

# FIRE ALARM SYSTEMS INFORMATION PACKET



## Colorado Springs Fire Department Division of the Fire Marshal

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## PURPOSE

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This information packet has been developed in an effort to provide the highest level of service to the customers of the Colorado Springs Fire Department. The major goal of the fire alarm plan reviews conducted by the CSFD Construction Services is to insure the design of fire alarm systems meet the minimum requirements of the adopted codes and ordinances. To meet this goal, the submitted plans and supporting documentation must contain all the necessary information needed to conduct a thorough review.

## SCOPE

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

## DEFINITIONS

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CSFD	Colorado Springs Fire Department
FACP	Fire Alarm Control Panel
FSA	Fire System Annunciator
IFC	International Fire Code
NFPA	National Fire Protection Association
PPRBC	Pikes Peak Regional Building Code
RBD	Regional Building Department

## GUIDELINES

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### I. INTRODUCTION

#### A. APPLICABLE CODES AND STANDARDS.

1. Adopted International Fire Code and local Amendments.
2. 2016 NFPA 72 National Fire Alarm Code.
3. 2014 NFPA 70 National Electrical Code.
4. Colorado Springs City Ordinances.
5. CSFD Administrative Rulings and Interpretations.

#### B. ADMINISTRATIVE REQUIREMENTS.

1. **Approved Contractors.** All fire alarm contractors shall obtain a Colorado Springs Fire Alarm Contractor 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 the Regional Building Department, Contractor Licensing at 719-327-2887 for additional information. See also 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 license from the Regional Building Department.

RME's of all FAC-A and FAC-B contractors involved on the project shall be declared on the plans and product cut sheets through their signature and date with the appropriate certification number.

2. **Approved Installers.** A Colorado Springs Licensed Installer shall be on-site for all installations, additions, alterations, repair and inspections of fire alarm systems. Installers are required to obtain and maintain a minimum of NICET Level 2 Fire Alarm certification OR pass a locally administered test. This NICET certification/passing grade shall be registered with, and an Installers wallet card obtained from Pikes Peak Regional Building Department. These requirements also apply to service personnel. See also section 10.5 of NFPA 72 for additional requirements of installers and service personnel.
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 the January 1<sup>st</sup> of the year following the effective date printed in the standard. Fire alarm systems shall also meet the requirements set forth in adopted ordinances and CSFD Administrative Rulings.
4. **Permits/Inspections.** Required plan submittal with approvals, permits and associated inspections must be secured through the CSFD. A Regional Building Rough-in Permit must be obtained in addition to the required permits obtained from CSFD.
5. **Special Circumstances.** Depending on the scope of work, different types of submittals may be required; therefore you may want to contact CSFD Construction Services for any additional guidance. For example, a performance based installation must be substantiated with documentation such as fire models with scenarios chosen by and/or acceptable to the Fire Code Official and/or documentation from an independent testing agency or manufacturer supporting the proposed design.
6. **Alternative Methods.** If special building conditions and/or restrictions exist (for example a SCIF room) that may prohibit any of the requirements set forth in adopted codes, rules, regulations, etc. from being met, approval by the CSFD Construction Services for an alternate installation will be required. This alternate method must be approved before any installation of the system begins. In some cases, the alternative method may be referred to the Fire Board of Appeals for consideration.
7. **Non-Required Systems.** All non-required fire alarm systems and/or features shall meet the requirements of adopted codes and standards. Additionally, they shall be submitted for review and approval to CSFD Construction Services.
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-Builts.** All deviations from approved plans shall be documented and submitted to CSFD for archival. Reviews will not be conducted on As-builts, unless specifically required by the fire inspector, as these field changes are often verified as compliant by the fire inspectors. All as-built plans shall be conspicuously marked as such.

## II. SUBMITTAL INFORMATION

Submittals shall be of sufficient clarity and quality to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of the IFC, and other relevant laws, ordinances, rules and regulations adopted by Colorado Springs, and as determined by the Fire Marshal. You may refer to the attachments section of this packet for a more complete

checklist of items required to be provided on the submitted plans. Also reference the documentation requirements of Chapter 7 of NFPA 72.

