# Sprinkler System Standard for One- and Two- Family Dwellings

(NFPA 13D-2016)

Effective Date: January 1, 2017

**2016 CBC 903.3.1.3 NFPA 13D sprinkler systems.** Automatic sprinkler systems installed in one- and two-family dwellings, Group R-3 or congregate residences with 16 or fewer residents and townhouses shall be permitted to be installed throughout in accordance with NFPA 13D. NFPA 13D – 2016 edition (13D), referenced in Chapter 80 of the 2016 California Fire Code (CFC), is modified by the State in Chapter 80 and by San Jose Ordinance. Presented herein is a summary of the modifications and SJFD interpretations:

13D Section 6.2.3 Where more than one dwelling unit is served by the same water supply pipe, each dwelling unit shall have an individual control valve that serves the fire sprinkler system in that dwelling unit and the owner shall have access to the valve that controls the sprinkler system in their unit.

6.2.3.1 The control valve shall be permitted to serve the domestic water supply.

6.2.3.2 In the situation addressed by 6.2.3, no valve controlling the sprinkler system in a unit shall be located in another unit.

*Note: See Page 5 of 6 for Example.*

13D Section 7.5 **Add** the following:

7.5.10 Spare sprinklers shall be provided as required by NFPA 13 – 2016, Section 6.2.9

13D Section 7.6 **Replaced** with:

Local water flow alarms shall be provided on all sprinkler systems in homes.

13D Section 8.3.4 **Deleted.** Hence, sprinklers shall be required to be installed under exterior roofs, canopies, balconies, decks, or similar projections exceeding 4 feet in width and in garages open attached porches, carports, and similar structures. Sprinklers shall be designed commensurate with the design area for the residence.

*Note: Sprinklers and components in exterior locations or locations open to the exterior shall be listed as corrosion resistant.*

13D Section 8.3.5 **Deleted**.
13D Section 8.3.5.1 **Deleted**.
13D Section 8.3.5.1.1 **Deleted**.
13D Section 8.3.5.1.2 **Deleted**.

13D Section 8.3.6 **Deleted.**

13D Section 8.3.8 **Deleted** as a result of local ordinance deleting 8.3.4.

13D Section 8.3.10 Where sprinklers may be subject to excess temperature such as closets containing heat producing equipment, unconditioned garages, Exterior unconditioned space, etc., intermediate temperature sprinklers shall be required.

13D Section 8.3 is further **amended** by adding a new subsection to read as follows:

13D New Section 8.3.11 Pilot sprinklers shall be provided in the attics and between floors where floor/ceiling assemblies consist of open web wood joists or trusses. Pilot sprinklers shall be intermediate temperature rated, K=4.2, quick response. Pilot sprinklers shall be located within twelve inches of the structure and/or at the apex of each ridgeline when applicable. A sprinkler is required where the ridgeline and hips converge. Sprinklers shall be spaced at maximum thirty feet centers (maximum fifteen feet from outside walls) and shall be located at all heat and fire sources including furnaces, hot water heaters, above kitchen ranges, etc.

**Note:** Similar to the requirements of NFPA 13 when sprinklers are required in attics/concealed spaces, pilot sprinklers shall be provided in these spaces where the depth of the space exceeds 6 inches, measured after insulation. Otherwise, the attic shall be fully insulated. If the attic will be fully insulated, the installing contractor shall obtain approval from the San Jose Fire Department prior to covering pipe (sheet rocking). Where attic spaces used for storage the sprinkler design shall be as directed below in the amendment to section 903.2.18.

13D Section 10.3 **Note:**
CPVC Fire Sprinkler Products, like all piping materials, will expand and contract with changes in temperature. The installation of expansion loops, offsets, or bends is required on long straight runs to compensate for this movement. This will allow the piping system to absorb forces generated by expansion/contraction without damage. This movement must be designed into the system per the manufactures stipulations. The GF Harvel CPVC Fire Sprinkler piping expansion/contraction Reference Tables are published on our website as an example of manufacturers conditions for your use.

13D Section 10.4.9 **Deleted.**

13D Section 11.2.1.1 **Replaced** with:
All piping and attached appurtenances subjected to system working pressure shall be hydrostatically tested at 200 psi and shall maintain that pressure without loss for 2 hours.

