



## DEVELOPMENT STANDARD #5a

# RESIDENTIAL AUTOMATIC SPRINKLER SYSTEMS

### RESIDENTIAL AUTOMATIC FIRE SPRINKLER SYSTEM INSTALLATIONS

The purpose of this standard is to provide minimum requirements for fire sprinkler systems in residential use buildings, in order to aid in the detection and control of fires and thus provide improved protection against injury, life loss, and property damage.

This standard, in conjunction with the latest edition of NFPA 13D and NFPA 13R and California Residential Code (CRC) section R313 shall apply to the design and installation of, as well as the modification to, all fire sprinkler systems in residential buildings. In the event of an inconsistency or conflict between the provisions set forth in this Standard, the Montecito Fire Protection District Code, NFPA 13D, NFPA 13R, or CRC R313, the more restrictive provision shall apply.

#### I. RESPONSIBILITY

All individuals and companies who intend to engage in the installation or alteration of fire sprinkler systems are subject to the requirements of this standard.

INSTALLER: The sprinkler system can be installed by an individual who holds a state of California C-16 (sprinklers), C-36 (plumbing) license or, by owner-builder of an owner-occupied, single-family dwelling.

DESIGNER: Plans shall be designed by a 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 individual. C-36 must have registered engineer design sprinkler drawings.

#### II. PLANS SUBMITTAL GUIDELINES

1. The property owner or applicant shall submit one (1) set of plans, data sheets, and hydraulic calculations for the proposed sprinkler system to the Fire District for review and approval prior to installation.



2. Plans will be checked and if approved, will be stamped "Approved", signed and dated. The Fire District will retain a set of plans electronically. Once approved, the plans can be picked up by the owner/applicant at District Fire Station #1 located at 595 San Ysidro Road.
3. Sprinkler plans shall be subject to review by a Fire District retained consultant at the Fire Code Official's discretion.
4. Any field changes shall be noted on the drawings. The edited drawings may need to be submitted to the Fire District for additional plan check prior to final Fire District approval.
5. A copy of the approved plans shall be maintained on the job site during all phases of system installation.
6. Copies of Manufacturer's data for all installed system components shall be provided upon Fire District request prior to final system acceptance. All system components shall be installed following manufacturer's guidelines unless specific relief is granted by the Fire Code Official.
7. Listed and Labeled: Only UL listed and labeled devices and materials shall be installed and used in accordance with the listing limitations and manufacturer's guidelines. Only new sprinkler heads and components shall be installed in the systems.

### III. PLANS

To speed up the plan check process and to avoid the possibility of having the plans returned for corrections, please use the following checklist, which identifies the information that is required on the working sprinkler drawings prior to submittal.

- a. Name of property owner and/or occupant
- b. Address of property
- c. Assessor's Parcel Number (APN)
- d. Name of sprinkler contractor, address, phone number, type of license and license number
- e. Sprinkler contractor's dated signature and seal (on each sheet)
- f. All plans must be to scale or dimension
- g. Plot map indicating all structures, water meter location/size, underground pipe size, point of connection, length and type of pipe to be installed
- h. Full height cross section showing beamed ceilings, vaulted ceilings, attic areas, and sub-floor basements



- i. Sprinkler riser detail including: double check valve assembly, pressure gauge, drain valve, flow switch, pressure relief valve, domestic water control valve
- j. Sprinkler head spacing
- k. Show all non-sprinklered areas
- l. Indicate manufacture, style, sprinkler model orifice size a "K" factor for each sprinkler used
- m. Pipe information: type and size
- n. Hanger detail
- o. Inspectors test valve
- p. Identify each room and space of the buildings
- q. Location of heat sources: Fireplaces, ovens and cook tops, heating devices, FAU
- r. Water flow information: Static pressure, residual pressure, flow

#### IV. WATER SUPPLY

1. Water Supply: All connections to domestic water supply shall be made in accordance with applicable codes and standards of the County and any local water purveyor.
2. Water Supply Main: All residential sprinkler systems shall have a single supply main from the meter serving both domestic demand and the sprinkler system. A dedicated main solely for sprinkler system may be required on a case by case basis.
3. Domestic Water Supply Shut Off: Domestic water supply shut off valve on the supply line shall be installed on the domestic side of the sprinkler system riser (system plumbing including flow switch and valves). This is to assure the sprinkler system remains in service when domestic supply is shut off.
4. Water Supply: Domestic water supply must be connected to the fire sprinkler system at rough inspection.
5. Domestic Water Demand: System hydraulic design shall provide for an allowance of five gallons per minute (GPM) for domestic demand.
6. Automatic Booster Pump: When domestic water supply pressure is insufficient to produce enough water flow and pressure to accommodate a fire sprinkler system, a booster pump can be integrated into the system to augment domestic and fire flow demand. The pump must be automatically activated upon system demand, self-priming and listed or approved for electrical safety by a recognized testing laboratory. The pump must be protected from exposure to freezing and brush fires.



