



SAN BERNARDINO COUNTY FIRE PROTECTION DISTRICT COMMUNITY SAFETY DIVISION

598 South Tippecanoe Ave.
San Bernardino, CA 92415
(909) 386-8400

Standard Number

F - 3

Revision Date:
July 1, 2023

FIRE PREVENTION STANDARD

FIRE SPRINKLER SYSTEMS IN MULTI-FAMILY DWELLINGS

AUTHORITY

Sections 102.9, 103 and 104.1 of the 2022 California Fire Code (CFC) and Sections 4 and 8 of Ordinance FPD 23-01 of the San Bernardino County Fire Protection District Fire Code (Fire Code) state that the Fire Code Official of the San Bernardino County Fire Protection District (SBCFPD) shall have the authority to adopt policies, procedures, rules, and regulations in order to clarify the application of the Fire Code and to determine requirements not specifically provided for by the Fire Code. For further requirements on this subject, see section 903 of the 2022 California Fire Code and the currently adopted edition of NFPA 13R as amended. This Standard may be modified with the approval of the Fire Code Official.

PURPOSE

The purpose of this Standard is to provide minimum requirements for the design and installation of fire sprinkler systems in multifamily dwellings, in order to aid in the detection and control of fires and thus provide improved protection against injury, life loss, and property damage.

SCOPE

This Standard, in conjunction with the currently adopted edition of NFPA 13R, shall apply to the design and installation of, and the modification to, all fire sprinkler systems in multi-family dwellings within buildings up to and including four (4) stories, and not exceeding sixty (60) feet in height above fire apparatus access roads. This Standard and its interpretation is not intended to be applied or enforced where there is any conflict with NFPA 13R or the California Fire Code.

DISCLAIMER

These Standards may change without notice. Whenever applicable statutes, regulations and Standards are updated and adopted, the latest shall apply. Please contact the Community Safety Division at (909) 386-8400 to determine if these Standards have changed. These requirements do not exempt any individual from complying with other applicable state, county, or city codes and Standards.

SUBMITTALS

- 1) Submit an application and all required documentation online through the county EZOP website, <https://wp.sbcounty.gov/ezop/>.

NOTE: If the project is in the City of Fontana, please contact (909) 428-8890 for submittal information.

- 2) All pages of plans shall have a three-inch (3) by three-inch (3) box labeled "FOR FIRE DEPARTMENT USE ONLY" located in the bottom right corner of every page for approval stamp.



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- 3) The following shall be submitted to the Fire Department for approval and permit prior to performing work on any fire sprinkler system:
 - a) Detailed plans describing the work to be done. (For information on what must be included on plans, see sections below in this Standard and the SBCFPD Plan Submittal Checklist.)
 - b) Hydraulic calculations for all design areas.
 - c) Manufacturer's specification sheets (cut sheets) for all proposed materials and equipment.
 - d) A water flow test report from the water purveyor dated within six (6) months of submittal. With the approval of the Fire Code Official, for special cases where water supply information is not available, the following may be considered acceptable:
 - i. A hydraulic analysis and report provided by a registered professional fire protection engineer (F.P.E.)
 - ii. A water flow test performed by a licensed C-16 contractor, documented on the SBCFPD "FIRE HYDRANT WATER FLOW TEST REPORT" form.
 - e) Approved drawings showing private underground water supply lines
 - f) Any other important details and information as required by this Standard.
 - g) Payment of all appropriate fees.

GENERAL

- 1) All automatic fire sprinkler systems for multi-family residential projects shall be designed to the requirements of the currently adopted edition of NFPA 13R and other recognized standards as they apply to the hazard being protected. No deviations from these recognized standards will be made without approval from the Fire Code Official.

UNDERGROUND PIPING SYSTEMS

- 1) Underground sprinkler piping, when serving fire protection systems only, shall be installed in accordance with SBCFPD Standard W-2 and currently adopted editions of NFPA 13R and 24.
- 2) Underground domestic water supplies that also serve sprinkler systems, either from the public water system or from a private supply source, shall meet the requirements of NFPA 13R and this Standard, as well as all applicable requirements of the local water purveyor. It is the contractor's or owner's responsibility to contact the local water purveyor prior to design of the system for specific requirements.

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- 3) Post Indicator Valves (PIVs) and Fire Department Connections (FDCs) serving fire sprinkler systems shall be installed in accordance with SBCFPD Standard F-4 and currently adopted editions of NFPA 13R and 24.
- 4) Underground fire riser sweep shall extend 6" above finished floor and be a minimum of 4" in diameter.

