving 5 devices or less may be submitted to CSFD as a 5-Device letter. All 5-Device letters shall be submitted using the letter format template provided in the appendix of this document and shall follow these guidelines:
 - a. Letter shall be submitted to CSFD Fire Construction Services on the fire sprinkler contractor's letter head and be signed/sealed by an RME of the licensed submitting contractor
 - b. A contact name and phone number from the applicant shall be provided, should the CSFD have any questions.
 - c. The system will be installed in accordance with all applicable local codes, standards and regulations as appropriate (e.g., International Fire/Building/Plumbing Codes and NFPA 70, 72).
 - d. The scope of work is to include exact number and type of fire alarm devices being removed, relocated and/or installed
 - e. A time schedule for start and completion dates
 - f. A sketch of the work area showing the modifications
 - g. Specification sheets for new or relocated devices
 - h. Battery calculations and voltage drop calculations for scope of work
 - i. The CSFD Plan ID Number and/or RBD Building Permit Number assigned to the project's construction plan. If the work is not associated with a construction permit

(deficiency corrections etc.), then the "System Work Only" box is to be marked on the letter.

- 5 device letters shall be submitted a minimum of two business days before the start of the work.
- There is a limit of ONE letter per building permit scope of work.
- No fire inspections will be performed on this work unless a special request is made or CSFD elects to make quality control checks on the work being performed. Any additions or remodeling to existing commercial and residential fire sprinkler systems that involve 5 devices or fewer will not require the submittal of plans or calculations through CSFD.
- 5 device letters do NOT apply to the addition or relocation of devices that perform a control function, or other stipulations previously mandated and/or required by CSFD.
- The approved letter is your permit and shall be posted on the job site.
- Revisions to the scope of work conducted under a 5 device letter require a revised letter to be submitted. If the revisions cause the scope of work to exceed 5 devices, you must submit plans and obtain a full fire alarm permit.
- At the time the work is completed, a completed installer certification and record of completion shall be filed with CSFD within 2 business days.
- CSFD reserves the right to modify or delete any portion of this program as necessary for the safe monitoring and regulation of fire alarm system installations.
- Any additions or remodels to existing fire alarm system will require a rough-in permit and follow-up inspections performed by the Pikes Peak Regional Building Department.

B. Construction Permits.

1. A construction permit is required for installation of or modification to a fire alarm system per the adopted fire code. Any modification requires a permit (also see 5 device letter section).
2. New fire alarm systems shall not be installed nor shall modifications be made to existing systems until complete application has been submitted, and a permit has been issued, including an PPRBD rough in permit. The permit card and approved plans must be on site for reference by the Designer of Record, the installer and/or fire inspector.
3. Permits for fire alarm systems expire one year after date of issue. A 30-day grace period is allowed to renew the permit. After the grace period expires, if inspections have been conducted in the past 13 months, new plans and permit is not required to be submitted for issuance of a new permit. If the grace period has expired and no inspections have occurred in the past 13 months, new plans shall be submitted prior to issuance of a new permit.
4. Permits will be issued to match the scope of work of the building permit they are associated with. For example: if there are 3 separate building permits issued for interior remodels in different areas of the same building, the fire alarm submittals will receive 3 separate permits, regardless if they were submitted on one plan set or separate plan sets. This prevents failures of one scope of work holding up the final of another scope of work.

C. Permissible Omissions.

1. **Apartment Buildings with Breezeways.** To prevent nuisance/malicious alarms, a pull station is not required to be provided in exterior corridors (breezeways) of apartment buildings. However, one shall be provided in the utility closet to provide notification to building occupants while system is undergoing testing, maintenance or repair.

D. Smoke Detectors.

Smoke detectors shall not be installed until final cleanup of all trades has been completed. The shipping covers that come with the smoke detectors are not considered listed dust covers and are not to be considered as protection against dust or other contaminants (NFPA 72: 17.7.1.12.3).

VII. INSPECTION AND TESTING

A. Inspection.

It shall be the duty of the person doing the work authorized by a permit to notify the CSFD that the work is ready for inspection. It shall also be the responsibility of the person requesting the inspections to provide access to and means for proper inspection of the work.

