



Riverside County Fire Department

Fire Alarm, Water Flow Alarm, & Signaling Systems Guideline OFM-05

PURPOSE

The purpose of this guideline is to facilitate the design and installation of these systems conform to adopted codes and standards. Plans (shop drawings) shall be submitted for review and approval by the Riverside County Fire Department-Office of the Fire Marshal (RVC-OFM) for new, rehabilitated, and modified systems, prior to installation.

SCOPE

The 2022 California Building Code (CBC) and California Fire Code (CFC) specify where the systems are required. These codes and the 2022 National Fire Protection Association Standards (NFPA) 72, including California State Fire Marshal amendments (CFC Chapter 80) apply to the design, installation, operation, testing, and maintenance of the systems.

PLAN SUBMITTAL REQUIREMENTS

All plan submittals and revisions must be electronically submitted via the RVC-OFM PLUS portal at: <https://rivcoplus.org>. Plan review and subsequent inspection services are provided on a deposit basis and due at the time plans are submitted.

The plans/shop drawings shall contain the following (as applicable):

1. Scope of Work Statement; Include all of the following information in the scope of work, on the plans:
 - A. Provide a brief description of the system being proposed or altered, and indicate if the system is manual, automatic, public/provide operating mode, voice evacuation, etc.
 - B. Describe in detail:
 - 1) The limits of the work for this specific set of plans.
 - 2) Describe the reason when modifying an existing alarm or water flow system.
 - C. State the CBC Occupancy group from the approved building department architectural plans. (Contact the project architect).
 - D. State if you are you proposing a system or specific devices that are not required by codes (and/or) if you are applying current codes that are designated for new buildings into a tenant improvement project.
 - E. Identify the occupant load on the first floor and other floors, when applicable. (NOTE: Coordinate with the project architect if necessary)
2. Design, Coordination, and Installation Information: (Provide all)
 - A. Designer's name, license number and phone number.
 - B. Coordinator of design/install name and phone number.
 - C. Installing contractor's C-10 License number.
4. Project Identification: Complete address of the project (include building names/numbers, suite numbers, tract and lot numbers for residential projects, and Assessor's Parcel #).

5. **Device Data Sheets:** Provide a single set of device manufacture data sheets, and current CSFM Listing sheets for all devices. Highlight the specific model and power consumption requirements.
6. **Complete Shop Drawings:** Provide a scaled floor plan (no smaller than 1/16" =1') showing the location of all devices involving your scope of work. Label all areas that are not part of the job scope. Shop drawings shall meet the requirements of CFC 907.1.2 and shall include the following, but not limited to: Zone requirements, riser and point to point diagrams showing number of devices on each circuit, floor identification, all walls and doors, a description of use for each room, terminal and circuit identification, power supplies, and any other information needed to demonstrate the function of the system. Drawings shall use the symbols identified in NFPA 170.
7. **Equipment Legend/Bill of Materials:** The legend shall indicate newly added, relocated, and replaced devices and appliances. (This shall match the device count on the RVC-OFM notes). The legend shall also provide device symbols, manufacturer name, model number, and the California State Fire Marshal listing numbers.
8. **Annunciator and Main Fire Alarm Control Unit(s) (FACU):** A remote annunciator indicating device is required when the FACU is not located in an area that the fire department would initially respond to or is in an area that may be difficult to gain access to. The annunciator should be placed in or near the front lobby or entrance area. In multi-tenant suites, locate the annunciator in the lowest numbered/lettered suite or the lowest street address. The FACU should be within a secure environment, electrical, mechanical, service, or riser room which is best accessed from the exterior of the building.
For scenarios involving multi-buildings and subsystem fire alarm control units (Subpanels): When the FACU is in one building and a subpanel is located within another building(s), the FACU shall reset automatically when a subpanel is reset. On the contrary, the FACU shall not reset any subpanel. (NFPA 72 Section 23.8.2.9.)
9. **Voltage Drop and Battery Calculations:** Voltage drop shall not exceed the minimum device specifications needed to meet the device listing. Voltage drop calculations shall be provided for the most demanding circuit(s) in the area of work. The maximum allowable voltage drop on a fire alarm circuit shall not exceed the minimum listed operating voltage for the appliance/ devices within the circuit OR the maximum voltage drop included in the fire alarm control panel specifications, whichever is less.
Standby battery calculations shall include both standby and alarm conditions. Calculations are to be performed for 100% of the load. Any non-fire related security device load shall be included. A Minimum 25% safety margin above the calculated amp-hour capacity is required. The batteries shall maintain the system in stand-by mode for 24 hours in a non-alarm condition, and then immediately be able to operate all devices for 5 minutes. (15 minutes for voice evacuation systems). (NFPA 72 10.6.7.2, CFC 907.1.2)
10. **Automatic Fire Extinguishing Systems:** Where a building fire alarm is present, automatic fire-extinguishing systems shall transmit a fire alarm signal to an approved supervising station. The activation of the extinguishing system shall also activate all notification devices. (CFC 904.3.5)

11. Emergency Responder Communication Coverage Systems (ERCCS): When an ERCCS is provided within a building, the ERCCS shall be monitored by the fire alarm system, and shall include the following supervisory signals:

1. Loss of AC Power	2. Battery System Failure	3. Malfunction of donor antenna(s)	4. Failure of active RF emitting devices
5. Low battery capacity (<70%)	6. Failure of critical system components	7. The communications link between the ERCCS & fire alarm system	8. Oscillation of active RF emitting devices

12. Performance-Based Communication Technologies: Performance-Based Communication Technologies using SFM listed components as part of a single/ multiple communication path (Cellular, Internet, or Other technology) are acceptable. Provide the active SFM Building Materials Listing sheet indicating this approval. For communicators using a radio/cellular signal, also provide the manufacturers testing protocol on the plan (e.g., signal strength test).

*NOTE: When changing the type of communication path(s) to satisfy the legacy requirements of two phone lines, you can propose a cellular phone or an internet line as the primary signal line. A hard wired plain old telephone system (POTS) land line can only be used as the secondary line. The two POTS lines can continue to exist if still operating reliably, when **no change** is proposed to the communication paths. (NFPA 72 Section 26.6.3.3, 26.6.3.4).*

13. Passenger Elevator Recall/Shutdown: New elevators that have a travel rise that exceeds 80 inches will require Firefighter Emergency Operations (FEO) recall/shutdown (ASME17.1).

A. Include all related functions into the sequence of operations on the plans, if the project has an elevator that exceeds 80 inches of travel, the hoistway is required to be of fire-resistive construction, or the hoistway penetrates a floor. Ensure that the system meets all the requirements specified below and copy the following onto the plans:

Under the heading PASSENGER ELEVATOR NOTES incorporate into the plan (verbatim):

Phase One (Automatic and Manual Recall):

- **Phase One/Automatic** - Cab recalls to a designated floor level, or alternate floor level needs to be automatically activated by the hoistway, machine room, or elevator lobby smoke detectors; and elevator pit water-flow switch signal, when installed (NFPA 72 conditions of the exception must be met).
- **Phase One/Manual** - Cab recall shall also be designed for firefighters to activate manually, by using a key switch located at the elevator lobby, or fire alarm control panel.

Phase Two (Manual Recall Key Switch Operation):

- **Phase Two** - Recall overrides Phase One and is manually activated from inside the cab by using a key switch. Firefighters are required to press and hold buttons to command the elevator car door operations.

Firefighter’s Hat Lamp and Sounder Indications during Phase One and Phase Two Recall:

- Phase One activation in the cab causes the Firefighter Hat Lamp to glow, and a sounder to activate.
- Upon activation of a Fire Alarm Initiating Device (FAID) within the elevator hoistway or machine room, the Firefighter Hat Lamp in the cab will illuminate intermittently (off/ on). This alerts firefighters to exit the cab and not use the elevator(s) for FEO.

Heat Detector and Power-Shutdown (Shunt Trip Mechanism):

- Heat detector(s) in the machine room shall activate first to remove power to the elevator prior to sprinkler head activation.
- Hoistway shunt trip heat detector(s) are required when sprinklers are provided in the hoistway more than 24 inches above the pit floor.
- Heat detector activation shall cause a shunt trip mechanism to shut down the power to the elevator(s) to prevent FEO usage completely, to ensure firefighter safety.

Smoke Detection:

- Smoke detectors are not allowed in the hoistway without sprinklers present.
- A FAID (smoke detector) is required in the hoistway area occupied by an elevator driving machine.
- If the elevator lobby, hoistway, or machine room detectors are only dedicated to activating recall, then the signal is supervisory and therefore does not cause building evacuation.
- Unless codes specifically require a smoke detection system, common area detectors, door holders, or duct detectors just activate a supervisory signal. Other circumstances identified during plan review may be allowed for common area detectors to cause building evacuation and/or emergency response.

Associated Alarm Devices and Panel Operations:

- Manual fire alarm pull station do not recall elevators unless required by RVC-OFM during plan review.
- Dedicated recall devices shall be connected to the fire alarm or water flow panel. If there is no fire alarm or water flow panel, a dedicated stand-alone and signed recall panel must be installed.

14. Duct Detection: Duct detectors are only required to be tied to the main fire alarm panel when the alarm system is required by CFC 907.2. When tied to the main fire alarm panel, duct detection activation shall only cause a supervisory signal to the central supervising station. For buildings that only have a water flow alarm or buildings with voluntary alarms, the duct detector activation shall provide a visible and audible signal at an approved location but does not need to notify the central supervising station.

15. High-Rise Building Fire Alarm System requirements: Refer to CFC Section 907.2, 907.13.1, 907.13.2, 907.5.2.2, and 907.6.4.2.

16. Special Uses and Occupancies: Fire Alarm systems are required or may be required for uses identified in CFC Sections 907.2.14 through 907.2.24. These uses include High Piled Storage, Aerosol Storage, Lumber Mills, Underground Buildings, Covered Malls, Residential Aircraft Hangers, Air Traffic Control Towers, Energy Storage Systems, Motion Picture, and TV Production Studios.

17. Manual Fire Alarm Boxes (Manual Pull Stations): RVC-OFM does not require a manual fire alarm box for the initiation of a fire alarm signal as permitted per CFC 907.2 Exception 3. Pull stations installed for other specific reasons or specific locations may still be required or acceptable. CFC 907.4.2 Pull station covers, or their sounding devices will be evaluated on a case-by-case basis and shall be subject to RVC-OFM approval during the plan review. (CFC 907.4.2.5)

18. Alarm devices related to special door egress and access controls:
Plan Review and Inspection Timing Sequence Requirements:

- A. The fire alarm designer shall provide to RVC-OFM a separate copy of the approved architectural plans for the areas in which the special door egress and access controls are proposed.
- B. The related alarm component plans shall be approved by RVC-OFM prior to the installation of special door egress and access controls.
- C. The alarm panel related components shall be installed and inspected, prior to or concurrent with the installation of special door egress and access controls.

19. Hazardous Materials Warning Systems: All emergency warning systems for hazardous materials emergency initiations shall have visual notification appliances that are **blue** in color unless otherwise approved by RVC-OFM. Audible devices shall be of a different tone and pattern than the notification alarm system. (CFC 5004.9 and 908).

20. Occupancy Group E Specific Information: Emergency voice alarm communication systems are required when the final approved occupant load exceeds 50 occupants, or more than one classroom, or when day care is being provided and a fire alarm system is installed. (CFC 907.2.3). In these cases, the alarm plans cannot be approved until the architectural plans are approved. Smoke detection shall also be installed in every room used for sleeping or napping. (CFC 907.2.3.9.2).

21. Occupancy Group R-2 Specific Information: Dwelling and sleeping units shall be provided with the capability to support future visible alarm notification appliances. (CFC 907.5.2.3.3) This is required only when a fire alarm is required by CFC 907.2.9.1, such as when the building has 17 or more units, four or more floors, or there are dwelling/sleeping units located below the level of exit discharge. See CFC Section 907.2.9.1 to find more scenarios and exceptions requiring a fire alarm.