13D Section 11.2.1.2 **Deleted.**

**CFC Section 903.2.18 is amended by SJFD Ordinance as follows**: **Group U private garages and carports accessory to R-3 occupancies.** Carports with habitable space above and attached garages, accessory to Group R-3 occupancies, shall be protected by residential fire sprinklers in accordance with this section. Residential fire sprinklers shall be connected to and installed in accordance with an automatic residential fire sprinkler system that complies with NFPA 13D as amended by San José. Fire sprinklers shall be residential sprinklers or quick-response sprinklers, design to provide a minimum density of 0.05 gpm/ft2 (2.04 mm/min.) over the area to the garage and/or carport, but not to exceed two sprinklers for hydraulic calculation purposes. Garage doors shall not be consider obstructions with respect to sprinkler placement.
*Note: As further discussed below, sprinklers are limited to the conditions of their listing. Hence, residential sprinklers or quick-response sprinklers may be spaced free of obstruction in accordance to their listing restrictions, in general, 400 sf or 225 sf respectively)*

For Antifreeze Systems see the State modifications to 2016 NFPA 13D provided in 2016 CFC Chapter 80.

For Additional the State modifications to 2016 NFPA 13D provided in 2016 CFC Chapter 80 are as follows with CFC modifications shown in *Red & italics*:

13D Section 6.2* Water Supply Sources. When the requirements of 6.2.2 are met, the following water supply sources shall be considered to be acceptable by this standard:

(1) A connection to a reliable waterworks system with or without an automatically operated pump.
*Note: San Jose is provided service by 3 different water purveyors. All 3 required the sprinkler system to be supplied through a water meter. The minimum size meter allowed for a new service is 1". The water company may require the meter be larger. An allowance to use an existing meter smaller than 1" may be approved if hydraulic calculations and field verification prove the meter can deliver sufficient supply.*
(2) An elevated tank.
(3) A pressure tank designed to American Society of Mechanical Engineers (ASME) standards for a pressure vessel with a reliable pressure source.
(4) A stored water source with an automatically operated pump.
(5) A well with a pump of sufficient capacity and pressure to meet the sprinkler system demand. *The stored water requirement of 6.1.2 or 6.1.3 shall be permitted to be a combination of the water in the well (including the refill rate) plus the water in the holding tank if such tank can supply the sprinkler system.*

13D Section 6.2.1 - *Deleted*

13D Section 6.2.2 Where a *well*, pump, *tank or combination thereof* is the source of supply for a fire sprinkler system, *the water supply shall serve both domestic and fire sprinkler systems*, and the following shall be met:

(1) A test connection shall be provided downstream of the pump that creates a flow of water equal to the smallest sprinkler on the system. *The connection shall return water to the tank.*
(2) Any disconnecting means for the pump shall be approved.
(3) *A method for refilling the tank shall be piped to the tank.*
(4) *A method of seeing the water level in the tank shall be provided without having to open the tank.*
(5) The pump shall not be permitted to sit directly on the floor.

*6.2.2.1 Where a fire sprinkler system is supplied by a stored water source with an automatically operated means of pressurizing the system other than an electric pump, the water supply may serve the sprinkler system only.*

13D Section 6.2.3 – *Unmodified (See page 1 for Text and page 5 for Figure A.6.2.3 (SJFD).*

*13D Section 6.2.4 ADDED as follows:*
***13D Section 6.2.4** - Where a water supply serves both domestic and fire sprinkler systems, 5 gpm (19 L/min) shall be added to the sprinkler system demand at the point where the systems are connected, to determine the size of common piping and the size of the total water supply requirements where no provision is made to prevent flow into the domestic water system upon operation of a sprinkler.*

*13D Section 8.3.10 and 8.3.10.1 ADDED as follows:*
***8.3.10 Solar photovoltaic panel structures.***
*8.3.10.1 Sprinklers shall be permitted to be omitted from the following structures:*
*(1) Solar photovoltaic panel structures with no use underneath. Signs may be provided, as determined by the enforcing agency prohibiting any use underneath including storage.*
*(2) Solar photovoltaic (PV) panels supported by framing that have sufficient uniformly distributed and unobstructed openings throughout the top of the array (horizontal plane) to allow heat and gases to escape, as determined by the enforcing agency.*

**Hydraulic Calculations**

1 The pressure cushion for hydraulic calculations shall be at least 10% of the water supply data provided by the water company at the flow require.

2 All hydraulic calculations shall include a copy of the letter from the Water Company that states the water-flow data verified within six months of the submittal date. Water-flow data may be obtained from the San Jose Water Company, San Jose Municipal Water Company or Great Oaks Water. If you wish, San Jose Fire Department can perform a water-flow test and provide the water-flow data at an hourly rate (3 hours minimum). However, this test will not take the place of the water company declaration.

3 The backflow prevention requirements for each water company are unique. San Jose Water Company and Great Oaks Water Company require an additional check valve after their meter. San Jose Municipal Water Company requires a "Lead Free Dual Check Valve Backflow Device (or equivalent)". We will need verification that the correct devices have been represented in the calculations. For San Jose, A completed Backflow Prevention Verification Form # 306 (available on this website) is required to be included with you permit application. For Reference concerning the backflow preventer see the California State Fire Marshal CODE INTERPRETATION 13-001 included herein (below).

