



CITY OF SAN JOSÉ, CALIFORNIA

SAN JOSE FIRE DEPARTMENT

CLEANROOMS **FIRE SUPPRESSION AND ALARM SYSTEMS** **DESIGN, INSTALLATION, AND PLAN SUBMITTAL REQUIREMENTS**

(Date of Issue: September 1, 1999)

1.0 GENERAL

- 1.1 All cleanrooms installed in this jurisdiction shall be in accordance with the 1998 edition of NFPA 318, "Standard for the Protection of Cleanrooms" 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, AND PLAN SUBMITTAL REQUIREMENTS" (<AS> systems). See <AS> 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 FED-STD-209 for a class 1,000 or less, 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 work stations. When excluding sprinklers in any of these areas, indicate on the plans the reasons and provide the exception reference(s) from the code.
 - 1.4.2 When the concentration of airborne particles in a cleanroom is controlled to meet the definition of FED-STD-209 for a class 10,000 or 100,000 and the amount of hazardous materials used and/or stored exceeds the quantities allowed by the 1997 UBC for Group F occupancies, the automatic fire extinguishing system shall comply with the requirements of NFPA 318 as stated in paragraph 1.3.1 above.
 - 1.4.3 When the concentration of airborne particles in a cleanroom is controlled to meet the definition of FED-STD-209 for a class 10,000 or 100,000 and the amount of hazardous materials used and/or stored do not exceed the quantities allowed by the 1997 UBC 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 ≥ 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 1997 UBC 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

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 If the plenum and/or interstitial space above the cleanroom is considered a concealed space that conforms to one of the nine exceptions per NFPA 13, paragraph 4-13.1.1, then the concealed space is not required to be protected with a sprinkler system.

2.4 Exhaust ducts shall be internally sprinklered in accordance with Section 2-1.2.7.1 of NFPA 318, when all of the following conditions apply:

- a) When the largest cross-sectional diameter is equal to or greater than 10 inches.
- b) The ducts may convey gases or vapors in a flammable range.

2.4.1 Combustible non-metallic ducts whose largest cross-sectional diameter is equal to or greater than 10 inches shall be internally sprinklered.

EXCEPTIONS:

- a) *Ducts listed for non-sprinklered applications.*
- b) *Ducts not more than 12 feet in length.*

- 2.4.2 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.
- 2.4.3 Approved inspection ports shall be provided in all internally fire sprinklered ducts for periodic inspection and maintenance.
- 2.5. Corridor fire sprinkler protection shall be designed in accordance with the Building Code as required for ordinary hazard Group 2. (See UBC Standard 9-1.) 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.
- 2.6 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

- 3.1 A manual fire alarm system shall be installed throughout buildings containing Group H, Division 6 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 35 of the California Building 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 monitored by the fire alarm system in accordance with NFPA 72, the National Fire Alarm Code, and NFPA 318.

4.0 DOCUMENT REVISIONS

- 4.1. This document is subject to revisions. For general information and to be sure that you are reading the most current document, please call (408) 277-4656, ask for the current version date.