V. SPRINKLER RISER SYSTEM COMPONENTS

1. All risers shall be easily located, preferably on the outside of the building in plain sight. Risers may be installed in an access panel on an outside wall with permanent labeling on the door. Alternate locations must have approval by the Fire Official.
2. The system riser shall branch off the domestic supply line on the supply side of the main shut off valve. This is to assure the sprinkler system remains operable when the domestic supply is shut off.
3. All risers shall use copper piping and all shut off controls shall be ball valves.
4. Riser Location: Separate system risers may be installed remote from the domestic water source however must be easily located outside of the building.
5. Check Valve: For back flow prevention, an approved double check valve assembly shall be installed on the system riser.
6. Sprinkler System Control Valves: There shall be two shut off ball valves located on each side of the double check valve. These valves shall be locked in the open position upon final inspection.
7. Pressure Gauge: A UL listed 300psi gauge shall be installed.
8. Pressure Relief Valve: An approved poppet type pressure relief valve shall be installed on the riser between the back flow device and the system flow switch. Device shall be set with a design pressure of 160 psi. Note: This valve is not required when sprinkler system is supplied from a gravity fed stored water system.
9. Drain Valve: An unthreaded 1/2 inch ball valve shall be installed on the system and positioned such that flow will be to the outside away from the building.
10. Flow Switch: A system flow switch shall be installed. It shall be equipped with two connections; one for a local exterior 6 inch bell and one for alarm system monitoring. All flow switches shall be set for a 30 second delay.
11. Signage: All sprinkler system shutoff valves shall have an all weather sign affixed identifying the buildings they serve.
12. Alarms: Each sprinkler riser shall have a minimum 6 inch alarm bell affixed to an exterior wall of the structure positioned such that it can be heard by closest neighbor when activated.



VI. RESIDENTIAL SPRINKLER SYSTEM DESIGN

1. Piping: The following list of approved piping is acceptable to use in residential fire sprinkler systems installations: Type "M" copper, Type "L" copper, steel pipe, and Chlorinated Polyvinyl Chloride (CPVC) plastic. CPVC piping & fittings are to be listed for fire sprinkler system installations. Note: Type "K" copper pipe is unacceptable to use
2. Hanging Methods: All piping shall be provided with approved hangers and supported per manufactures requirements. Refer to Standard VII of this section for further information on hanging pipe.
3. Sprinklers: Only new residential sprinklers shall be installed unless otherwise indicated in the Code. Sprinklers shall only be installed according to their listing.
4. Inspector's Test Valve: Property owner shall install non-threaded one-half inch ball valve at the remote area of the system to serve as the inspector's test valve. This same type of valve shall be located at the riser to serve as a system drain. Any threads on these outlets are to be removed.
5. Attics: Finished attic spaces intended for storage shall be sprinklered.
6. Garages: Garages shall be sprinklered with residential type sprinklers at their listed spacing and flows.
7. Water Heater Closets: All water heater closets regardless of size require fire sprinklers.
8. Mechanical Rooms: Intermediate temperature sprinkler heads are required and spaced for ordinary hazard with cage protectors.
9. Forced Air Units (FAU): A single intermediate temperature sprinkler shall be installed over each individual FAU. When there is more than one FAU in a single location, sprinkler heads shall be spaced as per Ordinary Hazard.
10. HVAC Diffuser: Heads shall be located a minimum eighteen inches away from any HVAC diffuser grille.
11. Heat /Return Air Registers: Sprinklers shall be located no closer than two feet from any register.
12. Obstructions: Sprinkler spray patterns shall not be obstructed and all head clearances shall be provided as required by NFPA 13D