4 Provide documentation for all pipe length equivalents used to develop your calculations. As an Example, Tyco CPVC fittings are "special" in that they get reduced equivalent lengths (for 90° elbow) compared to other manufacturers, you need to provide note on plans and in the calculations that only Tyco CPVC fittings will be used. We will check these in the field, so, the fittings must be readily identified as Tyco CPVC fittings. If not, then you will need to revise your calculations to reflect the "normal" equivalent lengths.

5 The 2 sprinkler calculation design is contingent on the installation conforming to the situations presented in 2013 NFPA 13D section 10.2. For the situation of flat, smooth, horizontal ceilings with beams at the ceiling, there are a number of variables that could cause many sprinklers to open during a fire. Residential sprinklers must be used in accordance with all of the restrictions of their listing to protect against this circumstance.

5.1 Referring to 10.2.2 – Some residential sprinklers are listed to specifically protect spaces with compartment features beyond those indicated in 10.2.1(1) through (5) and are permitted for use in accordance with 10.2.2. Some of these sprinklers are listed for a two-sprinkler design. Others are listed for more sprinklers in the design area. In any case, sprinklers used to protect spaces not specifically addressed in 10.2.1(1) through (5) are to be used in specific configurations in accordance with their listing.

5.2 Referring to 10.2.3 – There are some situations where no listed sprinklers exist for the compartment features under consideration. For example, there may be a single-family residence in which the ceiling height in the family room exceeds 24 ft (7.3 m). For this situation, compliance with 10.2.2 is not possible. Furthermore, if no sprinklers are listed for the ceiling height in question, compliance with 10.2.2 is also not possible. In this case, no standardized guidance on determining the appropriate number of sprinklers exists. However, sprinklers are still required to be installed in the residence in accordance with NFPA 13D. For this situation, the appropriate number of sprinklers for the design area is to be determined through an analysis by qualified individuals in consultation with the SJFD. In making these determinations, consideration should be given to factors influencing sprinkler system performance, such as sprinkler response characteristics, impact of obstructions on sprinkler discharge, and number of sprinklers anticipated to operate in the event of a fire.

5.3 As indicated in Section 10.2.4 - for situations not meeting one of the conditions in 10.2.1 and 10.2.3, the number of sprinklers in the design area shall be determined in consultation with SJFD as appropriate for the conditions. For the ceiling constructions and room configurations that are beyond the scope of the two-sprinkler discharge criterion referenced in 10.2.1 and 10.2.3, a greater number of design sprinklers and/or higher discharge flows should be considered in the system design. As of this date, there is limited fire test data available to include specific design criteria in this standard. Commonly a 4 sprinkler calculation design has been approved by SJFD as being capable of controlling the fire for 10 minutes and meeting the goals of NFPA 13D where the largest compartment has no more than 4 sprinklers.

**INSPECTIONS:** Inspection shall be scheduled by the installing contractor only. When scheduling for inspection, request sufficient time to complete a thorough inspection of the work performed. Inspections are provided as covered by the permit fees. Additional inspections shall be billed by the amount of time required. Travel time is included in your inspection time. Missed inspections or inspections cancelled less than 48 hours before the scheduled date shall be billed as an inspection for the amount of time booked.

**DOCUMENT REVISONS:** This document is subject to revisions. For general information and to verify that you have the most current document, please call 408-535-7750, and request the current version date.

