



## Cleanrooms Fire Suppression and Alarm Systems Design, Installation, and Plan Submittal Requirements

Effective Date: January 1, 2020

### 1.0 GENERAL

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- 1.1 All Cleanrooms installed in this jurisdiction shall be in accordance with the 2018 edition of NFPA 318, "Protection of Semiconductor Fabrication Facilities" and 2019 California Fire Code, Chapter 27 "Semiconductor Fabrication Facilities" as modified herein.
- 1.2 The most stringent requirements shall take precedence should there be a conflict amongst the California Building Code, California Fire Code, and NFPA 318.
- 1.3 This handout supplements the San Jose Fire Department's (SJFD) handout "**Fire Sprinkler Systems Design, Installation, & Plan Submittal Requirements**" (<AS> systems) and "**Fire Alarm Systems Permit Application, Plan Submittal, Design Installation, & Inspection Requirements**" (<FA> systems). See <AS> systems and <FA> systems for submittal requirements.
- 1.4 This pamphlet applies to all facilities containing a cleanroom or clean zone, or both as further defined below:
  - 1.4.1 When the concentration of airborne particles in a cleanroom is controlled to meet the definition of ISO 14644-1 or a ISO 6 Cleanroom or cleaner, the automatic fire extinguishing system shall comply with the requirements of NFPA 318 in its entirety. Sprinklers are required in the cleanroom, plenum and interstitial space above the cleanroom, exhaust ducts, and workstations. When excluding sprinklers in any of these areas, indicate on the plans the reasons and provide the exception reference(s) from the standard.
  - 1.4.2 When the concentration of airborne particles in a cleanroom is controlled to meet the definition of ISO 14644-1 for a ISO 7 Cleanroom or ISO 8 Cleanroom and the amount of hazardous materials used and/or stored exceeds the quantities allowed by the 2019 CBC for Group F occupancies, the automatic fire extinguishing system shall comply with the requirements of NFPA 318 as stated in paragraph 1.4.1 above.
  - 1.4.3 When the concentration of airborne particles in a cleanroom is controlled to meet the definition of ISO 14644-1 for a ISO 7 Cleanroom or ISO 8 Cleanroom and the amount of hazardous materials used and/or stored do not exceed the quantities allowed by the 2019 CBC for Group F occupancies, the automatic fire extinguishing system does not have to comply with the requirements of NFPA 318. However, quick-response sprinklers shall be utilized in cleanrooms or clean zones where the mechanical ventilation is sufficient to produce an air exchange rate  $\geq 1$  cubic foot per minute per square foot of floor area.

***NOTE:*** A letter, on tenant's letterhead, shall be provided indicating that hazardous materials in excess of the quantities allowed by the 2019 CBC for Group F occupancies shall not be used and/or stored in the cleanroom or clean zone at any time.

## **2.0 FIRE SPRINKLER SYSTEM DESIGN**

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2.1 All fire sprinkler systems shall be hydraulically calculated for areas as described in items 1.4.1 and 1.4.2 above.

2.1.1 The extent of the calculated area shall be 3,000 square feet or the entire clean zone encompassed by a minimum of one hour rated construction, whichever is less.

2.2 Sprinkler coverage of the horizontal surface at workstations shall not be obstructed. A sprinkler shall be installed within the exhaust connection or plenum of workstations of combustible construction. The sprinkler shall be located not more than two feet from the point of the duct connection or the connection to the plenum. The sprinkler and connecting piping to the duct shall be coated with approved materials to prevent corrosion, when necessary. The sprinkler shall be accessible for periodic inspection. The design of the sprinkler system in the area shall take into consideration the spray pattern and the effect on the equipment.

### **EXCEPTIONS:**

a) *An approved alternate fire-extinguishing system may be allowed by approved variance. Activation of such systems shall deactivate the related processing equipment.*

b) *Process equipment which operates at temperatures exceeding 500°C, which is provided with automatic shutdown capabilities and an approved alternate fire-extinguishing system by variance.*

c) *Exhaust ducts 10 inches (254 mm) or less in diameter from flammable gas storage cabinets that are part of a workstation.*

2.3 Exhaust ducts shall be internally sprinklered in accordance with Section 11.2.1 of NFPA 318.

2.3.1 Exhaust ducts which are provided with a water mist scrubber at the point of the duct connection or within the unit prior to the duct connection are not required to be provided with internal fire sprinklers.

2.3.2 Approved inspection ports shall be provided in all internally fire sprinklered ducts for periodic inspection and maintenance.

2.4 Corridor fire sprinkler protection shall be designed in accordance with NFPA 13 as required for ordinary hazard Group 2. When the design area of the sprinkler system consists of one row of sprinklers in the corridor, the maximum number of sprinklers to be calculated need not exceed 13.

2.5 Should a cleanroom or clean zone be utilized to accommodate commodities whose classification per other NFPA standards would require a design density in excess of the minimum required for cleanrooms, then the more stringent design criteria shall apply.

## **3.0 FIRE ALARM SYSTEM**

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3.1 A manual fire alarm system shall be installed throughout buildings containing Group H, Division 5 Occupancies. Activation of the alarm system shall sound a local alarm with the alarm signal sent to the emergency control station. Manual fire alarm systems shall be designed and installed in accordance with the appropriate standard and guides adopted in Chapter 80 of the California Fire Code, Article 760 of the California Electrical Code, and NFPA 72 of the National Fire Alarm Code. Should a conflict arise between codes, then the most stringent requirement shall apply.

3.2 The fire extinguishing system shall be electronically monitored by the fire alarm system and in accordance with CFC, NFPA 72, the National Fire Alarm Code, and NFPA 318.

## **4.0 INSPECTIONS**

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4.1 See <AS> systems and <FA> systems for inspection requirements.

## **5.0 DOCUMENT REVISIONS**

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5.1 This document is subject to revisions. For general information and to verify that you have the most current document, see SJFD development website or call 408-535-7750, and request the current version date.