VII. SPRINKLER PIPE INSTALLATION REQUIREMENTS

1. Copper Pipe

- a. All materials delivered to the job site shall be protected from the physical elements and damage. Any damaged, gouged, cut, scratched heads, pipe or fittings shall be removed and replaced.
- b. No corrosive or self-cleaning fluxes shall be used. Joints shall be wiped clean of excess flux and solder.
- c. All piping running through studs or masonry shall be protected by elastomeric or plastic sleeves at three foot maximum intervals.
- d. Nails are unacceptable as a means of securing hangers and supports. Piping shall be supported at the following maximum intervals:
  - Within six inches of all sprinkler drops
  - Within eighteen inches of all joints
  - Within four foot intervals on CPVC piping
  - Within six foot intervals on copper tubing
- e. Hangers: Refer to local plumbing codes for acceptable hanger types. Hangers shall be installed every twelve feet and within one foot of any sprinkler.
- f. Copper pipe may be exposed in attics, porches, canopies, garages and open carports.
- g. Spray Foam Insulation: When spray foam insulation is applied around sprinkler heads, a minimum of six inches shall be maintained between the spray foam insulation and all sides of the sprinkler head.
- h. Approved copper pipe must be utilized and protected when application calls for piping running through the sub-roof assembly just below roof decking.
- i. Approved Pipe: Type "M" copper, Type "L" copper.



2. CPVC Pipe

- a. CPVC piping is to be installed per manufacturer's listing. All CPVC piping & fittings are to be listed for fire sprinkler system installations.
- b. Installers shall have attended a practical application training class by a CPVC pipe manufacture and have in possession a pocket card verifying proper certification to install this pipe.
- c. Hangers shall be approved for CPVC Pipe and installed every six feet along the length of the pipe and within six inches from sprinkler heads.
- d. Spray Foam Insulation: CPVC pipe must be protected as per manufactures recommendations where it could come in contact with spray foam insulation. Under no circumstances is CPVC pipe allowed to be encased by this product without protection. When spray foam insulation is applied around sprinkler heads, a minimum of six inches shall be maintained between the spray foam insulation and all sides of the sprinkler head.
- e. Incompatible Materials: Materials that have been identified as incompatible with CPVC shall not be allowed to contact the pipe. Examples of such materials are Romex electrical wiring, flexible wire/cable, metallic ducting, and communication lines. Check CPVC manufacture product data sheets for a complete list of incompatible materials.
- f. Test Plugs: For CPVC piping, no sprinkler heads shall be installed in any system until the Fire Official has completed both flow test and rough inspections. At this stage of inspection, test plugs must be installed.



VIII. INSPECTION REQUIREMENTS

1. Rough Inspection: All system components including piping, connections, sprinkler heads (Test Plugs for CPVC), hangers, valves, gauges, and flow switches are required to be in place and shall be exposed for visible inspection.

The system shall be pressurized with water at a pressure comparable to working pressure for the duration of the inspection. System must pass inspection before being covered.

2. Hydrostatic Test: Each system shall be hydrostatically tested at no less than 200 psi for copper and steel systems and at 150 psi for all CPVC systems. System shall hold a desired pressure for a minimum period of two hours.
3. Flow/Bucket Test: Flow testing of system is required. Flow shall be measured for a thirty second flow period and shall conform to the manufacturer's listing criteria for the installed sprinkler heads plus an additional 5 GPM for domestic supply from the hydraulically most demanding heads in the system. Contractors shall provide all equipment necessary for conducting test. The system shall meet the required flow.
4. Spray Foam Insulation Inspection: A visual inspection after spray foam is installed on CPVC systems is required.
5. Final Inspection: At final inspection, fire sprinkler covers/escutcheons shall be installed. Sprinkler head box shall be mounted in plain sight in garage or mechanical room. Included in the box shall be three spare sprinkler heads per type installed in the system and a wrench sized for each type of head.

All-weather signs shall be permanently affixed to system or structure next to system and installed at time of inspection. (Main Drain, Inspector's Test, Control Valve, and Warning Sign)

System shall be flowed and tested for operability using the Inspectors Test Valve (ITV). Where waterflow detection devices are installed, these devices shall be flow tested and shall result in an audible alarm on premises within 30-45 seconds. If system is monitored by an alarm monitoring system, the proper communication links must be in place at time of inspection and the District must be contacted by the local alarm company within five minutes of the start of the flow test.

6. Maintenance Schedule: The sprinkler contractor shall provide the property owner with maintenance information as described in NFPA 13D. Property owner shall maintain the system consistent with these requirement.