## SJFD Example for 13D section 6.2.3

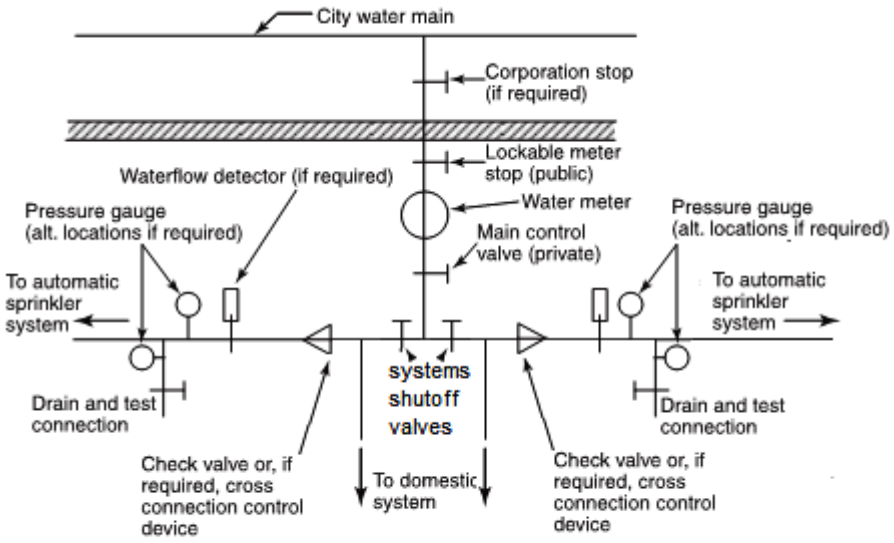



**FIGURE A.6.2.3 (SJFD)**
Where more than one dwelling unit is served by the same water supply pipe.

**INFORMATIONAL:**

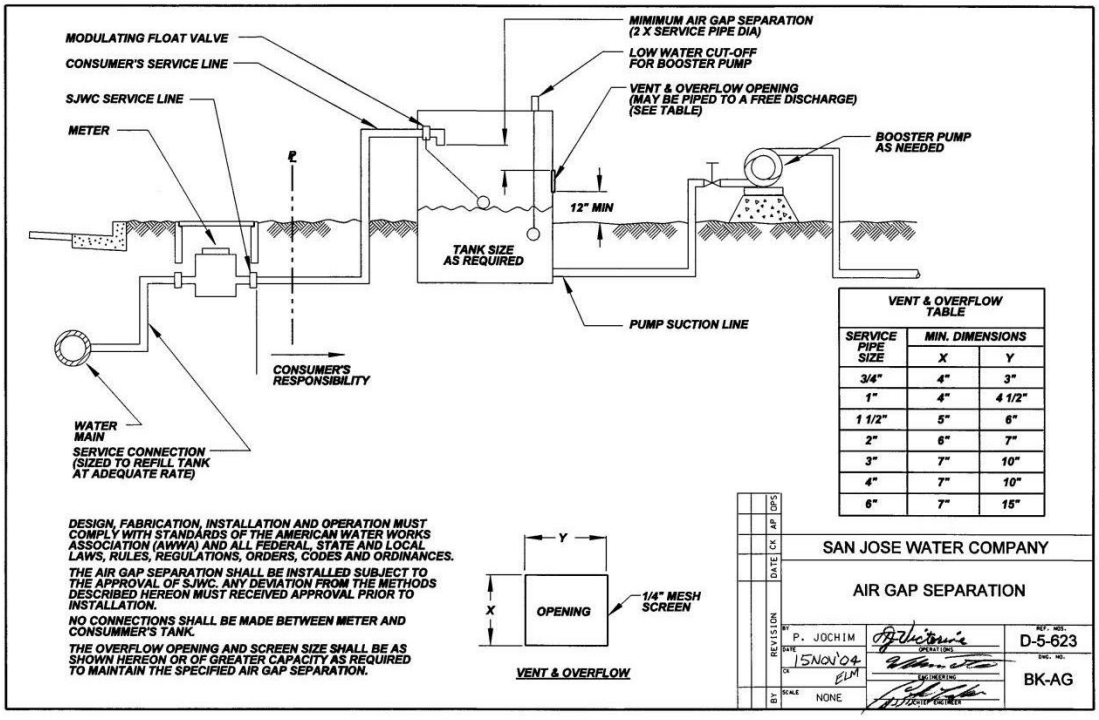
**California State Fire Marshal CODE INTERPRETATION 13-001**

Question: Is it the intent of Section R313.3.5.3 of the 2013 California Residential Code (CRC) to require backflow protection to separate a stand-alone residential fire sprinkler system from a potable water source supplying the system?

Answer: The answer to this question is dependent on the specific installation. Stand-alone residential sprinkler systems that 1) Use piping materials that are suitable for potable water, 2) Do not contain antifreeze, and 3) Do not have a fire department connection, are excluded from any backflow protection requirements under CRC Section R313.3.1. CRC Section R313.3.1 is a "specific" code provision that applies to residential sprinkler systems meeting these criteria. Any stand-alone residential sprinkler system that does not meet the three criteria must be provided with backflow protection in accordance with CRC Section 313.3.5.3, which contains the "general" requirements for providing backflow protection for residential sprinkler systems.

CRC Section 1.1.7 indicates that, where a conflict exists between code sections, specific provisions prevail over general provisions, even if the specific provision is less restrictive. For reference, CRC 1.1.7 assigns the following as the general order of precedence and use of the California Residential Code (Item 2 applies in this case):
1. Differences. In the event of any differences between these building standards and the standard reference documents, the text of these building standards shall govern.
2. Specific provisions. Where a specific provision varies from a general provision, the specific provision shall apply.
3. Conflicts. When the requirements of this code conflict with the requirements of any other part of the California Building Standards Code, Title 24, the most restrictive requirements shall prevail.

Consult your water purveyor for specific requirements. The following information is provided to be considered general guidance only. When a tank is used, SJWC requires an Air Gap configuration.

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