


<p>July 1, 2010</p>	<p>SANTA ROSA FIRE DEPARTMENT FIRE PREVENTION BUREAU STANDARD</p>
	<p>RESIDENTIAL FIRE SPRINKLERS NFPA 13R</p>

PURPOSE

This standard shall cover the general design and installation of automatic sprinkler systems for protection against fire hazards in residential occupancies up to and including four stories in height. Information contained herein applies to typical instances and may not address all circumstances.

CODE REFERENCES

2007 California Building Code (CBC)
2007 California Fire Code (CFC) Chapter
NFPA 13R, 2002 edition

PERMIT(S) REQUIRED

A Fire Sprinkler System Installation permit is required. Categories and fee amounts are found at: <http://ci.santa-rosa.ca.us/doclib/Documents/IB%20018.pdf>

REFERENCES

- 1) Plan Review Checklist – Fire Sprinkler Installation NFPA 13R
- 2) Inspection Checklist – Fire Sprinkler Installation NFPA 13R

REQUIRED INSPECTIONS

- 1) Underground – NFPA 13R, an inspection of all underground, flush and backfill.
- 2) Overhead Hydrostatic Inspection – NFPA 13R, System shall be pressurized at 200 psi for two hours. Gauge shall be marked upon pressurization.
- 3) Fire Sprinkler Final - NFPA 13R, A main Drain, Inspector Test and final walkthrough of sprinkler coverage shall be performed.

Inspections shall be scheduled a minimum of 48 hours in advance. Directions for scheduling are found at: <http://ci.santa-rosa.ca.us/news/Pages/AutomatedFireInspectionRequestSystem.aspx>

PERMIT INFORMATION

Fire Sprinkler Systems shall be designed and installed in accordance with NFPA 13R, 2002 Edition.

Working plans shall be submitted for approval to the Santa Rosa Fire Department before any work is conducted. A completed Permit and Plan Review Application Form and fees shall be submitted along with;

- Three (3) sets of plans.
- Three (3) sets of hydraulic calculations that comply with hydraulic calculation requirements of this standard.
- Three (3) sets of manufacturers' material information sheets (complete materials submittal) for sprinkler head, piping, fitting, hanger, earthquake bracing, horn & strobe, valve, fire pump

**Dev
Standard
Residential Fire Sprinklers 13R**

components, fire department connection and any other device being used.

All licenses must be included with the applications. At a minimum submit the following:

- A City of Santa Rosa Tax Certificate (may be on file)
- Current appropriate California licensed Fire Protection Contractor (C-16);
- Registered Fire Protection or Mechanical Engineer for design. (stamped plans acceptable)
- Proof of worker's compensation insurance (may be on file)

Plans shall include the information specified below.

- Failure to provide all of the required information may result in the plans being rejected.
 - Rejected plans will be returned with a Plan Review Correction Form.
 - Review the form and make the required additions/changes which shall be clouded for identification.
 - Provide a legend to describe the addition or change.
 - Allow ten (10) working days for review of submitted plans.
 - Any deviation during the installation from originally submitted plans requires Fire Department approval.

DESIGN AND SUBMITTAL REQUIREMENTS

The intent of this document is to aid in the process of design and installation of a fire sprinkler system.

- All new 13-R fire sprinkler systems within the jurisdiction of the City of Santa Rosa Fire Department shall meet all of the applicable sections of the Santa Rosa City Code and NFPA 13-R, 2002 Edition.
- For underground water main requirements, consult City of Santa Rosa Water Standard on design/installation guideline for private underground fire service lines.
- Contact the City of Santa Rosa Utilities Department (707)543-3930 for back flow prevention requirements and underground water main connection and encroachment matters.

PLANS

- The following is a list of standard information that shall be included on your plans - NFPA 13R 6.1.7.
 - Name of owner and occupant.
 - Location, including street address.
 - Point of compass.
 - Ceiling construction.
 - Full height cross section.
 - Location of fire walls.
 - Location of partitions.

Dev

Standard

Residential Fire Sprinklers 13R

- Occupancy of each area or room.
 - Location and size of concealed spaces, attics, closets, and bathrooms.
 - Any small enclosures in which no sprinklers are to be installed.
 - Size of the city main in the street, pressure, whether dead-end or circulating .and, if dead-end, the direction and distance to the nearest circulating main, and the city main test results including elevation of the test hydrant
 - Make, manufacturer, type, heat-response element, temperature rating, and nominal orifice size of the sprinkler.
 - Temperature rating and location of high-temperature sprinklers.
 - Number of sprinklers on each riser, per floor.
 - Kind and location of alarm bells.
 - Type of pipe and fittings.
 - Type of protection for nonmetallic pipe.
 - Nominal pipe size with lengths shown to scale.
 - Location and size of riser nipples.
 - Types of fittings and joints and the locations of all welds and bends.
 - Types and locations of hangers, sleeves, and braces, and methods of securing sprinklers, where applicable.
 - All control valves, check valves, drain pipes, and test connections.
 - Underground pipe size, length, location, weight, material, and point of connection to the city main; type of valves, meters, and valve pits; and depth at which the top of the pipe is laid below grade.
 - In the case of hydraulically designed systems, the material to be included on the hydraulic data nameplate.
 - Name and address of the contractor.
- Plans must be wet stamped and be signed by the designer of record (installing contractor or Fire Protection Engineer or Mechanical Engineer). The designer's name shall be clearly printed on the plans. The designer of record shall be responsible for the entire project design - Title 24 CFC A104.7.2

SPRINKLERS

- Indicate the type, size, temperature rating, nominal orifice size and manufacturer of the proposed sprinkler head(s) - NFPA 13R 6.1.7.
- Submit the manufacturer specification for every head to be used. Only new and nationally recognized testing agency sprinkler heads shall be used - NFPA 13R 6.1.7.
- At least three spare sprinklers of each type, temperature rating, and orifice size used in the system shall be installed on the premises with a wrench(s) and box(s), at the location of main riser, fire alarm

**Dev
Standard
Residential Fire Sprinklers 13R**

control panel room and/or electrical room - NFPA 13R - 6.4.1.

