WOODSIDE FIRE PROTECTION DISTRICT

Residential 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 one and two-family dwellings and manufactured homes. This guideline is meant to be used in conjunction with the latest edition adopted by the State Fire Marshal's Office of NFPA 13D: Installation of Sprinkler Systems in One and Two-Family Dwellings and Manufactured Homes, the 2025 California Fire Code, the 2025 California Residential Code, the Woodside Fire Protection District Ordinance, and other applicable national standings including manufacturer recommendation.

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

Automatic sprinkler systems installed in one and two-family dwellings shall be installed throughout the dwelling in accordance with NFPA 13D. Additional requirements for NFPA 13D sprinkler systems shall include:

1. Automatic fire sprinkler protection shall extend to attached garages and basements. Fire sprinkler protection may extend to accessory structures within 20 feet of the main structure and may also be required to extend to other structures that are located further than 150 feet from fire apparatus access. See CFC Section 503.1.1.
2. Pilot sprinkler heads shall be installed in attic spaces with heat sources (such as fuel-fire appliance) that are more than 30 inches in depth. Pilot sprinklers shall be placed at 30 feet on center.
3. Automatic fire sprinklers shall be provided under stairways unless enclosed and filled with insulation.

4. Automatic fire sprinklers shall be included in cover patios or overhangs with a heat source and connecting breezeways.
5. The main drain shall be a minimum ½ inch.
6. The main control valve shall be of indicating type.
7. The exterior fire bell shall be placed in the same area as the water supply control valve.
8. Only listed and approved devices shall be installed in this system.
9. All piping shall be provided with hangers and shall be supported per code and manufacturer's specifications. All piping shall be hung from structural members.
10. Underground mains and lead in connections shall be installed in accordance with requirements of the California Plumbing Code.
11. Where system piping or pumps are located in areas subject to freezing, steps shall be taken to protect system integrity; this may include, but is not limited to, heating and/or installation of insulation.
12. All sprinkler systems shall have a single supply main serving both the automatic sprinkler system and the domestic system. See Diagram 1
13. No wires shall be allowed to touch fire sprinkler piping due to pipe degradation.
14. Passive purge, backflow prevention and reduced pressure devices shall be approved by the local water purveyor for your system design.
15. CPVC piping used for longer drops or sprig ups longer than 1 foot 6 inches require restraint.
16. Sprinkler protection shall be installed in attic and crawl spaces that are accessible for storage (defined as having a clear height of 36 inches or greater and an access opening), with sprinkler heads spaced at intervals not exceeding 30 feet.

WATER SUPPLY REQUIREMENTS

Automatic fire sprinkler protection shall be designed as follows:

Square footage of structure Design Calculation

Less than 3600 sq. ft.	2 Head Calculation
3600 sq. ft. or larger	4 Head Calculation

Automatic Booster Pump

When the domestic water supply is deficient or a water tank is being used to supply the automatic sprinkler system, an automatic booster pump may be required to maintain the required pressure at the minimum gallons per minute. Pumps shall meet the following requirements:

1. Automatically activated upon system demand.
2. Be of self-priming type.
3. Installed on the main water line prior to the domestic and fire split.
4. A bypass shall be designed and installed around the pump to ensure street pressure is maintained in event of pump failure.

Water Storage Tanks

When a water storage tank is required, the tank(s) shall have a connection to a supply source to refill the tank automatically.

SYSTEM COMPONENTS

1. An approved rubber faced check valve shall be located on the system side of the main control valve.

2. All valves shall have an all-weather sign affixed to them, which indicate their purpose.
3. For systems with normal operating pressure in excess of 100 psi, a listed pressure relief valve shall be installed on the riser.

Sprinklers
Only new listed residential fire sprinklers shall be used.

Pressure Gauge
A listed pressure gauge shall be installed and maintained on the sprinkler system riser. The pressure gauge shall be installed on the system side of the check valve.

