GENERAL

The purpose of this standard is to clarify the minimum fire code requirements when installing a residential fire sprinkler passive purge system.

The information provided in this document is general and intended as a standard only. Each project is unique and additional requirements may be enforced as deemed appropriate.

TYPES OF RESIDENTIAL FIRE SPRINKLER SYSTEMS

The two most common types of sprinkler installations are as follows:

1. **Standalone Sprinkler System:** In this system, the aboveground piping serves only fire sprinklers, with a completely separate set of pipes directly connected to them. These are commonly installed with copper or CPVC pipe. Standalone sprinklers usually require a single check valve to prevent stagnant sprinkler system water from contaminating the domestic water supply. Although the underground, or supply piping, is permitted to serve domestic use as well as sprinkler system use, once the split is made, the systems are completely separate.

2. **Multipurpose Piping Sprinkler System:** In this system, the piping is intended to serve both domestic needs and the fire protection needs from one common piping system throughout the dwelling unit. A passive purge system is a multipurpose type, where a single toilet (or multiple toilets) is supplied in addition to the fire sprinklers. A single check valve is required in this type of system. The National Fire Protection Association recommends installing the system as a loop, or locating the toilet on a remote portion of the system to ensure the water moves through a majority of the system when that single plumbing fixture is used. The Fire Department and your water purveyor require loop systems to have at least two points (two toilets) of passive purge. Multistory homes must be separately purged on each floor.

WHAT IS A CROSS CONNECTION AND WHAT IS BACKFLOW?

1. **Cross-Connection** – is the physical connection between the potable (drinking) water system and an “end-use” (water utilizing fixture, equipment, or process) where a potential water contaminating hazard exists.

2. **Backflow** – is the undesired reverse flow of contaminants into the potable water from an “end-use” hazard and is typically driven by common, but unfavorable, hydraulic events in either the public or a private water distribution system.

FIRE SPRINKLER SYSTEM WATER SUPPLY

All fire sprinkler piping should be of approved materials where it will be supplying or connected to the domestic (potable) water system. Sprinkler systems shall be supplied by a 1” meter and 1” service. Contact your water purveyor for an application to upgrade the service if required.
PLAN REVIEW SUBMITTAL REQUIREMENTS

NOTE: Plans must be submitted to the Building Division. Failure to provide all of the requested information will result in unnecessary delays in the plan review process.

All residential fire sprinkler systems within the jurisdiction of the Fire Department shall meet all the applicable sections of the San Mateo Municipal Code, NFPA 13D, 2013 edition. Residential Fire Sprinkler Systems are required for:

1. All new residential structures.
2. Any combination of additions, alterations, or repairs to existing structures, affecting more than 50% of the existing floor area.

All residential fire sprinkler systems shall be designed and installed by either a California licensed Fire Protection Contractor (C-16) or CA licensed Plumber (C-36). A property owner may design and install the fire sprinkler system in a single-family residence. All residential fire sprinkler system submittals shall include:

1. Minimum three (3) sets of plans that comply with the Design and Plan Requirements of this standard.
2. Minimum three (3) sets of hydraulic calculations that comply with the Hydraulic Calculation Requirements of this standard.
3. Three (3) sets of manufacturers' material information sheets for the sprinkler heads, piping, horn and strobe device, flow switch and hangers.
4. A completed Permit Application.
5. Payment of Fees. A plan check fee/inspection fee will be charged for each submittal. Please remit payment at the time of submittal.
6. Building Division plan review will verify that a minimum of one tie-in for each floor is provided, as well as a fire system tie-in at all toilets just above the angle stop. Your water purveyor’s Meter Sizing Policy requires at least two purge points on looped systems. Multistory homes must be separately purged on each floor.
7. Provide a copy of the Will Serve letter and acceptance of water flow analysis from your water purveyor.

DETAIL REQUIREMENTS CHECKLIST

Failure to provide the required detail information will result in the delay of your plan review. A typical residential fire sprinkler plans submittal shall include the following:

☐ A complete set of piping plans drawn to scale showing all sprinkler head locations (use walls as dimensional reference) and room descriptions.
☐ Indicate the type of piping being used in all areas, (system piping, riser piping, and underground piping).
☐ Provide all piping sizing and lengths in all areas (system piping, riser piping and underground piping).
☐ Note any sloped or special ceilings.
☐ Note any exposed beams, lighting fixtures or other ceiling obstructions to the sprinkler heads.
☐ Show the attic access point and pilot sprinkler head above.
☐ Show any attic or crawl space areas that are designed for storage and provide sprinkler coverage for those areas.
☐ Indicate on the plans all heat producing zones.
☐ Specify the manufacturer of the sprinkler head, orifice size and temperature rating. Use residential sprinkler heads in habitable spaces.
☐ Provide hanger details showing all components and attachment devices.
☐ Provide a system riser detail showing all valves and devices (no shut-off devices shall be installed on the system side).
☐ Show the location of the exterior all-weather horn and strobe device.
☐ Provide the site plan, drawn to scale; showing the underground pipe size, location, water meter size and connection point to the city main.
☐ Provide a building cross section showing sprinkler system components and building construction.
☐ Provide all necessary information and details so a comprehensive plan review may be performed.

