

# SECTION 16720 - FIRE AND SMOKE ALARM SYSTEM

## City of San Diego, CWP Guidelines

### PART 1 -- GENERAL

#### 1.1 WORK OF THIS SECTION

- A. The WORK of this Section includes providing manual and automatic fire alarm and smoke detection systems meeting NFPA requirements for local, auxiliary, and remote station protective systems.

#### 1.2 RELATED SECTIONS

- A. The WORK of the following Sections applies to the WORK of this Section. Other Sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this WORK.

1. Section 08710 Finish Hardware
2. Section 11610 Fume Hoods
3. Section 14221 Hydraulic Passenger Elevators
4. Section 15310 Fire Protection Piping
5. Section 15330 Wet-Pipe Sprinkler System
6. Section 15855 Air Handling and Moving Equipment
7. Section 15880 Air Distribution, Devices and Accessories
8. Section 16050 Basic Electrical Materials and Methods

#### 1.3 CODES

- A. The WORK of the Section shall comply with the current editions, with revisions, of the following codes and City of San Diego Supplements:

1. Uniform Building Code
2. Uniform Fire Code
3. National Electrical Code

#### 1.4 SPECIFICATIONS AND STANDARDS

- A. Except as otherwise indicated, the current editions of the following apply to the WORK of this Section:

1. NFPA 72A Installation, Maintenance, and Use of Local Protective Signaling System for Guard's Tour, Fire Alarm, and Supervisory Service.
2. NFPA 72B Installation, Maintenance, and use of Auxiliary Protective Signaling System for Fire Alarm Service.
3. NFPA 72C Installation, Maintenance, and Use of Remote Station Protective Signaling System.
4. NFPA 72E Automatic Fire Protectors.
5. NFPA 72G Notification Appliances for Protective Signaling Systems.
6. NFPA 72H Guide for Test Procedures for Protective Signaling Systems.

7. NFPA 101 Life Safety Code.

#### 1.5 SHOP DRAWINGS AND SAMPLES

A. The following shall be submitted in compliance with Section 01300:

1. Manufacturer's product data including catalogue cuts.
2. Block diagram showing system relationships of major components, quantities and interconnecting cables.
3. Plans showing locations of devices.
4. Connection details (typical) for each device.
5. Control panel factory wiring and field wiring terminations, devices, and special mounting details.
6. Initiating device circuit descriptions with programming.
7. Wiring diagrams showing terminal identification for field-installed wiring.
8. Manufacturer's certificate that system complies with indicated requirements.
9. Documentation of Fire Department approval of manufacturer and installer.

#### 1.6 OWNER'S MANUAL

A. The following shall be included in the OWNER'S MANUAL in compliance with Section 01300:

1. Operating instructions and maintenance and repair procedures.
2. Manufacturer representative's letter stating that system is operational.

#### 1.7 QUALIFICATIONS

- A. **Manufacturer:** Company specializing in [smoke detection and] fire alarm systems and having Fire Department approval.
- B. **Installer:** Company specializing in [smoke detection and] fire alarm systems [certified by [the Fire Department] as fire alarm installing contractor.]

#### 1.8 SERVICES OF MANUFACTURER

- A. **Local Service:** The manufacturer shall have a local service agency (within 50 miles of the site) which maintains properly trained personnel and adequate spare parts and is able to respond and complete repairs within 24 hours.
1. **Demonstration:** Operation of the fire alarm system shall be demonstrated to the CONSTRUCTION MANAGER to prove that the system operates and complies with this Specification.

## PART 2 -- PRODUCTS

### 2.1 GENERAL

#### A. The system shall:

1. Be [UL] [and] [FM] listed.
- [2. Conform to requirements of NFPA 101.]

### 2.2 SYSTEM DESCRIPTION

#### A. The system shall comply with the following:

1. Fire Alarm System: [NFPA 72A;] [NFPA 72B;] [NFPA 72C;] [automatic] [and] [manual] fire alarm system.
2. System Supervision: System shall be electrically-supervised system, with supervised alarm initiating and alarm signaling circuits. Occurrence of single ground or open condition in initiating or signaling circuits shall place circuit in TROUBLE mode. Component or power supply failure shall place system in TROUBLE mode. [Occurrence of single ground or open condition on alarm initiating circuit shall not disable that circuit from transmitting in ALARM.] [Occurrence of single ground or open condition on signaling circuit shall not disable that circuit from transmitting in ALARM.]
3. Alarm Sequence of Operation: Actuation of [manual fire alarm station] [or] [automatic initiating device] shall cause system to enter ALARM, and shall include the following operations:

Sound and display local fire alarm signaling devices with [non-coded] [zone-coded] signal.

Transmit [non-coded] [zone-coded] signal to [municipal connection.] [and] [remote station equipment.]

Indicate location of alarm zone on fire alarm control panel[.] [and on remote annunciator panel.]

Transmit signal [by zone] to building smoke removal system.

