



WOODSIDE FIRE PROTECTION DISTRICT

Commercial Fire Sprinkler System Design and Installation Standard

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SCOPE. This standard and guideline applies to the design and installation of automatic fire sprinkler systems in all buildings and structures except one and two-family dwellings and manufactured homes. This guideline is intended to be used in conjunction with the latest State Fire Marshal adopted version of NFPA 13, 2022 California Fire Code, 2022 California Building Code, Woodside Fire Protection District Ordinance, and other applicable national standards including manufacturer recommendations.

SYSTEM DESIGN AND INSTALLATION

Plans for a fire sprinkler system shall be designed by a State of California C-16 licensed contractor or by a registered professional engineer (civil, mechanical, or fire protection), licensed by the State of California, Board of Professional Engineers. All copies of the plans shall be stamped and signed by the licensed individuals. A C-16 licensed contractor shall only design systems that the firm has a contract to install.

The fire sprinkler system shall be installed by an individual who holds a State of California C-16 contractor's license.

Any person who installs, alters, or repairs water-based fire protection systems is required to possess a certification from Cal Fire – OSFM. Apprentices and trainees shall also possess a registration card.

GENERAL REQUIREMENTS

1. When alterations of the existing light hazard sprinkler system exceed 50% of the compartmented area, the existing fire sprinklers shall use quick response sprinklers if the sprinklers are spaced at light hazard in accordance with NFPA 13.
2. Sprinkler system water flow alarm and valve tamper switches are required to be supervised by an approved central station for systems with more than 20 sprinklers. Shell buildings and tenant areas will not receive a final inspection until the sprinkler alarm supervision is complete and in service.
3. An exterior door is required to provide direct access to an interior fire sprinkler riser assembly.
4. When any building or structure or portion thereof undergoes an alteration, the portion of the fire sprinkler system in the alteration shall be upgraded to current codes and standards. This shall include but not be limited to the upgrading of seismic joints, sway bracing, fasteners and hangers.

5. CPVC Piping shall not be allowed for any NFPA 13 fire sprinkler system. **Exception:** When approved by the Fire Code Official, CPVC piping may be used in a NFPA 13 fire sprinkler system for residential portions of occupancies.
6. WFPD requires that the sprinkler system provide coverage for all combustible or noncombustible concealed spaces greater than 6" spacing. For drop ceiling or hard lid ceiling with concealed spaces at or greater than 6 inches shall require sprinkler coverage added.

WATER SUPPLIES AND HYDRAULIC CALCULATIONS

1. For single story buildings or structures with an interior height of up to 18 feet as measured from the finished floor to the underside of ceiling, the minimum sprinkler design shall be 0.18 gpm over the most remote 3,000 sq. ft. area plus 500 gpm hose stream allowance included at the base of the riser. For buildings or structures with an interior height of over 18 feet from finished floor to the underside of the ceiling, the minimum sprinkler design shall be 0.33 gpm over the most remote 3,000 sq. ft. area plus 500 gpm for hose stream allowance included at the base of the riser. With written approval from the fire code official, schools, churches and similar occupancies which have few hazards and are unlikely to change, may use lesser sprinkler design densities allowed by NFPA 13 and Chapter 9 of the Fire Code.
2. Sprinkler design shall be adequate for all anticipated high hazard situations such as high piled combustible storage, plastic storage 6 ft. or higher, flammable liquids and other special hazards.
3. The original sprinkler design for the building shall be maintained during all tenant improvements and other changes. One sprinkler may be added per plugged outlet included in the original sprinkler calculations. All other additional sprinklers are to be added from cross mains and feed mains unless the system is recalculated to verify that the additional sprinklers are acceptable.
4. NFPA 13 Section 11.2.3.3.3, Room Design Method, shall be omitted. The design for any existing light hazard sprinklered occupancy shall be not less than 0.1gpm over the most remote 1,500 sq. ft. area.
5. The following information shall be contained in the hydraulic calculations.
 - a. Calculations must conform to manufacturer's specifications.
 - b. "K" factors for all sprinklers.
 - c. "C" values for the type of pipe used.
 - d. A pump curve or city supply curve, where the total demand point is clearly plotted.
 - e. A 10% reduction in the available water pressure shall be included in all calculations.
6. When water storage tanks are required, each tank shall have a connection to a supply source to refill the tank automatically.

SYSTEM COMPONENTS

In addition to system components required by NFPA 13 and NFPA 14, all systems shall also include the following:

1. An approved rubber faced check valve located on the on the riser.
2. All valves shall have an all-weather sign affixed to them, which indicates their purpose. The Fire Department Connection (FDC) shall be painted red, posted with

the address of the building it services and type of system (i.e. combination system) and labeled with starting pressure if over 125 psi. All-weather signs shall be red with white text and be approved by the fire code official.

