



# Sacramento Metropolitan Fire District

## Community Risk Reduction Division

3012 Gold Canal Drive • Rancho Cordova, CA 95670 • Phone (916) 859-4330 • Fax (916) 859-3717

**KURT P. HENKE**  
Fire Chief

SACRAMENTO METROPOLITAN FIRE DISTRICT			
FIRE PREVENTION STANDARD			
STANDARD TITLE:	<b>Installation of Sprinkler Systems</b>		
STANDARD NUMBER:	1	EFFECTIVE DATE:	01/01/11
		REVISION DATE:	02/05/13

### OBJECTIVE

To ensure that sprinkler plans submitted for review contain items necessary for approval prior to installation of systems in accordance with the 2010 edition of NFPA 13, *Standard for the Installation of Sprinkler Systems*.

This standard applies to all new or modified sprinkler systems in accordance with the 2010 edition of NFPA 13, *Standard for the Installation of Sprinkler Systems*. All individuals and companies who propose to engage in the installation or alteration of fire sprinkler systems are subject to the requirements of this standard and all other requirements of NFPA 13, *Standard for the Installation of Sprinkler Systems*.

This standard outlines the procedure to be followed when submitting sprinkler plans and defines the District's requirements for sprinkler system installations that may be more restrictive or not included in existing codes and standards.

### PROCEDURE

Procedures are numbered in accordance with NFPA 13 chapters or sections. Chapter or section numbers missing from this document indicate direct application of that chapter of NFPA 13, *Standard for the Installation of Sprinkler Systems*.

#### **Section 6.3 – Aboveground Pipe and Tube**

1. Sprinkler piping shall meet the minimum requirements of NFPA 13, *Standard for the Installation of Sprinkler Systems*, Table, 6.3.1.1 and shall be UL listed and FM approved. All pipe shall have a Corrosion Resistance Ratio (CRR) of 1.00 or greater per the UL listing and FM approval. Other types of pipe material may be approved for use provided they meet appropriate UL listing, FM approval and NFPA 13, *Standard for the Installation of Sprinkler Systems* criteria. The Fire District must approve the use of alternate pipe prior to installation.

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**Sections 6.8, 8.16 and 8.17 - Fire Department Connections**

1. Fire department connections shall be visible, accessible, and installed on the address side of buildings in approved locations, and provided with metal caps and fasteners.
2. The fire department connection inlet connection shall be constructed of ductile iron and be the siamese type with two, 2-1/2 inch inlets.
3. Fire department connections shall be located between 3 and 40 feet from an accessible fire hydrant. The fire department connection and hydrant shall be located on the same side of the access roadway.

*Exception:* The Chief may allow a greater distance between the hydrant and fire department connection; however the distance shall not exceed more than 150 feet.

4. Fire department connections shall be within 2 feet of the curb or back of walkways adjacent to a public street or approved fire access lane. When the fire department connection is part of a back-flow assembly, it shall be located within 15 feet of the public street or fire access lane.
5. Fire department connections shall be located free of interference from nearby objects including buildings, fences, posts, trees, etc., and in regard to overhead hazards such as transformers or transmission lines.
6. Vehicle protection shall be provided for fire department connections subject to vehicular damage by approved barricades or a minimum of a six-inch curb.
7. The fire department connection shall serve only one building.

*Exception:* Mini-storage facilities and new public schools with multiple buildings located on one parcel may have one fire department connection.

8. Address numbers are required on the fire department connection to indicate the area or building served. The address numbers shall be 2 inch black numbers on a white reflective background and be located on the "mud leg" of the fire department connection facing the public street or fire access lane.
9. Existing buildings with automatic sprinkler systems that are upgraded with the addition of 20% or more fire sprinklers in which the fire department connection does not conform to #1 and #2 above shall require the installation of a new fire department connection in accordance with this standard.

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10. Sprinkler systems designed for a total combined water demand over 1,000 gallons per minute, determined by the sprinkler system and inside hose demand, shall be equipped with one 2-½ inch inlet per each 500 gallons per minute on a fire department connection manifold with a minimum of a 6 inch pipe and check valve.

11. Fire department connections located on a back-flow assembly shall be installed in a manner approved by the Fire District and the local water purveyor.

**Section 7.3 - Pre-Action Systems and Deluge Systems**

1. Pre-action systems are not approved for office or similar occupancies.
2. Pre-action systems shall default to a wet pipe system in the event of alarm system failure.