PIPING

- A welder certificate presented to fire inspector during the field inspection is required and it shall be kept at the job site at all times. The imprint of the welder's stamp shall be visible on the pipe during the inspection - AWS B2.1.
- When using CPVC products, the pipe, fittings and adhesive cement shall be compatible and the installation shall be per manufacturer's specification and procedure - NFPA 13R 5.2.2.2 and 5.2.10.2.
- Where mechanical tees are used, the whole disc (cutout) shall be wired to the mechanical tee - NFPA 13R 6.2.2.

SEISMIC PROTECTION

- The fire sprinkler system shall be designed and installed to resist the seismic load per NFPA 13 section 6-4 protection of piping against damage where subject to earthquake. Provide complete details of seismic bracing with attachment components and fasteners verified by load calculations. Include the following - NFPA 13R 6.6.6:
 - The seismic load: use NFPA 13, table 6-4.5.8 or use the actual weight of pipes plus water to be braced (area of influence).
 - Type, length and vertical angle of brace.
 - Method of attachment to building structure: include size of the structural member.
 - The type and size of fastener.
 - The earthquake bracing method and its components shall be listed by a nationally recognized agency.

HYDRAULIC CALCULATIONS

- Hydraulic calculation forms shall be provided. These forms shall include a Summary Sheet with the following information - NFPA 13R 6.7.4:
 - Date
 - Location
 - Name of owner and occupant
 - Building number or other identification
 - Name and address of contractor or designer
 - Description of hazard protected
 - System design requirements
 - Design area of water application, square feet
 - Minimum rate of water application (density), gpm/sq ft
 - Area per sprinkler, square feet

**Dev
Standard
Residential Fire Sprinklers 13R**

- The total quantity of water and the pressure required noted at a common reference point for each system
- Limitations (dimensions, flow, and pressure) on extended coverage or other listed special sprinklers
- Relative elevations of sprinklers, junction points and supply or reference points
- Sprinkler description and discharge constant (K factor)
- Flow in gpm
- Pipe size
- Pipe lengths, center-to-center of fittings
- Equivalent pipe lengths for fittings and devices
- Friction loss in psi per ft of pipe
- Total friction loss between reference points
- Elevation head in psi at each reference point
- Required pressure in psi at each reference point
- Velocity pressure and normal pressure if included in calculations
- Notes to indicate starting points, references to other sheets, or to clarify data shown
- Diagram to accompany gridded system calculations to indicate flow quantities and directions for lines with sprinklers operating in the remote area
- Combined K-factor calculations for sprinklers on drops, armovers, or sprigs where calculations do not begin at sprinkler
- Graphic presentation of the complete hydraulically calculated water supply available and the system demand including hose streams and in-rack sprinklers where applicable.

In addition:

- A fax confirmation sheet from the City of Santa Rosa Utilities Department is required as part of submittal package.
- Hydraulic reference nodes shall be shown on plan including the underground portion with pipe size, length and control devices.

ALARMS

- The sprinkler system piping shall not have a separate control valve installed unless supervised by Title 34 CFC 903.4 by one of the following methods - NFPA 13R 6.6.1.2:
 - Central station, proprietary, or remote station alarm service
 - Local alarm service that causes the sounding of an audible signal at a constantly attended
 - location

**Dev
Standard
Residential Fire Sprinklers 13R**

- Valves that are locked open
- A local water flow alarm shall be provided on all sprinkler systems - NFPA 13R 6.6.8.1.
- Where a building fire alarm system is provided, the local water flow alarms shall be connected to the building fire alarm system - NFPA 13R 6.6.8.2.
- If provided, Fire Department Connection (FDC) shall be located on the address side of the building. The location of FDC shall be visible from both street directions and free from any obstruction (36" clearance minimum) including landscaping - Title 24 CFC 903.3.7 and NFPA 13R 6.6.4.

FIELD INSPECTION

The sprinkler system installed in accordance with NFPA 13R shall be properly inspected, tested, and maintained in accordance with Title 24 CFC 901.6 and NFPA 25, Standard for the Inspection, testing, and Maintenance of Water-Based Fire Protection System, to provide at least the same level of performance and protection as designed.

- A 200 PSI hydrostatic pressure for two hours is required for all new installation however if the new work cannot be isolated from the existing portion, the entire system shall be tested for two hours at 150 PSI minimum or 50 PSI above static pressure, whichever is greater.
- Systems having more than 20 sprinklers or having a fire department connection shall pass a hydrostatic pressure test performed for the aboveground piping system in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems - NFPA 13R 6.3.2.1.
- Systems having both fewer than 20 sprinklers and no fire department connection shall pass a hydrostatic pressure test performed for the aboveground piping system at 50 psi higher than the maximum system pressure using the hydrostatic test procedure specified in NFPA 13, Standard for the Installation of Sprinkler Systems - NFPA 13R 6.3.2.2.
- It is the responsibility of the installing contractor to ensure and provide the accessibility for the inspector to conduct the visual inspection. No exception will be made. If any component of the system is not accessible for verification, the installing contractor shall provide a sample per the inspector's request - Title 23 CFC 901.5.
- As-built drawings are to be submitted and approved prior to the final inspection when there are deviations from the first approved plan(s) - Title 23 CFC 907.19.