



The purpose of this Technical Bulletin is to provide fire alarm system wiring guidelines and requirements to the permit applicant. In addition to the information provided in this Technical Bulletin, the permit applicant shall follow definitions, guidelines and requirements from adopted codes and standards.

Fire alarm systems submitted for review and approval shall comply with the requirements of Information Bulletin 137, California Fire Code (CFC) Section 907, National Fire Protection Association (NFPA) 72, and the California Electrical Code (CEC) Article 760 regardless if the fire alarm system is required, optional or voluntary. The following Technical Bulletin details the City of San Diego interpretations and requirements for fire alarm wiring.

I. CLASS "A" CIRCUITS

A. When Required

1. New fire alarm installations in new high rise buildings as defined in the California Building Code (CBC) require Class A circuits to be installed per CBC Section 907.6.1.1. Initiating circuits only serving a single device do not require Class A wiring.
2. Fire alarm systems proposed to be installed in existing high rises do not require Class A circuits per California State Fire Marshal (CSFM) Title 24 Interpretation #14-006, July 29, 2014.

B. Routing Requirements

Where required, Class A circuits using physical conductors shall be installed such that the outgoing and return conductors, exiting from and returning to the control unit, are routed separately. The outgoing and return (redundant) circuit conductors shall be permitted in the same cable assembly (i.e. multi-conductor cable, not including ROMEX), enclosure, or raceway only under the following conditions (NFPA 72, Section 12.3.7):

1. For a distance not to exceed 10 feet where the outgoing and return conductors enter or exit the initiating device, notification appliance, or control unit enclosures.
2. For single raceway drops to individual devices or appliances.
3. For single raceway drops to multiple devices or appliances installed within a single room not exceeding 1,000 square feet in area.
4. Where the vertically run conductors are contained in a two-hour rated cable assembly, or enclosed (installed) in a two-hour rated enclosure or a listed circuit integrity (C.I.) cable, which meets, or exceeds a two-hour fire-resistive rating.

Documents Referenced in this Technical Bulletin

- 2013 California Building Code, (CBC)
- 2013 California Fire Code (CFC)
- 2013 California Electrical Code (CEC)
- 2013 National Fire Protection Association (NFPA) 72, National Fire Alarm and Signaling Code
- San Diego Municipal Code, (SDMC)
- [Information Bulletin 137](#), How to Obtain a Permit for Fire Alarm Systems
- [Technical Bulletin BLDG-9-1](#), Design and Testing Requirements for Smoke Control Systems
- [Technical Bulletin FIRE-9-2](#), Requirements for Fire Alarm Control Panels
- National Electrical Manufacturers Association's (NEMA) [Engineering Bulletin No. 101](#)
- California State Fire Marshal Title 24 Code [Interpretation # 14-006, July 29, 2014](#)

C. Voltage Drop Calculations

Voltage drop calculations for Class A NAC circuits shall only require taking the furthest device from either the outgoing or incoming/return conductors. Calculations can begin with the furthest device for one side only. Point to point or EOL methods still apply and method must be noted on plans.

II. SURVIVABILITY

A. When Required

1. New fire alarm installations in new high rise buildings as defined in the California Building Code (CBC) are required to meet the survivability requirements in NFPA 72.
2. Fire alarm systems employing zoned evacuation or partial evacuation are required to meet the survivability requirements in NFPA 72.
3. Fire alarm systems proposed to be installed in existing high rises are not required to meet survivability requirements in NFPA 72. However, compliance with NFPA 72 Section 24.4.2.8.5.1 must be provided for all buildings using partial or zoned evacuation.

B. Wiring Methods

The following methods are an acceptable means of meeting the survivability requirements in NFPA 72.

1. Two-hour cable systems with a UL 1724 list-

ing for Electrical Circuit Protective Systems. These cable systems employ protective materials such as intumescent wraps/coatings, tapes, composite mats, etc, that meet the testing requirements under UL 1724.

2. Circuit pathways in rooms/areas constructed with two-hour fire rated enclosures. Areas constructed with a two-hour fire rating or running through existing rooms/areas with a two-hour rating will be subject to additional review and approval. It is not acceptable to use exit stairways to achieve the two-hour rating.
3. Cable systems running in two-hour rated raceways, including but not limited to, the following:
 - a. Cable systems embedded in 2-inches of concrete,
 - b. Cable systems pulled through concrete ductbanks (entrance and exit openings shall be firestopped), or
 - c. Continuous metallic raceways (conduit and associated compression fittings and set screw couplings must be two-hour rated and listed).
 - d. CI (Circuit integrity) cable is permitted provided that it has a marking from Underwriters Laboratory (UL) indicating that it is listed to UL 2196 for two hour survivability rated cable.

III. SMOKE CONTROL SYSTEMS

Refer to Technical Bulletin BLDG-9-1, Design and Testing Requirements for Smoke Control Systems for required wiring methods for Smoke Control systems. Where two-hour cabling and cable systems are required, the design may employ the methods specified in this technical bulletin, except MC (metallic clad) cable is not permitted for smoke control systems.

IV. GROUP R-2 OCCUPANCY “PRE-WIRE” REQUIREMENTS

CBC Section 907.5.2.3.4 requires all Group R-2 dwelling units and sleeping units be provided with the capability to support visible alarm notification appliances in accordance with NFPA 72 and Americans with Disabilities Act ([ADA](#)). Compliance must be shown on the fire alarm permit drawings.

- A. Wiring and associated j-boxes, terminations, etc. shall be installed per the CEC and this bulletin for future visual alarm notification appliances (replacement of audible devices to visual or audible /visual devices). The future increases in device load demand shall be accounted for in voltage drop and NAC power supply battery calculations. In addition, installation requirements of future NAC power supplies via add/drop diagram or other approved means shall be shown on plans.
- B. If future interconnection of the building fire alarm system with the unit smoke alarms is pro-

posed, then wiring and associated j-boxes, terminations, etc. shall be provided as part of the submittal. Unit smoke alarms are defined as single-station smoke alarms in the CFC.

- C. An extension of the existing wiring from the unit smoke alarm locations to required locations for the visible appliances shall be provided.

V. OTHER PERMITS

The associated work described below requires separate permits or approvals. If work is to be performed by others, please indicate on plans that work will be “furnished by others” or “under separate approval.”

- A. Installing a new dedicated circuit breaker, fuse or disconnect switch per NFPA 72 Section 10.6.5.2.3 for primary power branch circuits for FACP, NAC power supply, and communications methods involving modification to an existing electrical service panel will require obtaining a separate electrical permit per the SDMC Chapter 12, Article 9, Division 3.
 1. If disconnecting means is via a circuit breaker, a listed circuit breaker locking device shall be installed per NFPA 72 10.6.5.4.
 2. Branch circuits are required to comply with CEC 760.121(B) when supplying fire alarm equipment(s) and no other loads. The location of the branch-circuit overcurrent protective device shall be permanently identified at the fire alarm control unit. The circuit disconnecting means shall have red identification, shall be accessible only to qualified personnel, and shall be identified as “FIRE ALARM CIRCUIT.” The red identification shall not damage the overcurrent protective devices or obscure the manufacturer’s markings. The dedicated fire alarm primary power circuit shall not be supplied through a GFCI or AFCI.
- B. Installing underground conductors and conduit are subject to City of San Diego Stormwater Standards.