*Exception:* Normally unoccupied computer rooms constructed in accordance with NFPA Standard 75, *Standard for the Protection of Information Technology Equipment*.

**Sections 8.4, 8.15 and 11.3 - Residential Systems**

1. Hotels, Motels, Condominium, Town Houses and Apartment buildings shall be protected with sprinkler systems designed and installed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*.

**Section 8.5 - Position, Location, Spacing and Use of Sprinklers**

1. Sprinklers shall not be placed in or below smoke vents or ridge vents.

**Section 8.15 - Special Situations**

1. Attic spaces and areas above ceilings shall have automatic fire sprinkler protection regardless of construction type.
2. Areas under computer room floors and in similar occupancies shall have automatic fire protection systems installed if wire or cable is to be installed within that space. Systems may be fire sprinklers, clean agent systems, carbon dioxide systems, or similar automatic extinguishment systems.

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*Exception:* Spaces in which all wire and cable is concealed within conduit, covered non-combustible troughs, or non-combustible covered cable trays and no other combustible materials are present. However, a smoke detection system is required in accordance with NFPA 75, *Standard for the Protection of Information Technology Equipment*.

3. Sprinklers shall not be installed at the top of noncombustible hoistways of passenger elevators with car enclosure materials that meet the requirements of ASME A17.1, *Safety Code for Elevators and Escalators*.

**Section 8.16 - Piping Installation**

1. System riser shall be inside the fire control room constructed as follows:
  - A. Fire control room shall contain all fire sprinkler system risers, fire alarm control panels, spare sprinklers and wrench, and other fire equipment required by the Chief.
  - B. Fire control rooms shall be located within the building on an outside wall at a location approved by the Chief, and shall be provided with a means to access the room directly from the exterior with an approved door of minimum dimensions of 36"X80".
  - C. Durable signage shall be provided on the exterior side of the access door to identify the fire control room. The sign shall indicate "FIRE CONTROL ROOM" with 3" letters that contrast with their background.
  - D. A key shall be located within an approved high level Fire District Knox Company key box located adjacent to, and on the latch side of, the access door on the exterior of the building at six feet above the finished floor.
  - E. Fire control rooms shall have a minimum dimension of 5' and not be less than 35 square feet in usable area.
  - F. The fire sprinkler riser shall be located on the outside wall between 12" and 18" from that outside wall and at least 12" from any other wall.
  - G. The fire control room may contain other building service equipment. This other equipment shall not be within 3' in front of any fire equipment in the room.
2. In all new multi-family buildings (apartments, condominiums and town homes) the system riser shall be inside the fire control room constructed as follows:

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- A. Fire control room shall contain all fire sprinkler system risers, fire alarm control panels, spare sprinklers and wrench, and other fire equipment required by the Chief.
- B. Fire control rooms shall be located within the building on an outside wall at a location approved by the Chief, and shall be provided with a means to access the room directly from the exterior with an approved door of minimum dimensions of 36"X80".
- C. Durable signage shall be provided on the exterior side of the access door to identify the fire control room. The sign shall indicate "FIRE CONTROL ROOM" with 3" letters that contrast with their background.
- D. A key shall be located within an approved high level Fire District Knox Company key box located adjacent to, and on the latch side of, the access door on the exterior of the building at six feet above the finished floor.
- E. Fire control rooms shall have a minimum dimension of 2' and not be less than 8 square feet in usable area.
- F. The fire sprinkler riser shall be located on the outside wall between 12" and 18" from that outside wall and at least 12" from any other wall.

**3. System Control Valves**

- A. Control valves shall be an indicating type valve assembly. To comply with water quality requirements back flow protection shall be provided in accordance with local Water Purveyor standards. There shall not be any control valves located on a single sprinkler system riser.
- B. All sprinkler system control valves shall be supervised with tamper switches that report to a central station alarm company and shall be locked in the fully open position with a non-hardened lock.
- C. Vehicle protection shall be provided for above ground control valves subject to vehicular damage by approved barricades or a minimum of a six-inch curb.
- D. Multi-floor buildings (three or more stories): Individual floor control valves shall be required for each floor, located within a rated stairway or in the fire control room. Floor control valves shall have a permanent sign identifying areas or systems controlled in ½" letters that contrast with their

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background and shall be permanently banded to the valve or permanently affixed to a wall adjacent to the valve.

*Exception:* Three story multi-family buildings.