**HYDRAULIC CALCULATION REQUIREMENT CHECKLIST**

A typical residential fire sprinkler plans submittal shall include the following hydraulic calculation information:

☐ Outline the calculation areas on the plans.
☐ Calculations are required for the two most hydraulically demanding heads within a compartment (not applicable for additions described above). Provide a 10% safety margin.
☐ Indicate all hydraulic reference points on the plans.
☐ Indicate the water meter size on the plan and include the appropriate pressure drop in the calculations.
☐ Provide water flow data and the source of information on the plan. Provide a copy of written water flow analysis from your water purveyor. Verbal verification is not accepted. The design contractor is responsible to ensure the accuracy of the water flow information.

**DESIGN REQUIREMENTS**

Design the one and two family dwellings fire sprinkler systems per NFPA 13D, 2013 edition. The garage exception does not apply. The following detailed requirements shall also apply:

1. Sprinklers are required in all areas of the structure including:
   a. Attached garage
   b. Attic Spaces (as described below)
   c. Crawl Spaces (as described below)
   d. Closets (as described below)
   e. Under combustible balconies

2. Sprinkler piping shall be copper, stainless or CPVC.

3. All heads within the living areas are to be quick or fast response type and listed for residential occupancies.

4. Sprinklers in the garage shall be spaced at a maximum of 130 square feet per each sprinkler head.

5. Garages and small enclosures containing heat producing devices (i.e. furnaces, hot water heater, etc.) may be standard type with intermediate temperature 100° rating within the vicinity of the hazard.
6. A pilot sprinkler head is required in the attic above the attic access point. This sprinkler head shall be mounted on a stainless steel, CPVC or copper sprinkler with proper bracing.

7. Sprinklers are required throughout attics 200° and crawl spaces that are to be used, or have the potential to be used for storage. If only a heat-producing device is installed in an attic or crawl space, sprinklers shall be installed in the vicinity of the hazard.

8. Only listed and approved devices and materials shall be used. CPVC fire sprinkler pipe may be used. All materials shall be installed per their listing requirements. CPVC piping is acceptable for use in a garage when it is installed in the following manner:
   a. The piping is installed above a smooth flat horizontal ceiling.
   b. The entire ceiling and all the walls are covered with a minimum of 1/2 inch plywood or 1/2 inch gypsum board.

9. Provide an all-weather rated horn and strobe device in place of the alarm bell. Provide the manufacturers’ information sheets indicating the device being used is an all-weather type unit.

10. Sprinklers are required in all closets except for linen closets. Linen closets are any closet with permanently fixed full depth shelving the entire height of the closet.

11. Skylights are required to be sprinkler protected with intermediate temperature rated sprinkler heads. Any skylight having any dimensions greater than or equal to 4 feet by 8 feet with a depth of 12 inches, shall be sprinkler protected.

12. If a water pressure reducing valve is required by the CA Plumbing Code then the device shall be installed on the domestic water side only.

13. Your water purveyor requires a backflow preventer or an approved passive purge system. Please contact your water purveyor for further information.

14. Passive purge will NOT be approved, and a backflow prevention assembly will be required at the water meter when any of the following is present:
   a. Swimming pool, spa or hot tub b.
      Gray water irrigation system
   c. Sewage ejector pump
   d. Solar water heating system
   e. Ethylene or propylene glycol system f.

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APPROVAL OF PLANS

A. The approved permit application entitles the applicant to one (1) hydrostatic/overhead piping inspection and one (1) final fire sprinkler inspection.
B. It is the installer's responsibility to perform sufficient pre-inspection testing to ensure operational integrity and reliability of the system in order to avoid delays at the time of inspection. Additional fees will be charged for additional inspections.

**INSPECTION REQUIREMENTS**

1. Fire inspection will verify that the sprinkler system has connections at all at least 2 toilets per floor, minimizes the use of branches or laterals, and has no dead end branches or laterals that exceed 3' in length; to prevent water from becoming stagnant.

2. Fire inspection will verify that a minimum of two tie-ins for each floor is provided, as well as a fire system tie-in at a minimum of 2 toilets just above the angle stop.

3. Exposed stub-in for passive purge connection to toilets.

4. A phenolic sign with recessed or raised lettering at the fire riser pipe or riser access panel indicating that a passive purge system is installed.

5. All pipes and fittings shall be lead-free, copper, stainless or CPVC.

6. Joint cement shall be compatible with potable water systems.

7. Water supply (including meter size and piping) shall be verified during rough and hydrostatic test/inspection, and again at final. Inspector will notify the water purveyor.

Approved by:

[Signature]

Ray Iverson  
Deputy Fire Chief