3. Painted automatic fire sprinkler heads are required to be replaced.
4. All PIV and OS&Y valves shall be painted red and have an all-weather sign affixed to them indicating their purpose and the address of the building it serves. All-weather signs shall be red with white text and be approved by the fire code official.
5. In addition to the requirements of California Fire Code Section 903.3.8, floor control valves shall be provided for each floor of any building or structure two or more stories in height.
6. Check valves shall be provided on each floor of any building or structures.
7. Automatic sprinkler systems shall have all control valves and water-flow devices electrically supervised and maintained by an approved central alarm station. In addition, tamper alarms, all sprinkler control valves (OS&Y and PIV) and individual floor shut-off valves are required to be locked in the open position. Breakaway locks and chains are a satisfactory method of locking the control valves open.
8. Brush, shrubbery, and other obstructions shall be maintained a minimum distance of 36 inches around all portions of the fire department connection, post indicator valve(s), or OS&Y valves for visibility.
9. A cabinet with a stock of appropriate spare fire sprinklers and a special fitting wrench for the removal of activated sprinklers is required.
 - a. 300 sprinklers or less = 6 spare
 - b. 300 - 1,000 = 12 spare
 - c. over 1,000 = 24 spare
10. Main drain valves, control valves, inspectors test valves, fire department connections, etc., shall be accessible and clearly identifiable with respect to their function.

STANDPIPES

1. Within parking garages, standpipes shall be front facing on columns with a reflective blue dot installed in the drive aisle. Standpipes shall be painted red to a minimum of 6.5 feet above finished floor.

PLAN SUBMITTAL PROCEDURE

A permit for the installation or modification to a Commercial Fire Sprinkler System and related equipment is required. Maintenance performed in accordance with the CFC is not considered a modification and does not require a permit. Refer to the Plan Check and Submittal Process Section in the Standards and Guidelines Manual to apply for a permit.

Include the following required documents for submittal:

Water purveyor flow test

Hydraulic calculations

Cut sheets

PLAN SUBMITTAL INFORMATION

1. Sprinkler plans and calculations shall be submitted with all the information required

by the latest approved edition of NFPA 13, INCLUDING ALL DETAILS FOR HANGERS, and EARTHQUAKE SWAY BRACING AND FASTENERS. The sprinkler system will not receive a final inspection unless and until the installation is in accordance with the approved plans, and the placard with the design information has been provided on the riser. NFPA 13- 6.1, CFC 901.2

2. To speed up the plan check process and to avoid the possibility of returning the plans for corrections, please use the following checklist, prior to submittal, to ensure that the appropriate information is included on the working sprinkler drawings:
 - a. Name of owner
 - b. Project location
 - c. Designer information
 - d. Sprinkler installer information
 - e. Building square footage
 - f. North arrow
 - g. Scale (no smaller than 1/8 inch=1 foot)
 - h. Site plan showing:
 - i. Tank
 - ii. Pump
 - iii. Structures
 - iv. underground pipe size and type
 - v. point of supply connections
 - vi. depth of bury
 - vii. type and size of any valves or meters.
 - i. Piping plan showing:
 - i. Tank
 - ii. Pump
 - iii. Structure elevations as they relate to each other.
 - j. Full height cross-section showing building construction types, vaulted, and beamed ceiling locations.
 - k. Water tank details including size and type of construction (Where applicable).
 - l. Sprinkler head spacing.
 - m. Label un-sprinklered areas.
 - n. Indicate manufacturer, style, model, orifice size, and "K" factor of each sprinkler used. Riser detail showing system split, pressure gauge, check valve, main control valve, relief valve (where applicable), main drain valve.
 - o. Indicate the manufacturer, model, type, and pump curve of the booster pump (where applicable).
 - p. Indicate the type and size of pipe.
 - q. Provide hanger details.
 - r. Indicate type of fitting used.
 - s. Use of each room.
 - t. Location of heat sources.

The following notes shall be completed and placed verbatim on the working sprinkler plans:

1. This fire sprinkler system shall be designed and installed in accordance with NFPA 13 and The Bureau of Fire Prevention and Life Safety Standards and Guidelines Manual.
2. Only listed and approved devices shall be installed in this system.

3. Only new, listed sprinklers shall be employed in the installation of this sprinkler system.
4. All piping shall be provided with hangers and shall be supported per code and manufacturer's specifications.
5. All piping shall be hung from structural members.
6. Underground mains and lead-in connections shall be flushed before connection is made to sprinkler piping. The flush shall take place in the presence of Fire District Inspectors.
7. This fire sprinkler system shall be tested and inspected at both rough and final inspections, prior to occupancy being granted. Call two working days in advance to schedule all inspections.

INSPECTION AND TESTING PROCEDURE

1. Welded piping connections shall be inspected before installation.
2. The sprinkler system shall be field tested and inspected at the rough plumbing stage (i.e. exposed pipe and fitting stage) by the Fire Prevention Division. All new systems shall be hydrostatically tested (not pneumatic) for leakage at 200psi. For existing systems, when 20 sprinkler heads or more are added, a hydrostatic test of 50 psi over normal water pressure shall be required.
3. All piping shall be provided with hangers and shall be supported per code and manufacturer's specifications.
4. All piping shall be hung from structural members, if the members are wood, they shall be at least 3-inch width in thickness. For piping 2 ½ inches or greater, they shall be hung from 4-inch width in thickness.
5. All systems shall have an underground flush completed at time of hydrostatic test prior to connecting the underground to the overhead piping.
6. The sprinkler system and all the related components shall be tested and inspected at both rough and final inspections, prior to occupancy being granted.
7. At least two spare sprinklers of each type, temperature rating, and orifice size used in the system and a sprinkler wrench shall be provided and located at the system riser.
8. A 5 Year Service Test sticker shall be placed on the riser at the time the sprinkler system is put in service or at the time of final inspection if the system is put in service before final inspection.