Transmit signals to building elevator control panel to initiate return to [main] [ ] floor.

Transmit signal to building mechanical systems to initiate shutdown of fans and damper operation.

Transmit signal to release door hold-open devices[.] [by zone.]

4. Alarm Reset: Key-accessible RESET function shall reset alarm system out of ALARM if alarm initiating circuits have cleared.
5. Trouble Sequence of Operation: System trouble, including grounding or open circuit of supervised circuits, or power or system failure shall cause system to enter TROUBLE mode and shall include the following operations:

Visual and audible trouble alarm [by zone] at control panel.

Visual and audible trouble alarm at annunciator panel.

Manual ACKNOWLEDGE function at control panel silences initiating trouble alarm; visual alarm is displayed until initiating trouble is cleared.

[Transmit trouble signal to [municipal connection.] [remote station.]

6. Lamp Test: Manual LAMP TEST function shall cause alarm indication at each zone at fire alarm control panel[.] [and at annunciator panel.]
7. Drill Sequence of Operation: Manual DRILL function shall cause ALARM mode operation to:

Sound and display local fire alarm signaling devices.

Indicate location of alarm zone on fire alarm control panel[.] [and on remote annunciator panel.]

## 2.3 FIRE ALARM AND SMOKE DETECTION CONTROL PANEL

### A. The control panel shall include the following:

1. Control Panel: Modular construction with [flush] [surface] wall-mounted enclosure.
2. Power Supply: Designed to serve control panel modules, [remote detectors,] [remote annunciators,] [door holders,] [smoke dampers,] [relays,] [ ] and alarm signaling devices; [and including battery-operated emergency power supply with capacity for operating system in standby mode for [24] [60] [ ] hours followed by alarm mode for [5] [10] [ ] minutes.]
- [3. Detection Circuits: Supervised zone module with alarm and trouble indication.]
4. Signal Circuits: Supervised [zone coded] signal module, sufficient for signal devices connected to system.
- [5. Municipal Trip Circuit: With output connections for [future use.] [connection to [local energy] [shut trip] [parallel telephone circuit] municipal master fire alarm box.] [connection to remote station transmitter.] [and including municipal trip DISCONNECT switch.]
6. Remote Station Signal Transmitter: Electrically supervised, capable of transmitting alarm and trouble signals over telephone lines to remote station receive.
- [7. Remote Station Signal Receive: Electrically supervised, capable of receiving signals from remote station transmitter over telephone lines with up to [4000] [ ] ohms loop resistance, and visually annunciating alarm signals [by zone] and common trouble signal; and including circuit for remote audible alarm and trouble signal, accessory alarm and trouble relays with single pole, double throw (SPDT) contacts, and separate manual alarm and trouble SILENCE functions.]
8. Auxiliary Relays: With sufficient SPDT auxiliary relay contacts [for each detection zone] to provide accessory functions specified.

9. Switches: With TROUBLE ACKNOWLEDGE, DRILL, and ALARM SILENCE switch.

## 2.4 INITIATING DEVICES

### A. Initiating devices shall comply with the following:

1. Manual Station: [Semi-flush] [Surface] mounted, [single action] [double action] manual station with break-glass rod[,][.] [and auxiliary contacts for [operating remote annunciator.] [performing accessory functions indicated.]
2. Heat Detector: [Fixed temperature,] [Combination rate-of-rise and fixed temperature,] rated [135 degrees F][,][.] [ ] degrees F[,][.] [and temperature rate of rise of [15 degrees F.] [[ ] degrees F.]]
3. Ceiling Mounted Smoke Detector: NFPA 72E; [ionization type] [photoelectric type] with [adjustable sensitivity,] [plug-in base,] [auxiliary relay contact,] [integral thermal element rated 135 degrees F] [and] visual indication of detector actuation, suitable for mounting on 4-inch outlet box; [two-wire detector with common power supply and signal circuit] [four-wire detector with separate power supply and signal circuits].
4. Duct Mounted Smoke Detector: NFPA 72E; [ionization type] [photoelectric type] with [auxiliary SPDT relay contact,] key-operated NORMAL-RESET-TEST switch, duct sampling tubes extending width of duct, and visual indication of detector actuation, in duct-mounted housing; [two-wire detector with common power supply and signal circuit] [four-wire detector with separate power supply and signal circuits].
5. Water Flow Detector: Complying with Section [ ].
6. Valve Supervisory Switch: Complying with Section [ ].
7. Flame Detector: NFPA 72E; [ultraviolet] [infrared] radiation type.
8. Remote Test Switch: Key-operated switch mounted on flush cover with lamp to indicate detector actuation, [with one switch for each duct mounted smoke detector.]