Be advised that approval as the result of an inspection shall not be construed to be an approval of a violation of the provision of the adopted fire code, standards or of other ordinances of the City of Colorado Springs. Inspections presuming to give authority to violate or cancel provision of this code or of other ordinances of the jurisdiction shall not be valid (IFC 106.4).

All systems are required to be pre-tested in accordance with NFPA 72. Programming or programming changes will not be permitted during an inspection. If a laptop is seen or connected to the panel, it will be the inspector's discretion to continue with the inspection.

Systems shall undergo an acceptance test witnessed by CSFD. The building shall not be occupied or stocked with furniture until the sprinkler system has been inspected and approved by CSFD.

Fire alarm detection and notification devices shall be visually inspected for proper location, candela rating and installation in accordance with NFPA 72: 14.3.

A Rough-In Inspection permit shall be obtained from the Regional Building Department in accordance with PPRBC 208.5 to begin pulling wire. Be advised, wire, conduit and back-boxes are all covered under the Rough Permit. The RBD Electrical Inspector shall sign the CSFD permit card prior to our final inspection.

B. TESTING.

1. Functional Pre-Test Requirement. A full operational pre-test of the fire alarm system shall be performed PRIOR to the scheduled fire inspection and shall be documented on the Installers Certification form. Failure to pre-test will result in immediate failure of the inspection and the assessment of a re-inspection fee.
2. Notification appliances and circuits, alarm- supervisory- and trouble-initiating devices and circuits, primary and secondary power supplies, shall be tested in accordance with NFPA 72 Chapter 14.
3. The intelligibility of an emergency communication system is considered acceptable if at least 90% of the measurement locations within each ADS have a measured STI of at least 0.45 and an average STI of at least 0.50. Reference Appendix D of NFPA 72 for additional information.
4. A/C Power Loss and delays on reporting. The time delay in reporting A/C power loss must be accounted for. This will not be verified as part the CSFD inspection (See CSFD Admin Ruling). Provide documentation that this test was performed as part of the required pre-testing.
5. Communications are still required to be provided for final testing even if there is no owner for the building/residence! Without verification of monitoring, the system inspection cannot be finalized.
6. Re-acceptance Testing. Refer to NFPA 72 Table 14.4.3.2 for additional information.
 - a. When any initiating device, notification appliance or control relay is added, it shall be functionally tested.

- b. If any of the above is deleted, another item of the same description on the affected circuit shall be tested.
- c. When any modification to the control equipment is made, the control equipment shall be tested in accordance with NFPA 72: 14.4.
- d. When changes are made to site-specific software (this includes panel replacements), all functions known to be affected by the change or identified by a means that indicates changes, shall be 100% tested. In addition, 10% of the initiating devices that are not directly affected by the change, shall also be tested and correct system operation shall be verified. A revised record of completion shall be prepared to reflect these changes.

If functions are found to not be operational during an inspection, a 100% reacceptance test will be required.

C. Completion Documents.

1. The completed *Fire Alarm System Record of Completion* form is to be provided to the fire inspector at the time of inspection. This form is located in Chapter 7 of NFPA 72. Be sure to use the updated form in the 2016 edition of NFPA 72. Previous editions will NOT be accepted.
2. An owner's manual and installation instructions covering the fire alarm systems equipment.
3. A copy of the completed *Fire Alarm System Installer's Certification*
4. Permanent records in accordance with NFPA 72:14.6 shall be provided
5. Checklist for required system testing documentation:
 - Fire Alarm System Record of Completion
 - Point to Point Wiring Diagrams
 - Individual Device Interconnection Drawings
 - Approved As-Built/Record Drawings
 - Copy of Original Equipment Submittals
 - Operational Manuals
 - Manufacturer's Proper Testing and Maintenance Requirements
 - Device Address List/Conventional Device Location List

System documents shall be housed in a documentation cabinet, installed next to the Fire Alarm Control Panel. See also, section 7.7 of NFPA 72.