SYSTEM RISERS

- 1) All system risers shall be installed inside of buildings to be protected, or in an approved weather-resistant exterior enclosure, and in a location acceptable to the Fire Code Official.
- 2) Risers shall be accessible to SBCFPD personnel and shall have a minimum of thirty-six inches (36") clearance from obstructions and around all components and equipment. Risers shall be accessible for operation, inspection, testing and maintenance. Signage for rooms enclosing sprinkler risers shall be in accordance with the 'Signage' section of this Standard.
- 3) System risers shall be located inside a 4'x4' room and accessible by means of at least one (1) exterior access door of not less than thirty-six inches (36") in width and eighty inches (80") in height. **(See DIAGRAM F-3.1)** Signage for the room shall be in accordance with the 'Signage' section of this Standard.
- 4) System risers shall be co- located with the Fire Alarm Control Panel (FACP) unless otherwise approved by the Fire Code Official.

DRAINS AND VALVES

- 1) Each sprinkler system shall have a test valve installed in an approved location, either on the system riser or in a remote area of the system. The orifice shall be equal to the hydraulically calculated most remote sprinkler head.
- 2) All drains and test valves shall be piped to the exterior of the building. Outlets of test valves and drains shall discharge preferably into landscaped areas, such as planters or basins, but in no case shall the installation allow water to flow into the public street or storm drain system.
 - a) As an alternate to exterior outlets, test valves and drains may have outlets that discharge into interior floor drains connected to the sewer system, or another suitable location approved by the Fire Code Official. Floor drains are to be adequately sized for the flow and pressure of the water being drained from the system.

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- b) Such outlets for systems with anti-freeze solutions shall not be allowed to drain onto the site. All anti-freeze systems shall have drain and test valve connections that allow for the safe collection of anti-freeze solutions.

SYSTEM MONITORING AND ALARMS

- 1) Fire sprinkler systems and all control valves shall be connected to an approved sprinkler monitoring alarm in accordance with the currently adopted California Fire Code, NFPA 72 and SBCFPD Standard F-5. The sprinkler monitoring alarm system shall be tested, accepted, and operational prior to final approval to occupy the building.
- 2) Every sprinkler system riser shall be provided a separate local water-flow alarm bell, installed at the exterior of the protected building closest to the sprinkler riser. Water-flow alarm bells shall be a minimum of eight (8) inches in size and bear a sign stating, "WHEN BELL RINGS CALL FIRE DEPT" in minimum one-inch (1") letters on a contrasting background.
- 3) Other local alarm devices may be provided with the approval of the Fire Code Official. See SBCFPD Standard F-5 for fire alarm interior water-flow notification requirements.

SYSTEM COMPONENTS

- 1) In living areas within dwelling units, only approved listed residential or quick response sprinkler heads shall be used, per the listing of the manufacturer and NFPA 13R.
- 2) All CPVC plastic pipe used shall meet the requirements of the manufacturers listing, particularly for applications when pipe is exposed.
- 3) All system components shall be rated for the maximum working pressure, but not less than 175 psi.
- 4) In storage areas, attics, and attached or detached garages, approved residential or quick response sprinkler heads may be used, with a minimum intermediate temperature rating.
- 5) An approved rubber-faced check valve shall be installed on systems that have a common fire protection and domestic supply, on the system side of the tee that feeds the sprinkler riser. For systems on which a separate backflow device is required on the riser, an additional check valve is not required.
- 6) Piping shall be supported from structural members using methods approved by the pipe manufacturer and NFPA 13R. Devices such as "J-hooks" or plumbers' tape are prohibited. Hangers shall not be attached to the structure by nails or any fastener which requires impact to fasten it to the structure. All hangers used on CPVC pipe shall be an approved type and listed.

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- 7) The installation of a reduced pressure (RP) device or backflow device on sprinkler system risers shall be allowed when required by the Plumbing Code or the water purveyor. When such RP or backflow devices are required, they shall be secured in an open position and an appropriate allowance shall be made for all such devices in the hydraulic calculations.

SYSTEM DESIGN

- 1) Residential sprinkler heads shall be designed for a coverage area in accordance with the manufacturers listing. Sprinklers other than residential sprinklers shall provide coverage as specified in NFPA 13.
- 2) For water supplies using a water meter, the water meter shall be of sufficient size to meet the hydraulically calculated system demand. Hydraulic calculations shall demonstrate the appropriate pressure loss through water meters, using the manufacturer's specification or NFPA 13R. Information on friction loss and flow rates through water meters shall be submitted for review and approval.
- 3) Sprinkler systems shall be designed to provide the demand of the four (4) most hydraulically remote sprinkler heads, per the manufacturer's listings and specifications. Hydraulic calculations shall be provided for each separate remote area or design area that uses a different piping configuration, different sprinkler head or different spacing.