Piping
1. Approved plastic pipe may be used when installed in accordance with the manufacturers listing where installed in attics. Adequate insulation shall be provided on the attic side of the piping to avoid exposure of the piping to temperatures in excess of its rated temperature.
2. Insulation, include spray application insulation mixtures, shall be compatible with piping materials in accordance with manufactures specifications.
3. CPVC Piping: CPVC Sprinkler sprig ups in attic space or where CPVC piping is exposed to the temperatures below 40 degrees F, or above 120 degrees F shall require the pipe to be protected against freezing by insulating coverings, frost proof casings, listed heat tracing systems, or other reliable means capable of maintaining minimum temperatures so listed within.
    a. Method of insulating CPVC piping vertical piping to sprig ups or change in elevation in attic space shall be inspected at time of Rough Inspection. WFPD permits insulation wrap properly sized for vertical section of piping in attic or exterior pipe. Insulation shall be checked at time of rough inspection.
    b. Installation criteria for installing insulation in unheated attic areas to follow the guidelines of the insulation manufacturer. Per NFPA 13D Section 9.1.1 (note; method of piping anchoring will impact insulation cover).
    c. CPVC piping shall be installed by persons who have been certified by the manufacturer for installation of CPVC piping.
    d. Primers and glues shall be listed and approved for use with CPVC piping in systems using CPVC pipe.

System Activation
1. Upon activation of the fire sprinkler system, an interior alarm shall be provided capable of being heard in all sleeping rooms. Smoke alarms shall not act as an interior sounder for water flow unless the smoke alarm is listed and approved for such application.
2. The exterior fire bell shall be placed in the same area as the water supply control valve.

MANUFACTURED HOMES AND MULTI-UNIT MANUFACTURED HOUSING WITH TWO DWELLING UNITS

1. The Department of Housing and Community Development is responsible for plan approval, in-plant inspection, testing and installation of fire sprinkler systems installed in new manufactured housing units and multi-unit manufactured housing with two dwelling units for

sale in California. Prior to shipment of a home containing a fire sprinkler system, the factory is required to affix a “Fire Sprinkler System Information and Installer Certification” label inside the unit that provides detailed information for the on-site installer and homeowner use. The label is required to be affixed on an inside wall or door of the water heater compartment.

2. The installation of a fire sprinkler system in an existing manufactured home or multi-unit manufactured home with two dwelling units requires prior design approval from the Department of Housing and Community Development and inspection approval of the installation prior to the installer covering the piping material with finished wall or ceiling materials. Only the occupant homeowner or a fire protection contractor holding a valid C-16 license may install a fire sprinkler system in an existing manufactured home or multi-unit manufactured home with two dwelling units. Woodside Fire Protection District is responsible for plan check, and the General Requirements noted above.

TESTING PROCEDURE

1. The sprinkler system shall be field tested and inspected at the rough plumbing stage (i.e. exposed pipe and fitting stage) by the Bureau of Fire Prevention and Life Safety. All systems shall be hydrostatically tested (not pneumatic) for leakage for not less than a two-hour time period at 200 psi.
2. The riser shall show the system split (domestic and fire sprinkler piping), pressure gage, check valve, main control valve, relief valve (where applicable), main drain, and domestic shut-off valve.
3. The sprinkler system and all of the related components shall be tested and inspected by the Bureau of Fire Prevention and Life Safety at the final inspection stage, prior to occupancy being granted.

PLAN SUBMITTAL

A permit for the installation or modification to a Residential 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:
Plan Set
Water purveyor flow test
Hydraulic calculations
Cut sheets

*Plan Set shall include:

1. Owner Information
2. Project Address (including parcel number)
3. Designer Information
4. Contractor Information
5. Square Feet
6. Construction type

7. North Arrow
8. Scale (no smaller than 1/8 inch)
9. Site plan showing the following:
    a. Location of tank
    b. Location of pump
    c. Structure
    d. Underground pipe size and type
    e. Point of supply connection
    f. Depth of bury
    g. Type and size of valves or meters
10. Piping plan showing the following:
    a. Tank
    b. Pump
    c. Structure elevations
11. Full height cross section (including vaulted and beam ceiling locations)
12. Water tank details
13. Sprinkler spacing
14. Room use
15. Heat sources
16. Un-sprinklered areas

<u>Hydraulic Calculations</u>

1. Calculations must conform to manufacturer's specifications.
2. "K" factors for all sprinklers.
3. "C" values for the type of pipe used.
4. A pump curve or city supply curve, where the total demand point is clearly plotted.
5. A 10% reduction (Safety Margin) in the available water pressure shall be included in all calculations.
6. Provide a 5 gpm domestic demand at the base of the riser in the calculations.

Disclaimer: Simplified Calculation Method as per NFPA 13-D, Section 10.4.3, is <u>not</u> accepted by WFPD.