LINKS

1. Administrative Rulings and 2015 IFC amendments can be found on the CSFD website at: <https://coloradosprings.gov/fire-department/page/fire-code-amendments-and-administrative-rulings?mlid=9796>

APPENDIXES

- A. Plan Requirements Checklist
- B. Public/Common Use Areas Requiring Notification
- C. Device/Appliances list for determining permit fees

- D. Fire Sprinkler/Fire Alarm flow chart for Elevator shafts and equipment rooms
- E. 5-Device Letter Template

Appendix A

Submittal Requirements per CSFD, NFPA 72 and IFC.

Drawings:

Cover Sheet/Title Block shall contain the following:

- Name of owner and occupant
- Location including full street address as assigned by RBD Enumerations, including Suite numbers
- Name, address, phone, FAX number and email address of installing contractor and designer
- RME of both designer **and** installer declared on the plans
- Signature/seal of RME's for designer **and** installer, if different, on both the drawings and the product data submittals
- CSFD Plan Review number or other designator (AL only)
- Written narrative providing intent and system description
- A list of the codes and standards, including the edition dates, that were used to design the fire alarm system
- Type of fire alarm system – zoned, addressable, intelligent
- Name, address and type (central, remote, proprietary) of monitoring agency.
- Occupancy Classification
- Occupant Load
- Indicate if the building is fully, partially or not sprinklered
- Building construction type and occupancy classification. If Multi-use, note separate occupancy classifications on the layout or key plan.
- Date of issue and any revision dates

Building Information:

- Site Plan – new buildings only, no smaller 1:50 scale, including location of FACP and sprinkler riser room, if one is provided
- Building Key Plan
- Details of ceiling geometries, including beams and solid joists, and ceiling height
- Building elevation detail/view to include interior cross sections showing typical areas, concealed spaces or unusual construction characteristics.
- Details showing structured and/or mechanical elements which might affect spacing permits.
- Point of Compass on every page.

System Information:

- ❑ Device Legend to include: Make, model, temperature rating if applicable, candela rating if applicable and quantity of each item
- ❑ Wiring Legend to include: Wire type and size, identify if wiring is enclosed in conduit, open, plenum, and power limited or non-power limited. Include type and quantity of conductors and conduit (if used) for each circuit
- ❑ Complete riser diagram showing:
 - General arrangement of the system in a building cross-section
 - Number of risers
 - Type and number of circuits in each riser – identify if wiring is enclosed in conduit, exposed, PL or NP
 - Type and number of system components/devices on each circuit, on each floor or level
 - Number of conductors for each circuit.
 - Wire color coding schedule
- ❑ Control unit diagrams shall include:
 - Identification of control equipment depicted
 - Location of control equipment
 - All field wiring terminals and terminal identifications
 - All circuits connected to field wiring terminals and circuits identifications
 - All indicators and manual controls
 - Field connections to supervising station signaling equipment, releasing equipment or emergency safety control interfaces where provided
- ❑ Address list (if applicable) - include the device identification number, type of device, location of the device and the location description to be displayed at the FCP
- ❑ Zone List (if applicable) - include the zone identification of each zone to be displayed at the FCP. In addition, a listing of the zones shall be included
- ❑ Power Connection to include emergency generator monitoring
- ❑ Location of primary power disconnecting means
- ❑ Calculations:
 - Battery calculations
 - Voltage Drop calculations
 - Deviations from listed spacing, such as reduced ceiling height or airflow, corridor spacing, or similar; or when otherwise called for in NFPA 72
- ❑ Intended areas of coverage
- ❑ Sequence of operations – matrix format
- ❑ Notification and evacuation signaling zones indicated
- ❑ Floor plan indicating use of all rooms and level identification

- Type and number of system components/devices on each circuit on each floor or level
 - The location of system duct smoke detectors shall be indicated. This information is to include the location of the remote test switch, when a remote test switch is required.
 - The location of smoke control/exhaust fans, vents, dampers and other similar equipment. This information is to include the design information on the smoke control/management system.
 - The location of all electromagnetic door holders and the smoke detectors that release those electromagnetic doors shall be shown. The ceiling elevation on either side of these doors must be indicated on the plans.
 - Include point-to-point wiring address/zone identifier or circuit number and candela rating as applicable
- Graphic scale on each sheet
- Location of Alarm control and trouble signaling equipment
- Location of Annunciator, if provided
- Location of FDC
- Location of monitor/control interfaces to other systems
- The location of all elevators and elevator equipment rooms shall be indicated
- All walls and doors – identify any smoke or fire-rated corridors and/or area separation walls as well as their rating
- When a new system is an addition to an existing system, enough of the old system shall be indicated to make all conditions clear
- Acoustic properties of spaces, where known
- ADS' identified and noted as requiring or not requiring intelligibility (Voice evac/ECS systems only)
- Design minimum audibility level for occupant notification