- E. Sprinkler systems located in special hazard areas (i.e. spray booths, trash chutes, flammable liquid storage, etc.) shall have a separate locked and monitored indicating control valve.

**Section 8.17 - System Attachments**

1. An alarm bell shall be located on the address side of the building in an approved location readily visible from the street or roadway fronting the structure.
2. Alarm bells shall provide a sound pressure level of a minimum 85db in accordance with UL Standard 464, *Audible Signal Appliances*.
3. Fire sprinkler systems shall be monitored in accordance with Fire Prevention Standard 2, *Fire Alarm Systems*.

**Section 9.1 - Hangers**

1. For all new sprinkler system installations, a completed copy of the Structural Attachment Compliance Letter (attachment 1) shall be provided upon plan submittal.

**Section 9.3 - Protection of Piping Against Damage Where Subject to Earthquakes**

1. For all new sprinkler system installations, a completed copy of the Structural Attachment Compliance Letter (attachment 1) shall be provided upon plan submittal.

**Chapter 11 - Design Approaches**

1. Office buildings or portions of buildings used for office or similar use shall be designed in accordance with the following:
  - A. The system shall be designed as an Ordinary Hazard Group 1 density.

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- B. Upright sprinkler protection (attic areas) shall have a maximum protection area of 130 square feet per sprinkler unless a smaller protection area is required by Table 8.6.2.2.1(a).
  - C. No design area reduction for quick-response sprinklers shall be permitted for the shell building installation. A design area reduction for quick-response sprinklers shall be permitted for the ceiling areas of the tenant spaces.
  - D. All sprinklers on branch lines shall be provided with a tee and one-inch plugged outlets for future tenant improvements.
2. Retail buildings or portions of buildings used for retail or similar use without a specified occupant shall be designed in accordance with the following:
- A. Buildings with a ceiling height not exceeding 20 feet, the system shall be designed as an Ordinary Hazard Group 2 density, with a minimum design area of 3,000 square feet.
  - B. Buildings with a ceiling height exceeding 20 feet, the system shall be designed based on the specific use and storage array for that space. A detailed plan showing the storage array and commodity classification shall be provided at the time of plan submittal.
  - C. All sprinklers on branch lines shall be provided with a tee and one-inch plugged outlets for future tenant improvements.
3. Warehouse buildings shall be designed in accordance with the following:
- A. Warehouse buildings shall have a minimum design criteria of .495 GPM over 2,000 square feet.
  - B. Buildings without a specified occupant or tenant shall have a system designed to meet a minimum of .495 GPM over 2,000 square feet. Documentation shall be provided from the building owner; stating acknowledgement that this is a minimum design standard and that future occupants may require upgrades to the system.
  - C. Buildings with a specified occupant known to require a system that will exceed the minimum design criteria of .495 GPM over 2,000 square feet shall have a system designed to meet the storage array and commodity classification for that space. A detailed plan showing the storage array

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and commodity classification shall be provided at the time of plan submittal.

## Chapter 22 - Plans and Calculations

1. Sprinkler plans for new installations, system upgrades, tenant improvements, etc. may be submitted at the following location:
  - Sacramento Metropolitan Fire District  
Community Risk Reduction Division  
3012 Gold Canal Drive  
Rancho Cordova, CA 95670  
(916) 859-4330  
8:00 to 3:00
2. A minimum of two sets of plans shall be submitted with one set retained by the Community Risk Reduction Division and the other returned to the contractor with comments or corrections required. The approved set marked "Job Set" shall be maintained at the site where the work is being performed.
3. A C-16 license holder shall install all sprinkler systems. The licensed company or a registered engineer that is licensed and authorized for fire protection shall prepare plans. License numbers shall be shown on all copies of plans.
4. Installation shall not begin until plans have been approved.
5. All buildings requiring sprinkler protection shall have sprinklers throughout and no building may be partially protected with sprinklers without approval of the Fire Marshal.
6. Fees shall be paid at the time of submittal. Additional fees will be assessed for work performed prior to Fire District approval.

## Chapter 23 - Water Supplies

1. Underground piping shall be installed in accordance with NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances* and the approved plans prepared by a civil engineer or piping installation contractor. The underground fire service installation contractor shall submit for review and approval a schematic drawing showing the part for part installation arrangement of the underground piping and appurtenances and a

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parts list with listing information for all parts prior to installation. A trench cross sectional detail shall be included on the plans.