HYDRAULIC CALCULATIONS

- 1) All hydraulic calculations shall be designed for the system demand not to exceed ninety percent (90%) of the available water supply. This demand is to include the sprinkler system flow and the combined inside and outside hose allowance requirements but shall not be required to include fire-flow demand per Appendix B of the California Fire Code.
- 2) Hydraulic calculations shall be designed using data either from official flow tests or computer-generated models performed by the water purveyor. All water flow tests used in design of sprinkler systems shall be dated no more than six (6) months prior to time of plan submittal. With the approval of the Fire Code Official, for special cases where water supply information is not available, system design may be based on the following:
 - a) A hydraulic analysis and report provided by a registered professional fire protection engineer (F.P.E.)
 - b) A flow test performed by a licensed C-16 contractor, documented on the SBCFPD "FIRE HYDRANT WATER FLOW TEST REPORT" form.



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- 3) For systems served by a common domestic and fire water supply, where no provisions are made to prevent the domestic waterflow upon sprinkler system activation, the domestic demand for the building being calculated shall be included as part of the overall system demand.

TESTING AND MAINTENANCE

- 1) All sprinkler systems shall be tested in accordance with the proper CCR Title 19 and NFPA 25 standards.
- 2) All testing and maintenance reports and documentation shall be submitted to the appropriate SBCFPD office using an approved automatic extinguishing system form available from the Office of the State Fire Marshal.

MULTIFAMILY BUILDINGS WITHIN A COMPLEX

- 1) For multifamily buildings that are built as part of a master development or complex, a licensed sprinkler contractor shall submit plans, together with a current water flow test dated within six (6) months, and hydraulic calculations based on the current water flow test. A separate application and set of system plans shall be required for each floor plan type. After approval of each plan, a permit will be issued for each individual building.
- 2) Each separate remote area or design area that uses a different piping configuration, different sprinkler head, different spacing, or different water supply information shall have a separate set of hydraulic calculations. Where acceptable to the fire code official, 'worst case scenario' calculations shall be submitted showing maximum hydraulic losses to a number of buildings for a given plan type.

PROTECTION FROM FREEZING

- 1) All piping for new systems in areas subject to freezing temperatures and not maintained above 40°F shall be protected from freezing in accordance with the current edition of NFPA 13R.
- 2) The need for freeze protection shall be as determined by the Fire Code Official and based on the California Energy Commission "Climate Zones" and Part 6 of CCR Title 24, the California Energy Code. Systems located in Climate Zone 16 shall be freeze protected by a means other than the use of insulation. Detailed maps and information about Climate Zones may be found on the Internet at <https://www.energy.ca.gov/>
- 3) Heat tape and foam pipe wraps are not approved methods of freeze protection.

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- 4) Insulation may be used as freeze protection for piping if the building or spaces containing piping can be maintained at a minimum of 40°F at all times. The use of batt or blown-in insulation for freeze protection shall be certified by the general contractor/developer and installed per the currently adopted edition of NFPA 13R.
- 5) All anti-freeze solutions shall be a listed factory premixed solution and approved in accordance with NFPA 13R and the California Fire Code. A metal placard shall be placed on all systems using anti-freeze solutions at the main riser as well as at all test and drain valves. The placard shall contain the necessary information permanently stamped or engraved as shown in **DIAGRAM F-3.2**.

SIGNAGE & IDENTIFICATION

- 1) All signs for drains and test valves required on sprinkler systems shall be made of metal, no less than 10-gauge thickness, colored red and engraved with permanent white letters.
- 2) Hydraulic calculation plates required on risers shall be made of metal, unpainted, and the information permanently stamped or engraved, and attached to the riser with a metal “U-bolt” or chain.
- 3) All doors enclosing or concealing sprinkler risers, shall have a durable metal sign four inches (4”) in height and twelve inches (12”) in length with a minimum of two inch (2”) red block letters on a white background stating “FIRE RISER INSIDE” per **DIAGRAM F-3.3**. Signs shall be installed at five feet (5’) above finished floor on the outside of doors.

INSPECTIONS

- 1) All sprinkler systems are required to be inspected visibly by the Fire Code Official prior to final approval. The C-16 contractor of record shall contact the appropriate SBCFPD office at least forty-eight (48) hours prior to requesting an inspection and shall notify the SBCFPD office a minimum of twenty-four (24) hours for any cancellation of inspections.
- 2) A hard copy of the stamped plans (paper) and required job card(s) shall be onsite at the time of inspection.
- 3) The following inspections shall be required for all fire sprinkler systems in multi-family dwellings:
 - a) **OVERHEAD ROUGH INSPECTIONS:**
 - i. All piping and components are required to be in place and shall be exposed and visible, including Fire Department Connections (FDCs), sprinkler heads valves, gauges, and flow switches. If insulation is to be used for freeze protection, this shall be in place and fastened, and with the approval of the inspector, is permitted to cover the necessary exposed pipe.
 - ii. Effective January 1, 2024, fire sprinkler systems installed with CPVC shall use plugs in place of sprinkler heads.