Submittals:

- Completed CSFD permit application
- Code Study showing code references for system requirements/features
- Manufacturer's Product Data, including system operation and maintenance manuals
- Compatibility listings
- Most recent Record of Completion – existing systems
- Most Recent Inspection Testing and Maintenance documents
- Risk Analysis as applicable (MNS)

Appendix B

Matrix of Submittal/Inspection Requirements

<i>Work</i>	<i>Submittal</i>	<i>Inspection Required</i>
New System or modification to existing system >5 devices	Full Plans, Permit Application Cut Sheets and Calcs	Yes
Control Equipment (Panels, Power Supplies, Communicators, Etc.)	Letter, Permit Application Cut Sheets and Calcs	Yes
5 Device Letter (No control functions)	Letter, Permit Application Cut Sheets and Calcs	No
Devices with Control Functions	Letter, Permit Application Cut Sheets and Calcs	Yes
Monitor/Relay Modules for purpose of monitoring new suppression system	Letter, Permit Application, Cut sheets and calcs	Yes
Monitor/Relay Modules, not as described above	Letter, Permit Application, Cut Sheets, and Calcs	No
Panel Re-Programming	Letter, Permit Application, Cut Sheets, and Calcs	Yes

Appendix C

Public/Common Use Areas Requiring Notification

The Fire Alarm Committee Members established a list of rooms that will be used as guidelines when designing a fire alarm system.

The rooms requiring notification appliances include, but not limited to:

- Reception Lobbies
- Waiting Lobby/area
- Conference/meeting rooms
- Corridors
- Restrooms
- Elevator Lobbies
- School Office Areas
- School health/nurse rooms
- Places of assembly:
 - ⇒ Theater, Auditorium, Gymnasium etc.
- Classrooms
- Accessible Rooms
 - ⇒ Hotels
- ⇒ Handicap & Hearing Impaired rooms etc.
- Locker/shower rooms
- Indoor Pool Areas
- Public Hotel Laundry Rooms
- Break/lunch rooms
- Dinning/cafeteria rooms
- Sales floors/customer areas
- Music Practice Rooms
- Shared offices greater than 100 sq. ft.
- Libraries
- Mechanical/electrical/data/phone/utility rooms greater than 300 sq. ft.
- Medical exam rooms

- Parking Garages will be a pre-designed basis. Contractors will need to contact CSFD/DRE for parking garage structures prior to submitting fire alarm plans.
- Copy/mail rooms greater than 100 sq. ft.
- Dressing rooms
- Open work areas greater than 100 sq. ft.

Appendix D

Device/Appliance list for Determining Permit Fees

One fire alarm system device/appliance shall be considered any one of the following when determining permit quantities:

- | | | | |
|----|--|-----|--|
| 1. | A smoke or heat detector | 10. | A secondary address point |
| 2. | A visual notification appliance | 11. | A line type detector, per continuous line |
| 3. | An audible notification appliance | 12. | A magnetic hold open device, powered by a control panel/power supply |
| 4. | A combination audible/visual appliance | 13. | A control panel* |
| 5. | A beam detector* | 14. | Communication panels* |
| 6. | A remote power supply* | | |
| 7. | A remote annunciator* | | |
| 8. | A duct detector* | | |
| 9. | A secondary control panel* | | |

* Items are not eligible for 5-device letter program.