**A. MINIMUM REQUIREMENTS OF THE CSFD FOR 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.
2. **Plan Review Number.** Drawings shall be provided with a **CSFD Plan Review Number**. This number is an eight-digit numeric code located on the back of the Architectural/building permit plans. Some projects are fire alarm work only, please indicate such.
3. **Number of Drawing Sets.** A minimum of 2 sets of fire alarm plans shall be submitted to the CSFD and shall include the items found in the checklist provided within this packet. Please roll the plans, as opposed to folding them, as this method is more appropriate for our plan bins and easier to transport within the office. A maximum of 3 original sets may be stamped with our approval.
4. **Cut Sheets/Specifications.** One 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.

Cut sheets shall be rolled inside the plans to prevent them from becoming separated, if the cut sheets are too large to feasibly roll them, a binder identifying the project is acceptable. 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.

5. **Secondary Power Calculations (Battery Calculations).** A minimum of 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.
  - 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 series or parallel.

NEW! Battery calcs 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 note of the battery size on the riser diagram.

6. **Voltage Drop Calculations.** Two sets of voltage drop calculations shall be submitted with the plans. Sample calculations may be obtained from CSFD Construction Services. These calculations shall include the following information:
  - a. The total number of devices on each wiring circuit.
  - b. The current draw of each device.
  - c. The maximum length of wire utilized on each circuit.
  - d. The wire size being used.
  - e. The voltage remaining at the last device.
  - f. Intelligent Horn/Strobes must show the manufactures information of how the voltage drops shall be calculated.
  - g. 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.
  - h. Indicate method used and show all formulas/equations.
7. **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 located in NFPA 72 Figure A.14.6.2.4.
8. **Permit Application/Code Study.** A permit application is found at the end of this document. Be sure to include it with all submittals to CSFD. Incomplete applications may result in a disapproval status. Indication of the design criteria/requirements for the system being submitted shall be provided. The permit application shall include occupancy classification and occupant load, whether the system is conventional or addressable, the existing evacuation tones and the presence of any extinguishing systems as well as specific references from the applicable fire code, NFPA standards and any other design standards utilized such as FM Data sheets. Existing conditions and any non-required and/or owner specified equipment shall also be declared.
9. **NEW! 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.
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.**

Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provision of the IFC, and relevant laws, ordinances, rules and regulations as determined by the CSFD.

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 copying.

When a project is associated with a building permit, alarm plans shall reflect the building plans as approved under the building permit. The scopes of work must match. 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.

Refer to the attachments within this packet for a checklist of items to be included on your drawings.

### 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 72:10.17.3). Annunciators should be mounted at approximately eye level.
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 72:10.4.4.

#### B. ZONED SYSTEMS.

1. Each floor of a multi-floor building shall be zoned separately.
2. Manual and automatic initiation devices located within the same fire zone or floor may be wired on the same zone. Duct detectors shall be zoned separately from manual and automatic devices.

#### C. 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 communications methods shall be clearly identified on the plans.
3. **NEW! 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. Prior to termination of service, CSFD shall be notified (26.2.6).

#### D. 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.

#### E. 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 and existing equipment shall be designated with "N" 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 issues 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 will 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.
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. Only ONE 5-device letter per project is permitted! Refer to 2009 IFC 901.3.1.1 for additional information and restrictions. Such submissions shall include the following information:
  - a. Letter shall be submitted on a licensed contractor's letterhead.
  - b. All work performed will be completed by the licensed contractor indicated on the letterhead or as declared in the letter if other than the submitting contractor.
  - c. The power supply is of sufficient capacity – power and voltage drop calculations shall be included verifying this statement.
  - d. The system shall be installed in accord with all applicable local and national standards.
  - e. Scope of work being conducted including the building name and address as well as interior area location. A sketch may be the easiest way to depict the scope of work, but is not required.
  - f. Time schedule for the work being performed, including start and completion dates.
  - g. CSFD plan review number OR statement "System Work Only" shall be provided. Please include the RBD permit number as applicable.
  - h. A statement attesting to the compatibility of all new and existing equipment and devices. At the time the work is completed, a certificate of compliance shall be filed with the Division of the Fire Marshal.

At the time the work is completed, a certificate of compliance shall be filed with the Division of the Fire Marshal.

Any devices having control function (smoke detector for door release, elevator recall, duct detectors, etc.) are not eligible for this program. Please reference the chart towards

the end of this document for additional guidance. Address list of initiating devices must indicate if a device is initiating a control function.

4. **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. Refer to Administrative Ruling 2007-6 for additional information.

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.

**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.**

5. **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.

6. **NEW! 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.

#### **F. ALARM VERIFICATION AND POSITIVE ALARM SEQUENCE.**

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

Positive alarm sequence is permitted in the City of Colorado Springs with prior approval from the fire department. A letter of request shall be submitted to the 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 tested with these features in place.