2. Plastic piping approved for underground installations shall be PVC, C900, Class 150 or greater, and be listed for such use.
3. All runs of non-metallic water pipe shall have a No. 10 gauge solid soft drawn copper locator wire taped on top of the pipe to facilitate locating the pipe at a later date. The wire shall be stubbed up inside each valve box. Continuity test shall be conducted on each splice at all locations.
4. Galvanized pipe is not approved for underground supply piping.
5. Non-metallic pipe shall not be used within five feet of a building.
6. Above grade valves for controlling the water supply for on-site fire hydrants and automatic fire sprinkler systems shall be electrically supervised.
7. All piping shall be laid in a six inch bed of sand or natural gravel not over one inch in diameter and have a twelve inch fill of sand or natural gravel not over one inch in diameter.
8. A strand of 3" wide non-detectable blue tape marked "Water" shall be placed 12 inches above all piping.
9. All sections of ductile iron pipe or ductile iron fittings shall be encased in 8-mil linear low density (LLD) or 4-mil high-density, cross-laminated (HDCL) polyethylene sheets or tubes in accordance with American Water Works Association Standard C105/A21.5-05, *Polyethylene Encasement for Ductile-Iron Pipe Systems*. Any fasteners shall be made of low-alloy steel.
10. Concrete thrust blocks or other approved retaining, shall be installed at all locations where piping changes direction.
11. A 200-PSI hydrostatic pressure test shall be performed on all installed piping and appurtenances for a period of two hours. The piping shall be center-loaded during pressure testing with all joints, fittings and appurtenances uncovered. Failure to comply with this section will result in a test failure and the uncovering of the piping for a visual inspection and retesting.
12. A fire sprinkler underground supply piping flush, using a full pipe diameter discharge shall be conducted and witnessed by the Fire District prior to connection to the above ground fire sprinkler system. The fire department

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connection piping shall also be flushed if connected to the fire sprinkler supply piping below grade. Piping shall be flushed until all foreign objects have been discharged and the water is clear.

### **Chapter 23 - Fire Pumps**

1. Fire pumps shall be installed in accordance with NFPA 20, *Standard for the Installation of Stationary Fire Pumps for Fire Protection*.
2. A fire pump shall serve only one building.
3. A fire pump shall have a by-pass line installed.
4. If a test loop is provided, listed control valves with normally closed tamper switches or other approved tamper switches shall be installed. In addition to the test loop, a method of flowing water every three years in accordance with the latest edition of NFPA 25, *Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems* shall be provided.

### **Chapter 24 - System Acceptance**

1. Inspections: A new fire sprinkler system requires the following inspections per system riser or floor that are included in the original permit fee. Fees for additional inspections shall be paid prior to scheduling the inspection.
  - A. Weld inspection. Required for all piping with welded outlets prior to the piping being installed.
  - B. Installation inspection of all piping, sprinklers, hangers, seismic bracing, etc. and hydrostatic testing.
  - C. Final inspection including any previously noted corrections.
2. Completed copies of the contractor's material and test certificates for the underground and aboveground piping shall be provided.

Attachment 1 – Structural Attachment Compliance Letter



Ray Iverson, Assistant Chief/Fire Marshal

**The information below is to be completed and reproduced on the structural engineer's letterhead and included with the fire sprinkler plan review submittal package. Wet stamp and wet signature are required.**

**STRUCTURAL ATTACHMENT COMPLIANCE LETTER**

Project Address: \_\_\_\_\_

Project Name: \_\_\_\_\_

This building has been designed for a fire sprinkler system with an equivalent weight of \_\_\_\_\_ pounds per square foot over the entire roof area. This load was used for the design of both gravity and seismic lateral resisting systems. Our review of the structural drawings by \_\_\_\_\_, dated \_\_\_\_\_, and fire sprinkler drawings by \_\_\_\_\_, dated \_\_\_\_\_, determined that the loading, methods of attachment of the hangers and seismic bracing and the location of the attachment for the hangers and seismic bracing are in conformance with structural design requirements, the truss manufacturer's requirements and the 2010 Edition of National Fire Protection Association Standard 13. The fire sprinkler contractor shall be responsible for installing the fire sprinkler system per the above-mentioned drawings.

Sincerely,

Signature: \_\_\_\_\_

Print Name: \_\_\_\_\_

Date: \_\_\_\_\_

Engineering Stamp: