

Orange County Fire Authority

Community Risk Reduction

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Fire Alarm, Water Flow Alarm & Signaling Systems



Guideline D-03

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Fire Alarm, Water Flow Alarm, & Signaling Systems

PURPOSE

The purpose of this guideline is to facilitate the design and installation of fire alarm, water flow alarm and signaling systems. The codes require plans (shop drawings) to be submitted for review and approval by the Orange County Fire Authority (OCFA) for new, rehabilitated and modified systems, prior to installation.

SCOPE

The 2019 California Building code (CBC) and the California Fire Code (CFC) specify where the systems are required. These codes and the 2016 National Fire Protection Association (NFPA) standards apply to the design, installation, operation, testing and maintenance of the systems.

PLAN SUBMITTAL REQUIREMENTS

Submit two sets of scaled plans and an electronic copy of the plans in PDF format. The plans/shop drawings shall contain the following information, when any of the sections involve this project:

1. Within the OCFA notes, the occupant history, central station and device count information for new, relocated, and replaced devices, shall be filled in by the designer (*the device count in the notes will determine the plan review fee amount*).
 - A. Copy the completed, "Fire Alarm, Water Flow Alarm & Signaling Systems" notes, on the plans.
2. Scope of Work Statement: Include all of the following information in the scope of work, on the plans:
 - A. Indicate type of system proposed: (Notification, initiating, water flow monitoring, 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. If yes to either, this requires a disclosure or confirmation letter(s) to be completed and copied on the plans. For the exact information required to be stated in the letters, see below under the heading of, "Voluntary Systems/Devices (or) Applying New Current Codes to a Tenant Improvement Project".
3. 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, and tract and lot numbers for residential projects).
 5. Device Data Sheets: Provide one set of device manufacture data sheets for all devices.
 6. Completeness of Shop Drawings: Provide a scaled floor plan 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 (this shall match the device count on the OCFA 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 OCFA 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 located 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 is 10%, or the 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 20% 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 and 15 minutes for voice evacuation systems (NFPA 72 10.6.7.2.1, CFC 907.1.2).

10. Automatic Fire Extinguishing Systems: Where a building fire alarm or monitoring system is present, automatic fire-extinguishing systems shall transmit a fire alarm signal to a central supervising station. The activation of the extinguishing system shall also activate all notification devices (CFC 904.3.5).
11. Single Path Dialers or Two Phone Lines: Only dialers listed as a single path of communication by the California State Fire Marshal are acceptable. Provide a cut sheet from the manufacturer indicating this approval. When changing the types of communication path to meet the requirements of two phone lines, you can propose a cellular phone or an internet line as the primary signal line, and a hard wired plain old telephone system (POTS) land line can only be used as the secondary line. The two POTS lines can still exist if still operable, when no change is proposed to the communication paths (NFPA 26.6.3.3, 26.6.3.4).
12. Voluntary Systems/Devices (or) Applying New Current Codes to a Tenant Improvement Project: In accordance with 2D above, the plans will not be approved unless you draft either the disclosure letter or confirmation letter per below. The letter shall have a printed name and be signed, and shall be copied on the plans. There is a possibility that both letters will be required on the plans, such as a notification system for a tenant improvement now being required by code, yet voluntary initiating devices are also being proposed. Select one or both of the letter choices based on the scenario you fit into:
 - A. Disclosure letter (for voluntary systems/devices): The business/facility manager, or building owner shall sign this letter.
 - The letter shall state verbatim, “The signee is aware the devices are not required, but accept the additional devices for greater life safety protection for the occupants and building protection. The system will be tested and maintained per code requirements. The devices that are not required are _____.” (List individual types of devices)
 - B. Confirmation letter (for tenant improvement projects): The building Architect of record or Building Department staff shall sign this letter.
 - The letter shall state verbatim, “The amount of the project tenant improvement work now requires the proposed alarm system normally designated for new buildings. The CBC code section(s) requiring the new system is, CBC Section _____.” (List the code section)

(The building department approved stamped plans could be submitted to OCFA by the applicant, in lieu of processing any confirmation letter).

13. Elevator Recall/Shutdown: New elevators that have a travel rise that exceeds 80 inches will require Firefighter Emergency Operations (FEO) recall/shutdown in accordance with OCFA Bulletin 05-16.

- A. Include all related actions from OCFA Bulletin 05-16 into the sequence of operations on the plans.
- B. Copy OCFA Bulletin 05-16 on the plans.

Existing Elevators: If the work on the alarm system is involving elevator recall/shutdown related devices (or) existing elevator recall functions are currently significantly incorrect, and safety expectations of recall/shutdown is not currently available to the public or firefighters:

- FEO features could be required to be retrofitted to OCFA Bulletin 05-16 or portions of the bulletin thereof.
- When elevator recall or shutdown becomes part of the scope of work, you shall then copy OCFA Bulletin 05-16 on the plans.

14. Duct Detection: Duct detectors are only required to be tied to the main fire alarm panel, when the alarm system is required by CBC 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. Manual Fire Alarm Boxes (Manual Pull Stations): OCFA 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 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 OCFA approval during the plan review (CFC 907.4.2.5).

16. 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 OCFA a separate copy of the approved architectural plans in PDF format, for the areas in which the special door egress and access controls are proposed.
- B. The related alarm component plans shall be approved by OCFA 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.

Notes required to be copied on the plans: Select the correct heading from the below list that fits your situation. You are required to find those specific notes correlating to the heading, within OCFA Guideline E-01 Section 4. Copy those notes as found in Guideline E-01, verbatim on the alarm plans. If you have more than one of the situations below, then copy each set of correlating notes from E-01 on the plans.

- Sensor-released egress door installations (CBC 1010.1.9.8).
- Delayed egress lock installations (CBC 1010.1.9.7).
- Elevator lobby egress-control devices (CBC 1010.1.9.12) and (Chapter 10).
- Electromagnetically locked egress doors (CBC 1010.1.9.9).

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

18. Occupancy Group E Specific Information: Emergency voice alarm communication systems are required when the final approved occupant load exceeds 100 occupants, when a fire alarm is installed (CBC 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 (CBC 907.2.3.8.2).

19. High Rise Building Alarm System Requirements: See OCFA Guideline H-01 for specific details. The Fire Command Center has specific alarm equipment and its placement required. The buildings shall be provided with an approved automatic fire alarm system meeting the requirements of 2019 CBC, CFC, and NFPA 72. For the sequence of operations, see the Fire Alarm Section of OCFA Guideline H-01, in lieu of the sequence provided herein. Prior to submitting the alarm plans to OCFA, they shall be reviewed by the smoke control design engineer for compliance of the smoke control design when applicable, and the design engineer shall provide a letter indicating compliance with the Smoke Control Rational Analysis.

20. Occupancy Group R-2 Specific Information: Dwelling and sleeping units shall be provided with the capability to support future visible alarm notification appliances (CBC 907.5.2.3.3). This is required only when a fire alarm is required by CBC 907.2.9.1, such as when the building has 17 or more units, 4 or more floors, or there are dwelling/sleeping units located below the level of exit discharge. However, see Section 907.2.9.1 to find more scenarios and exceptions requiring a fire alarm.

See CBC 907.5.2.3.3 for multiple ways to provide the capability to support future visible alarm notification appliances. Acceptable examples are as follows:

- 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 (OCFA does not require pre-wiring within units and future damage to walls to install wiring later is the choice of the builder at the time of construction).

- Fire alarms in these building have more requirements in addition to visible appliance capabilities in dwelling/sleeping units (see CBC 907.5.1 through 907.5.2.3.4).

21. 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 OCFA prior to submittal if there is a discrepancy.

Example Sequence of Operations

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

Emergency Response and 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



ORANGE COUNTY FIRE AUTHORITY NOTES

Fire Alarm, Water Flow Alarm & Signaling Systems

First complete the bottom portion and then copy the notes on the plans

1. OCFA inspections are required for this project. Please schedule all field inspections at least 48 hours in advance. Inspections canceled after 1 p.m. on the day before the scheduled date will be subject to a re-inspection fee. Call OCFA inspection scheduling at (714) 573-6150 and provide the service request number on these plans.
2. The scope of work shall be tested by the installer prior to the OCFA inspection to determine the system properly functions as approved on the plans.
3. For extremely large systems, OCFA may require the installing contractor to provide a written certification by a different third party licensed contractor, to verify all or specific portions of the system function as approved on the plans (NFPA 72, 7.5.2).
4. This system was designed and installed under the 2019 code requirements.
5. 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 (NFPA 72, 7.5.3 and 7.7.1).
6. Written records and reports of the alarm system testing frequencies and results, shall be available for review on the premises for the OCFA inspector during fire inspections.
7. Testing and service personnel shall be qualified and experienced per NFPA 72, 10.5.3.
8. Any future modifications to the system after this final OCFA 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 OCFA (NFPA 72, 7.5.6.6).
9. When the Fire Alarm Control Unit (FACU) panel is in a room accessed through a door, a permanent sign shall be provided on the door indicating, "Fire Alarm Control Unit" or equivalent. When there are sub-panels, door signs shall also indicate where the main FACU panel is located.
10. A 24-hour emergency response phone number shall be permanently posted at the control panel.
11. 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).
12. Storage batteries shall be marked with the month and year of manufacture (NFPA 72, 10.6.10).
13. 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, 10.6.7.2.1, CFC 907.1.2).
14. If a 24 hour battery test was not required, OCFA could require shut down of the AC power to verify trouble signals.
15. Batteries shall be fully charged under normal conditions and after a power loss event discharge (NFPA 72, 10.6.10.3).
16. A battery charger failure shall be detected as a trouble signal (NFPA 72, 10.6.10.6.1).
17. An alarm signal shall occur within 10 seconds after initiating device activations (NFPA 72, 11.11.1). The alarm signals shall be audibly distinctive from all other different types of audible systems or alarms (NFPA 72, 10.10).
18. All audible alarm notification signals shall be a three pulse temporal pattern (CFC 907.5.2.1.3).
19. Audible alarm sound pressure levels shall be provided as specified by CFC 907.5.2.1. and 907.5.2.1.2

20. When more than two visual notification appliances are located within the same room or area, they shall be synchronized (NFPA 72, 18.5.5.4.2).
21. Manual pull station key(s) should be placed in the main FACU box or sprinkler head box.
22. When tied to the main fire alarm panel, duct detector activations shall only cause a supervisory signal to the central supervising station.
23. Inspection, testing and maintenance shall be performed and maintained per Chapter 14 of NFPA 72 and the manufacturer specifications.
24. Where a building fire alarm or monitoring system is installed, automatic fire-extinguishing systems shall be monitored to the central supervising station by the building fire alarm or water flow system in accordance with NFPA 72 and CFC 904.3.5.
25. Elevator recall shall operate per the signals found in sequence of operations on this plan (NFPA 72, 21.4).
26. 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 OCFA. 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. When the change of the supervising station company is not part of the new construction inspection on these plans, the responsible party causing the change shall complete a new Service Request application/fee process at OCFA headquarters. The responsible party is required to generate the OCFA inspection. No plan review is required for this scope of work (CFC 901.9).
27. 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 covers the following quantity of devices:			
Devices below are factored in fee charges		Devices not factored in fee charges	
List the # of Initiating Devices below:		List the # Other Devices below:	
<u>Detectors</u>	<u>Duct Detectors</u>	<u>Manual Pull</u>	<u>Tamper/Water Flow</u>
New/Added:	New/Added:	New/Added:	New/Added:
Relocated:	Relocated:	Relocated:	Relocated:
Replaced:	Replaced:	Replaced:	Replaced:
List # of Notification Devices below:			<u>FACU</u>
<u>Horns / Strobes</u>			New/Added:
New/Added:			Relocated:
Relocated:			Replaced:
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 amount 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.

U.L. Listed Central Supervising Station Facility (CSSF) Information:

The CSSF Name: _____ Phone Number: _____

CSSF Address: _____