## 2.5 SIGNALING DEVICES

### A. Signaling devices shall include:

1. Alarm Bells: NFPA 72G; electric [vibrating,] [single stroke,] [8] [10] [ ] inch bell with operating mechanism behind dome; sound rating of [81] [ ] dB at 10 feet. [with integral [strobe] lamp and flasher with [red] [ ] lettered FIRE on [white] [ ] lens.
2. Alarm Lights: NFPA 72G; [strobe] lamp and flasher with [red] [ ] lettered FIRE on [white] [ ] lens.
3. Alarm Horn: NFPA 72G; [surface] [flush ] [projector] type fire alarm horn; sound rating: [87] [ ] dB at 10 feet [with integral [strobe] lamp and flasher with [red] [ ] lettered FIRE on [white] [ ] lens.]
4. Remote Annunciator: [Supervised] remote annunciator including audible and visual indication of fire alarm by zone, and audible and visual indication of system trouble. Install in [flush] [surface] wall-mounted enclosure.

## 2.6 AUXILIARY DEVICES

### A. Auxiliary devices shall include:

1. Door Release: [Door closer complying with Section 08710.] [ .] [Magnetic door holder with integral diodes to reduce buzzing, [[24] [ ]VDC] [[120] [ ] VAC] coil voltage.]

## 2.7 FIRE ALARM WIRE AND CABLE

### A. Wire and cable shall comply with the following:

1. Fire Alarm Power Branch Circuits: Building wire complying with Section [ ].
2. Initiating and Signal Circuits: [Building wire complying with Section [ .] [Non-power limited fire-protective signaling cable, copper conductor, 150 volt insulation rated 60 degrees C.] [Power limited fire-protective signaling cable, copper conductor, 300 volts insulation rated 105 degrees C.] [ [Power limited fire-protective signaling cable classified for fire and smoke characteristics, copper conductor, 300 volts insulation rated 105 degrees C, suitable for use in air handling ducts, hollow spaces used as ducts, and plenums.]

## 2.8 SPARE PARTS

### A. The WORK of this Section includes the following spare parts:

1. [Ten] [ ] manual station break-glass rods.
2. [Two] [ ] keys of each type.
3. [Five] [ ] smoke detectors.

## 2.9 MANUFACTURERS

### A. **Smoke Detectors:** Smoke detectors, of the model indicated, shall be manufactured by one of the following (or equal):

ADT [32521 Series] [3506] [ ]  
Pyrotronics Model ]DS-2] [PB-300] [ ]  
Simplex [4262-5] [ ]  
ESL [611U] [ ]

### B. **Heat Detectors:** Heat detectors, of the model indicated, shall be manufactured by one of the following (or equal):

ADT [Model 4222] [ ]  
Pyrotronics [Model DT-200F] [135R] [ ]  
Simplex [4255] [ ]

### C. **Manual Fire Alarm Stations:** Manual fire alarm stations, of the model indicated, shall be manufactured by one of the following (or equal):

ADT Model 5012  
Pyrotronics Model MS-5

- D. **Fire Alarm Control Panels:** Panels shall be manufactured by one of the following (or equal):

ADT [Model     ]  
Pyrotronics [Model     ] [System 3]  
Simplex [Model     ]  
ESL [Series 2000]

### PART 3 -- EXECUTION

#### 3.1 INSTALLATION

- A. **General:** System and products shall be installed in accordance with the manufacturer's written installation instructions and as follows:
1. Manual station installed with operating handle [54] [     ] inches above floor; and audible and visual signal devices installed [90] [     ] inches above floor.
  2. With [16] [14] [     ]AWG minimum size conductors for fire alarm detection and signal circuit conductors; and wiring installed in [conduit.] [cable.]
  3. With outlet box for electric door holder mounted to withstand 80 pounds pulling force.
  4. With conduit and wiring connections to [door release devices,] [sprinkler flow switches,] [sprinkler valve tamper switches,] [fire suppression system control panel,] [duct smoke detectors,] [and] [     ].]
  5. With automatic detector installation complying with NFPA 72E.

#### 3.2 FIELD QUALITY CONTROL

- A. Systems shall be tested in accordance with [NFPA 72H][.] [and] [local fire department requirements.]
- B. The WORK of this Section includes the services of [certified] technician to supervise installation, adjustments, final connections, and system testing.

#### 3.3 FIRE ALARM AND CABLE COLOR CODE

- A. Except as otherwise indicated or required by requirements of the City of San Diego Fire Department, fire alarm circuit conductors with color coded insulation, or color coded tape at each conductor termination and in each junction box shall comply with the following:
1. Power Branch Circuit Conductors: [Black, red, white.] [     ].]
  2. Initiating Device Circuit: [Black, red.] [     ].]
  3. Detector Power Supply: [Violet, brown.] [     ].]
  4. Signal Device Circuit: [Blue (positive), white (negative).] [     ].]
  5. Door Release: [Gray, gray.] [     ].]

6. Municipal Trip Circuit: [Orange, orange.] [ .]
7. Municipal Fire Alarm Loop: [Black, white.] [ .]

\*\* END OF SECTION \*\*