A. See CFC 907.5.2.3.3 for multiple strategies to provide the capability to support future visible alarm notification appliances. One acceptable example is as follows:

- 1) In lieu of actual pre-wiring for visible devices within the unit, provide approved electrical conduit installed in all units with suitable junction boxes and direct termination at the fire alarm control unit location. (RVC-OFM does not require pre-wiring within units and future damage to walls to install wiring later, is the choice of the owner and builder at the time of construction).
- 2) Fire alarms in these buildings have more requirements in addition to visible appliance capabilities in dwelling/sleeping units. See (CFC 907.5.1 through 907.5.2.3.4).

22. Sequence of operations for all systems: See the example below. Match the sequence you are proposing, to the sequence and signal types we provide you. Contact us prior to submittal if there is a discrepancy.

Example Sequence of Operations

(Differences may be approved on a case-by-case basis)

Emergency Response & Alarm Condition: (List both of these in separate rows)

Audible and Visual Notification System

Area Smoke and Heat detectors

Sprinkler Head Activation

Special Extinguishing System

Manual Pull Station

Supervisory Signals

Elevator Recall Devices in Lobby, Machine Room, or Shaft

Duct Detectors

Valve Tamper Signals

Door Closure Devices (unless for required area detection)

Power Failure

Generator, Fire Pump, Water Tank

Elevator Recall Signals

Firefighter Hat Lamp in Elevator Cab Glows:

- Elevator Lobby Smoke/Heat Detectors
- Recall Key Switches

Firefighter Hat Lamp in Elevator Cab Flashes:

- Machine Room or Hoist-way Smoke/Heat Detector

RVC-OFM standard notes, supervising station, and device count information for new, relocated, and replaced devices shall be provided by the system designer and incorporated into the system plans.

Riverside County Fire - Fire Alarm, Water Flow Alarm & Signaling Systems Notes, first fill any blank information and complete the bottom portion, and then copy the following notes on the plans verbatim:

1. Riverside County Fire (RVC-OFM) inspections are required for this project. Email: RRUOFMSCHEDULING@FIRE.CA.GOV. Please provide at least 2-days advance notice.
2. A system Pre-Test Report is required prior to final inspection by RVC-OFM. Coordinate with the Inspector on how/ when to provide the report.
2. The scope of work shall be tested by the installer prior to the RVC-OFM inspection to determine the system properly functions as approved on the plans. Upon completion of all testing, the installer shall provide a completed Certificate of Completion conforming to NFPA 72 requirements to both the owner and RVC-OFM Inspector.
3. This system was designed and installed under the _____ edition of the CFC, and the _____ edition of NFPA 72. (NOTE: The currently adopted codes are the 2022 CFC and 2022 NFPA 72).
4. Approved drawings and documents shall be retained. Drawings shall be accessible upon request. After final inspection, approved shop drawings and maintenance instructions shall be properly delivered to a representative of the occupying business, who shall offer copies to the building owner and retained in the system Document Box. (NFPA 72, 7.5.3 and 7.7.1)
5. Written records and reports of the alarm system testing, frequencies, and results shall be available for review on the premises for the RVC-OFM inspector during fire inspections.
6. Testing and service personnel shall be qualified and experienced per NFPA 72, 10.5.3.
7. Any future modifications to the system after this final RVC-OFM inspection shall cause a new plan to be drafted and submitted by the tenant or building owner. The modifications shall not be started until the new plans are approved by RVC-OFM. (NFPA 72, 7.5.6.6)
8. When the Fire Alarm Control PANEL (FACU) is in a room accessed through a door, a permanent sign shall be provided on the door indicating, "Fire Alarm Control Panel" or equivalent. When there are sub-panels, door signs shall also indicate where the main FACU panel is located.
9. A 24-hour emergency response phone number shall be permanently posted at the control panel.
10. The circuit breaker power disconnect shall only be accessible to authorized personnel and shall be identified as "FIRE ALARM". (NFPA 72, 10.6.5.2) The electrical panel with the fire alarm circuit shall be in a secure room, or a circuit breaker locking device shall be installed (NFPA 72, 10.6.5.4)
11. Storage batteries shall be marked with the month and year of manufacture. (NFPA 72, 10.6.10.1)
12. The batteries shall be able to run the system in stand-by mode for 24 hours without building power in a non-alarm condition, and then immediately be able to operate all devices for 5 minutes. (15 minutes is required for voice evacuation systems). (NFPA 72, 10.6.7.2, CFC 907.1.2)
13. If a 24-hour battery test was not required, RVC-OFM may require shut down of the AC power to verify trouble signals.