#### **G. 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 an Acoustically Distinguishable Space which 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' are 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. Table S2.4 can be of use when utilizing wall mounted appliances. 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 adequate.

#### **H. 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.

#### **I. COMMUNICATIONS.**

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.

Communicators for new systems will be permitted by the contractor installing the system as part of that system permit. If the dialer is being installed by a third party, they will have to obtain their own permit.

If the communications technology is changing (i.e. from phone lines to radio) a permit and inspection is required.

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.

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 the Division of the Fire Marshal for more information regarding Knox Boxes for existing structures.

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.

Be advised, cellular communications is NOT permitted on commercial systems utilizing a DACT by NFPA 72:26.6.4.1.4! Also note that separate technologies are required – you can no longer use two phone lines on DACTs.

#### **J. NEW! 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, and a permit application (with submittals) is submitted by the next business day after the work is completed.

- K. **New! Decommissioning Systems.** When systems are to be removed from service, a letter shall be submitted to CSFD Construction Services detailing the reason(s) for the system being removed. Information on the building, occupancy classification and occupant load shall be included.

### **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)**

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

NEW! See flow chart in Attachments section for guidance for fire alarm requirements for elevator equipment.

Shunt trip of elevators is not permitted in Colorado Springs. If you are working on a healthcare facility, please contact Construction Services for assistance in coordinating the requirements among the various agencies. Shunt trip will be required in healthcare facilities by State and Federal agencies.

Elevator Recall functions shall include a 3<sup>rd</sup> 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.

Elevator Recall system shall be tied to the building fire alarm system if provided.

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.

**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 20 for all occupancies. There are exceptions to this, please refer to the IFC and local amendments for these exceptions.

Buildings intended to serve more than one tenant, where access to each tenant space is from the exterior (i.e. a strip mall), need not be equipped with an audible and visual sprinkler flow alarm on the interior of the building to alert occupants provided an alarm system is not required by other code provisions per the IFC. Additionally, a pull station is not required for buildings intended to serve more than one tenant. For single tenant buildings (big box retailers), the pull station should be located by 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 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 becomes a fire alarm system.

**C. DUCT DETECTORS AND FIRE/SMOKE DAMPER DETECTORS.**

Duct detectors required by the provisions of the 2009 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 waterflow alarm system or an elevator recall system.

If the fire alarm panel is monitoring smoke damper detectors, the smoke damper 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. NEW! Two-Way Emergency Communication Systems**

Two way communication systems as required by IFC 1007.8 shall be submitted and approved by CSFD.

Two way communication systems shall meet the requirements of NFPA 72: 24.10 and 24.11.

Two way communication system wiring shall be per NFPA 72: 24.3.13.9 and 24.3.13.10.

Two way communication systems shall notify a constantly attended location (i.e. front desk at hotel), or be configured that the communication system contacts the owner's monitoring company for verification of emergency prior to contacting CSFD. The reason for notifying the monitoring company prior to notifying CSFD is to cut down on the number of false alarms that occur in unmanned locations (i.e. apartments)

## 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 packet attempts to indicate the differences and similarities while providing the basic requirements.

Audible fire alarm signals shall meet the performance requirements of NFPA 72:18.4.3, and 18.4.5 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. The audible signal shall be that of the emergency evacuation tone described in ANSI S3.41 which is the temporal 3 evacuation tone.

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 Hillside Overlay 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. One telephone line.

### 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 fire/burglary systems!**

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

### 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 preaction fire sprinkler system are 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. Please contact Construction Service for assistance on these complex systems, **prior to beginning your design.**

## **VI. INSTALLATION**

### **A. ADMINISTRATIVE PERMITS.**

1. Work at Risk. Approval shall be obtained from CSFD to install devices/appliances prior to issuance of a permit. A letter is to be submitted to CSFD requesting the work at risk, and defining the justification for the request. The work at risk approval shall be posted on the job site until such time your installation permit is issued. Work begun under a work at risk proceeds at the installing company's risk. Inspections will not be conducted under a work at risk permit.
2. Demolition Permit. Approval shall be obtained from CSFD to permanently remove a fire protection system from a building. The approval shall be posted on the job site until such time the final inspection is completed.
3. 5-Device Letters. Any additions or remodels to an existing commercial fire alarm system involving 5 devices or less will not require plans submittal or a construction permit when approved by the CSFD. Upon approval, the letter is considered an administrative permit and must be posted on the job site in lieu of the formal construction permit.