Appendix D

Elevators and Fire Sprinkler/Fire Alarm Requirements

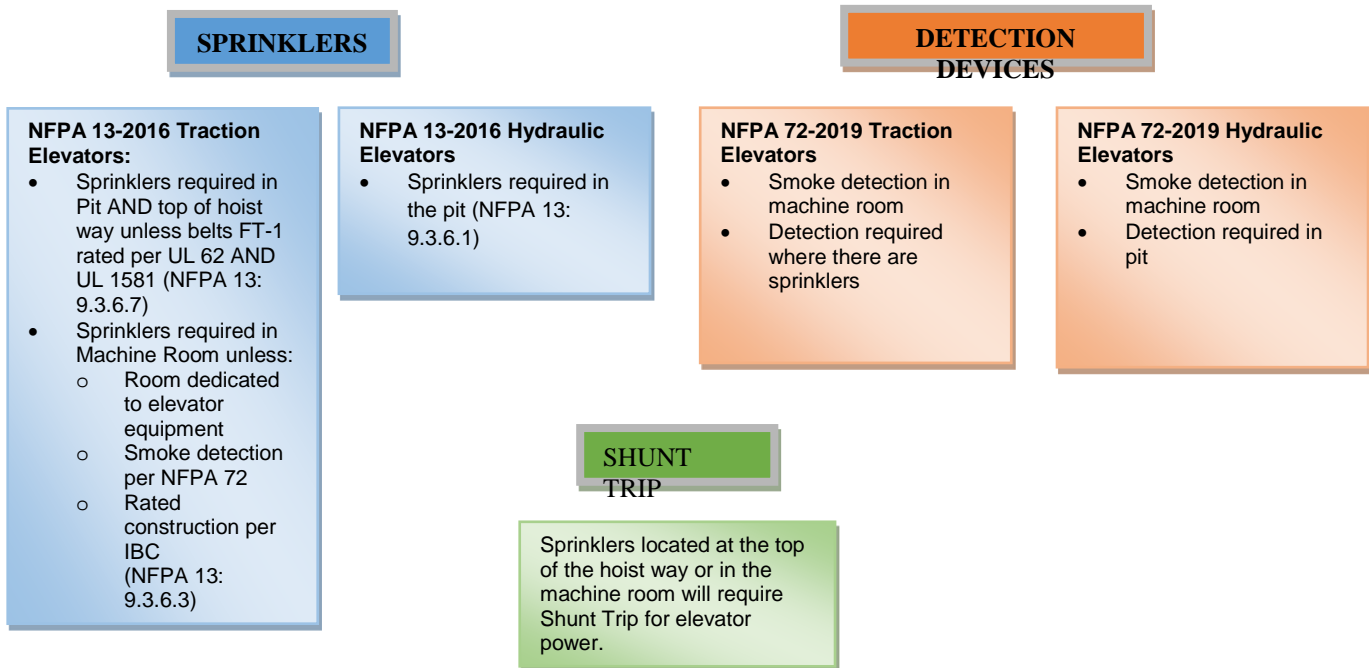
**Codes: 2019 NFPA 13
2019 NFPA 72
2015 IFC**

With changes in elevator technologies, the fire sprinkler and fire alarm requirements are continually trying to keep up. Different elevators have different requirements. Even different sprinkler systems have different requirements.

Buildings protected by NFPA 13R and 13D sprinkler systems do not have any special requirements when it comes to elevator protection.

2019 NFPA 13R 6.6.6: Sprinklers are not required in elevator machine rooms or shafts, where the elevator installation complies with ANSI A17.1 (Elevator code)

2019 NFPA 13D 8.3.5: Sprinklers are not required in elevator machine rooms or shafts.



Appendix E

CSFD Construction Services 5 -Device Letter Template

Company Information (Designer):

Date:

Company Information (Installer):

Project Name and Address:

Area of work in the building:

CSFD Plan Review #:

PPRBD Permit #:

System Work Only

Reason for work:

Remodel

Deficiency

System Type:

Addressable

Zoned

Dedicated Function

Number of Devices:

Added

Relocated

Removed

Work is scheduled to start:

Work is scheduled to be completed by:

Scope of work:

Check to acknowledge that a sketch for the scope of work and battery calculations has been provided.

Signature and Date by Design Contractor's RME

Signature and Date by Installing Contractor's RME

By providing the company's responsible managing employee's signatures it is acknowledged that all new and existing devices are compatible. It is also, acknowledged that the system will be installed in accord with all applicable local and notional codes and standards.