14. Batteries shall be fully charged under normal conditions and after a power loss event discharge. (NFPA 72, 10.6.10.3)
15. A battery charger failure shall be detected as a trouble signal. (NFPA 72, 10.6.10.6.2)
16. An alarm signal shall occur within 10 seconds after initiating device activations (NFPA 72, 10.11.1) The alarm signals shall be audibly distinctive from all other different types of audible systems or alarms. (NFPA 72, 10.10)
17. All audible alarm notification signals shall be a three-pulse temporal pattern. (CFC 907.5.2.1.3)
18. Audible alarm sound pressure levels shall be provided as specified by CFC 907.5.2.1. and 907.5.2.1.2
19. When more than two visual notification appliances are located within the same room or area, they shall be synchronized. (NFPA 72, 18.5.5.7.2)
20. Manual pull station key(s) should be placed in the Document Box or FACU box or sprinkler head box.
21. When tied to the main fire alarm panel, duct detector activations shall only cause a supervisory signal to the central supervising station.
22. Inspection, testing and maintenance shall be performed and maintained per Chapter 14 of NFPA 72 and the manufacturer specifications.
23. Where a building fire alarm or monitoring system is installed, automatic fire-extinguishing systems shall be monitored to the supervising station by the building fire alarm or water flow system in accordance with NFPA 72 and CFC 904.3.5.
24. Elevator recall shall operate per the signals found in sequence of operations on this plan. Elevator keys shall be provided to the Inspector and placed in the Knox Box. (NFPA 72, 21.3)
25. All fire alarm and water flow alarm systems undergoing a change in central supervising station companies are required to be immediately tested in the presence of RVC-OFM Inspector. This is to verify that new company is appropriately receiving necessary signals, transmitting emergency 911 communications, and that devices dedicated for supervisory and trouble signals do not cause an emergency response.
26. Cellular communication equipment shall be tested in the presence of the RVC-OFM Inspector to demonstrate that the signal strength meets manufacturers requirements.
27. A document box shall be provided and placed adjacent to the FACU or as otherwise approved.
28. System operating instructions shall be affixed adjacent to the FACU in a manner that prevents tampering/removal.
29. Floor plans with initiating device locations depicted and a corresponding device address/ ID list shall be affixed adjacent to the FACU in a manner that prevents tampering/ removal.
30. The following must be completed by the designer prior to copying on the plans. List the number of all total devices proposed only for this specific job.

This scope of work only includes the following quantity of devices:			
List the # of Initiating Devices below:			List the # Other Devices below: ERCCS Supervisory Signals (if provided): Other:
<u>Detectors</u> New/Added: Relocated: Replaced:	<u>Duct Detectors</u> New/Added: Relocated: Replaced:	<u>Manual Pull</u> New/Added: Relocated: Replaced:	<u>Tamper/Water Flow</u> New/Added: Relocated: Replaced:
List # of Notification Devices below:			<u>FACU</u> New/Added: Relocated: Replaced:
<u>Horns / Strobes</u> New/Added: Relocated: Replaced:			(Indicate) Dialer Replaced Yes / No Extinguishing System Yes / No

(The Information Above Shall Match the Equipment Legend/Bill of Materials).

Occupant History and Background: (Provide the information underlined on each below.)

- i. Approximate age of the building? (In Years) _____.
- ii. Occupant will be new to the building? Yes / No.
- iii. Number of floors this occupant will occupy? _____.
- iv. Occupant is already existing in the building? Yes / No.
 - If occupant is existing, list the approximate number of years occupied _____.
 - Occupant will be occupying an additional floor? Yes / No.
 - Occupant is staying on the current floor level, and occupying new area? Yes / No.

Approved Supervising Station Information:

(UL Listed as either UUFX (Central Station), or UUJS (Remote or Proprietary),
or by other Nationally Recognized Testing Lab (NRTL). Or comply with FM 3011

Supervising Station Name: _____ Phone Number: _____

Supervising Station Address: _____

Listing Information: _____