### **B. CONSTRUCTION PERMITS.**

1. A construction permit is required for installation of or modification to a fire alarm system per the adopted fire code. Maintenance is defined as the work necessary to keep equipment operable or to make repairs. An example of maintenance work would be calibration of detectors or cleaning battery connections.
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 RBD rough in permit. To begin work prior to plan approval, refer to the Work at Risk section. The permit card and approved plans must be on site for reference by the Designer of Record, the installer and/or fire inspector.
3. A Rough-In Inspection permit shall be obtained from the Regional Building Department in accordance with PPRBC 208.5 to begin pulling wire. The RBD Electrical Inspector shall sign the CSFD permit card prior to our final inspection.
4. 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.

If the grace period has expired and no inspections have occurred in the past 13 months, new plans shall be submitted. Refer to IFC 105.3.1 for further information.

5. 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. PLAN REVIEW AND PERMIT FEES.**

Fees for review and permits are based upon the proposed number and type of devices/appliances. Fees are due upon plan approval. Our fee schedule can be accessed on our website.

#### **D. APPROVED CONTRACTORS.**

A Colorado Springs licensed Installer shall be on-site any time the system is being worked on, to include all installations, additions, alterations, repair and inspections of fire alarm systems.

#### **E. PERMISSIBLE OMISSIONS.**

1. **Multi-Tenant Buildings.** A pull station is not required to be provided in strip mall type buildings.
2. **Apartment Buildings with Breezeways.** A pull station is not required to be provided in exterior corridors (breezeways) of apartment buildings.

#### **F. 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 72:17.7.1.11.3).

### **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.

Don't put the inspectors on the spot. Call before they walk on the site with any questions and get them resolved up front with all parties involved. Additionally, if you want them to be consistent, compliance with the minimum codes is a must.

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. It shall be unlawful to occupy any portion of a building or structure until the required systems have been tested and approved by the 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.

#### **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 of our inspection. 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 cannot be finalized.
6. Re-acceptance Testing. Refer to 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**

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1. Administrative Rulings can be found on the CSFD website at:  
<https://csfd.coloradosprings.gov/public-safety/fire/fire-code-and-permits/fire-code-amendments-and-administrative-rulings>
2. Amendments to the 2009 International Fire Code can be found on the CSFD website at:  
[https://csfd.coloradosprings.gov/sites/default/files/fire/files/DFM/Admin\\_Rulings\\_Amendments/09ifc\\_firecodeamendments.pdf](https://csfd.coloradosprings.gov/sites/default/files/fire/files/DFM/Admin_Rulings_Amendments/09ifc_firecodeamendments.pdf)

## **ATTACHMENTS**

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Plan Requirements Checklist

Public/Common Use Areas Requiring Notification

Device/Appliances list for determining permit fees

NEW! Fire Sprinkler/Fire Alarm flow chart for Elevator shafts and equipment rooms

Permit Application

## 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:
  - o General arrangement of the system in a building cross-section
  - o Number of risers
  - o Type and number of circuits in each riser – identify if wiring is enclosed in conduit, exposed, PL or NP
  - o Type and number of system components/devices on each circuit, on each floor or level
  - o Number of conductors for each circuit.
  - o Wire color coding schedule
- Control unit diagrams shall include:
  - o Identification of control equipment depicted
  - o Location of control equipment
  - o All field wiring terminals and terminal identifications
  - o All circuits connected to field wiring terminals and circuits identifications
  - o All indicators and manual controls
  - o 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:
  - o Battery calculations.
  - o Voltage Drop calculations.
  - o 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)

**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

## 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

## Notification Requirements for Public Accessible/Common Use Rooms

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 devices include, but not limited to:

- Reception Lobbies
- Waiting Lobby/area
- Conference/meeting rooms
- Corridors for public areas
- 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.
- Counselor offices
- Locker/shower rooms
- Indoor Pool Areas
- Public Hotel Laundry Rooms
- Break/lunch rooms
- Dinning/cafeteria rooms
- Sales floors/customer areas
- Music Practice Rooms
- Work room/office space greater than 100 sq. ft.
- Libraries
- Mechanical/electrical/data/phone/utility rooms greater than 300 sq. ft.
- Medical exam/treatment/patient care 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.