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- iii. All seismic bracing, hangers and other restraints shall be in place and installed per the approved plans.
- b) **OVERHEAD HYDRO INSPECTION:**
 - i. The system piping and all components shall be hydrostatically tested in accordance with NFPA 13R. There shall be no visible pressure drop on the gauge during the hydrostatic test. All piping shall be exposed to check for leaks.
- c) **FINAL INSPECTION:**
 - i. A thorough flush of the underground supply piping shall be completed prior to connecting to the riser and witnessed by the SBCFPD inspector (See SBCFPD Standard W-2).
 - ii. Water motor gong bell or electric water-flow alarm bell and flow switch shall be functional, and all identification signs and system hydraulic data plates shall be installed. Spare head box, including additional sprinklers and sprinkler head wrench, shall be installed.
 - iii. All sprinkler heads shall be uncovered, with escutcheons or trim rings in place. For concealed heads, the cover plates shall be off. All sprinkler heads shall be free of protective caps, paint, texturing, or any other obstructions. Protective guards shall be installed on all heads in garages and storage areas, if required.
 - iv. A flow test shall be performed using the approved Test and Drain Valve or Inspectors Test Valve, (if installed). If the water-flow alarm bell is electrically operated, the water-flow shall activate an audible alarm on the premises within 90 seconds after such flow begins and until such flow stops. If the water-flow alarm bell is mechanically operated, the water flow shall activate the bell within 5 minutes.
 - v. Contractor shall provide a hard copy of the "Above Ground Completion" certificate per NFPA 13.

SPECIAL SITUATIONS

- 1) Spray applied or wrapped polyurethane foam insulation that comes into contact with non-metallic fire sprinkler piping, whether such is required for freeze protection or not, shall be listed for such use with pipe and applied according to the manufacturer's recommendations. Information about any polyurethane foam insulation shall be made available to the Fire Code Official upon request.

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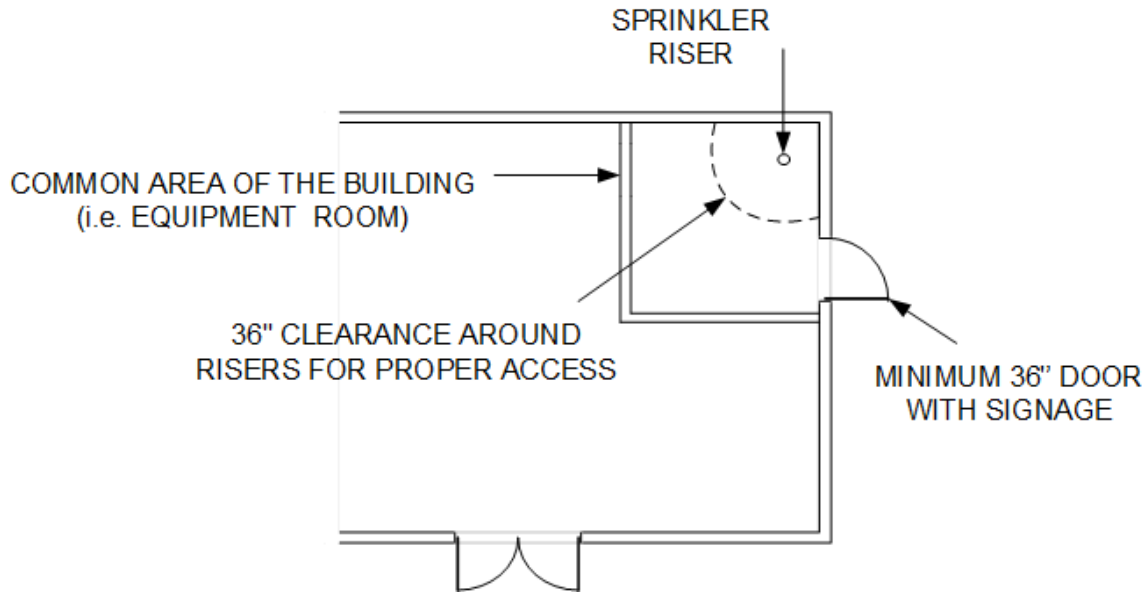


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DIAGRAM F-3.1: ACCESS TO SPRINKLER RISERS





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DIAGRAM F-3.2: ANTI-FREEZE SIGN

ANTI-FREEZE SYSTEM

The fire sprinkler system in this building contains an anti-freeze solution for protection against freezing.

Type of anti-freeze:

Manufacturer:

Trade name & brand:

Solution concentration: %

System volume: gallons

Protected to: degrees (°F/°C)

Location:

Date tested:

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DIAGRAM F-3.3: FIRE RISER SIGN