## Definition of Fire Alarm Devices/ Appliances

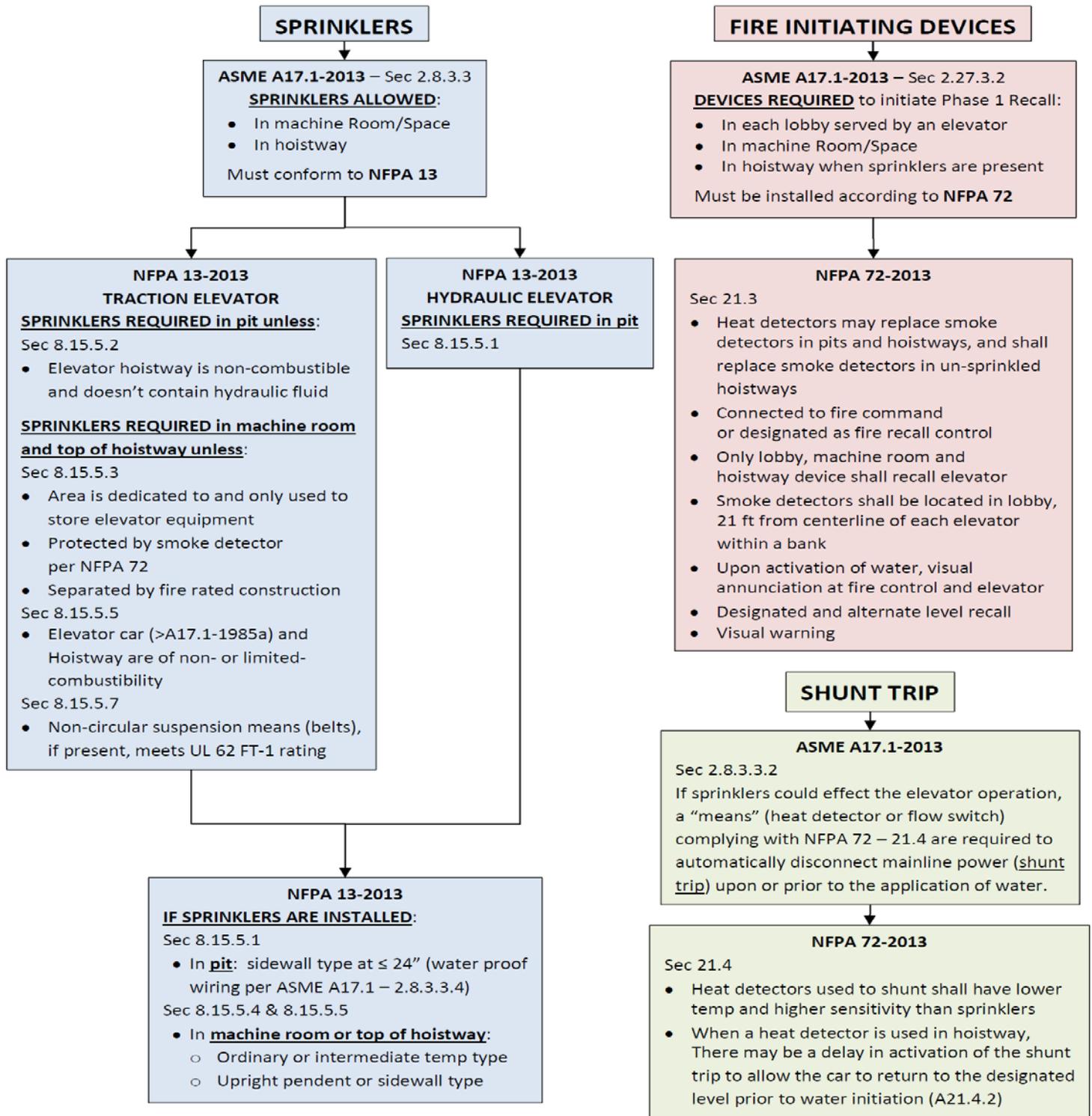
One fire alarm system device/appliance shall be considered any one of the following when determining permit quantities:

1. A spot detector
2. A visual notification appliance
3. An audible notification appliance
4. A combination audible/visual appliance
5. A beam detector\*
6. A remote power supply\*
7. A remote annunciator\*
8. A tamper switch
9. A valve closure switch
10. A high/low pressure indicator switch
11. A manual initiating appliance
12. A supervisory switch connected to the alarm system
13. A secondary control panel\*
14. A secondary address point
15. A line type detector, per continuous line
16. A magnetic hold open device
17. Or similar individual piece of equipment or appliance.
18. A control panel\*
19. Communications panels\*

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

## Requirements for Sprinklers and Fire Initiating Devices

*The reason for any deviation from these requirements must be provided by the local fire authority to OPS in writing.*





## Fire Alarm System Permit Application

This form must be completed and attached to the front of plans

Initial Review     Re-Review     Overtime Review     Revision

PROPERTY INFORMATION:

Property Address: \_\_\_\_\_ Suite \_\_\_\_\_

Tenant: \_\_\_\_\_

Owner's Name : \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

CONTRACTOR INFORMATION:

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Email: \_\_\_\_\_

**Information to be provided on the plans check all that apply:**

- |  |   |  |
|--|---|--|
| <input type="checkbox"/> CSFD Plan Review Number                               | <input type="checkbox"/> Equipment Data Sheets                                      | <input type="checkbox"/> Narrative Scope of Work |
| <input type="checkbox"/> Project address, Suite #                              | <input type="checkbox"/> Designer & Installer Address(es)                           | <input type="checkbox"/> Device Legend           |
| <input type="checkbox"/> Voltage Drop Calculations                             | <input type="checkbox"/> Battery Calculations                                       | <input type="checkbox"/> Compatibility Listing   |
| <input type="checkbox"/> Sequence of Operations Matrix                         | <input type="checkbox"/> Verified Within City of Colorado Springs Fire Jurisdiction |  |
| <input type="checkbox"/> Plans, Calculations, Cut Sheets signed/sealed by RMEs |   |  |

## THIS PLAN IS READY FOR PICK-UP

APPROVED/APPROVED AS CORRECTED

DISAPPROVED/WITHDRAWN

FEES DUE: \_\_\_\_\_

• Reviewer: Withee     Taylor     Peterson     Other  \_\_\_\_\_

Comments:

\_\_\_\_\_

**Please do not call our office regarding plan review comments until after pickup and review by your office.**

Plan Review Status/Comments available online at:

[http://springsgov.com/units/fire/Prevent/PlansReview/FPS\\_WebFPS.asp](http://springsgov.com/units/fire/Prevent/PlansReview/FPS_WebFPS.asp)

**\*\* All plans remaining in our office more than 30 days will be discarded as abandoned**



**Building Information:**

Occupancy Class:  Assembly  Business  Education  Institutional  Mercantile  
 Residential  Special Amusement  Other \_\_\_\_\_  
Occupant Load:  >50  >100  >300  >500  >1000  
High Rise:  Yes  No # of Floors: \_\_\_\_\_  
Is bldg provided with PBX system (Dial 9 outside line)?  Yes  No

**System Information:**

Scope of Work:  New  Existing  Existing Audible Signal \_\_\_\_\_  
If existing, please attach a copy of the most recent inspection report  
 Addressable  Conventional  
 Addition/Modification, provide original install date/codes/editions \_\_\_\_\_  
 System Replacement/Upgrade provide reason \_\_\_\_\_  
 Panel Replacement, provide reason \_\_\_\_\_  
Provide Make/Model of both panels: \_\_\_\_\_

Is this System  Required  Voluntary Provide IFC Code Section: \_\_\_\_\_

Type of System:  Manual  Automatic  
 Dedicated Function, what function(s) \_\_\_\_\_  
 Mass Notification; include Risk Analysis and Emergency Response Plan  
 Household

Auxiliary Functions:  Door Release  Elevator Recall  Duct Detectors/Dampers  Voice Alarm  
 Suppression Monitoring  Special Hazard Releasing  Smoke Control/Mgmt  
 Any Non-required/Owner Specified Equipment: \_\_\_\_\_

Communication Method:  DACT  IP/DACT  Radio  Cellular  Other: \_\_\_\_\_  
Circuit/Pathway Class:  A  B  C  D  E  X  
Circuit/Pathway Survivability:  Level 0  Level 1  Level 2  Level 3

Any additional information we need to know about this system? (Scope of work, requirements, code sections, intent of the system, owner specifications, etc.): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I understand and agree that my failure to provide accurate, true and correct information shall constitute grounds for rejection or denial of my submittal. I understand these are requirements of the adopted codes and standards, rules and regulations of the jurisdiction.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_ Print Name: \_\_\_\_\_

<b>Office Use Only</b>	
Address: _____	
Plan Review Number: _____	Permit Fees: _____
Building Permit Number: _____	Date: _____

