



COSUMNES COMMUNITY SERVICES DISTRICT

## **FIRE DEPARTMENT**

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CosumnesCSD.gov/Fire 

# **FIRE PREVENTION CONSTRUCTION STANDARDS FIRE SPRINKLER SYSTEM DESIGN STANDARD**

Standard Number: FPCS-1008

Original Effective Date: 8/7/2020

Revision Date: 4/15/2022, 10/26/2023, 4/1/2025

Code Section: 2022 California Fire Code, 2022 NFPA 13

## **PURPOSE AND SCOPE**

1008.1 This standard is for designing and installing fire sprinkler systems in all buildings and is pursuant to NFPA 13, NFPA 13R, and NFPA 13D. Additional Cosumnes Fire Department Design Standards may apply in addition to this standard.

All new buildings requiring sprinkler protection shall have sprinklers throughout and in accordance with adopted building standards. Buildings shall not be partially protected.

## **APPLICATION**

## 1008.2 Fire Department Connections

- a. Systems designed for a total combined water demand of 1,000 GPM and over, determined by sprinkler system and inside hose demand, shall be equipped with one inlet per each 500 GPM on a FDC manifold with a 6-inch pipe or greater and a check valve. Exceptions may apply for larger projects.
- b. Fire department connections shall be visible, accessible, and installed on the address side of buildings in approved locations and provided with listed caps and fasteners. Fire department connections shall face the fire lane and have line of sight to the fire control room.
- c. Fire department connections shall be located between 10 and 40 feet from an accessible fire hydrant and a minimum 40 feet from the buildings served. The fire department connection and hydrant shall be located on the same side of the fire access lane/roadway.



- d. Fire department connections shall not be located within the required fire apparatus turning radius.
- e. Fire department connections shall be located free of interference from nearby objects including buildings, fences, posts, trees, etc., and from overhead hazards such as transformers or transmission lines.
- f. Fire department connections shall serve only one building. Where multiple risers are supplied by an individual connection only one FDC will be required.

*Exception: Mini-storage facilities and apartment complexes with multiple buildings located on one parcel may have a single fire department connection serving a maximum of three buildings. Residence/office buildings for storage facilities and clubhouses shall be on their own fire department connection.*

- g. Address numbers are required on the fire department connection to indicate the area or building served. A metal sign with raised address numbers at least 2 inches high shall be permanently mounted on the fire department connection facing the public street or fire access lane.

#### 1008.3

#### **System Control Valves**

- a. Each floor in a multi-floor building shall be provided with a floor control valve with tamper switch, a flow switch, and a drain valve. Floor control valves shall have a permanent sign identifying areas or systems controlled in  $\frac{1}{2}$ " letters that contrast with their background and shall be permanently banded to the valve or permanently affixed to a wall adjacent to the valve.
- b. Sprinkler systems protecting special hazard areas (i.e. spray booths, etc.) shall have a separate locked and monitored indicating control valve.
- c. The inspector's test valve and discharge shall be located on the remote side of the building and remote from the system riser. In multi-story buildings, the inspector's test may be in a stairwell opposite the system



riser. Combination test/drain valves may be used in lieu of the remote test valve, provided they are listed for use and provided there is a means of testing the flow of the system at a remote location.

#### 1008.4 **System Design**

- a. Buildings or portions of buildings that house the occupancy classification of an office or similar use shall have the fire sprinkler protection designed on the following conditions:
  1. The system shall be designed to Ordinary Hazard Group One (1) design density.
  2. Upright sprinklers shall be installed regardless of construction type.
  3. Upright sprinklers shall be spaced at a maximum of 130 square feet.
  4. No area reduction for quick-response sprinklers is permitted for the shell installation. Area reduction for quick-response sprinklers is permitted for ceiling areas of tenant improvements only.
  5. All sprinklers on branch lines shall be provided with a provision for providing one-inch plugged outlets.
- b. Buildings or portions of buildings that house retail or similar type occupancies shall have the sprinkler protection designed on the following conditions:
  1. The system shall be designed to Ordinary Hazard Group Two (2) design density with a minimum design area of 3,000 square feet. This applies to buildings with a ceiling height not exceeding 20 feet.
  2. Buildings or portions of buildings that are used to house retail type or similar use occupancies and located in structures with a ceiling height exceeding 20 feet shall have sprinkler protection installed based on the space's specific use and storage configuration. A detailed floor plan that includes the storage configuration and storage method shall be provided at the time of plan submittal for approval.



3. Upright sprinklers shall be installed regardless of construction type.
4. All sprinklers on branch lines shall be provided with a provision for providing one-inch plugged outlets.
- c. Buildings found not to meet the provisions of items 1008.4.a. or 1008.4.b. above shall have a fire sprinkler system designed to a minimum of 0.45 GPM over 2,000 square feet. A letter or other document of record approved by the owner or owner's representative shall stipulate their acknowledgment of this design or other design parameters and is based on the minimum proposed requirements of the Authority Having Jurisdiction ("AHJ"). The building owner shall be responsible for any fire sprinkler system upgrades required to comply with NFPA 13 for changes to the storage configuration and/or commodity class.
- d. For large industrial type warehouse buildings please see separate standard on our website for additional information and requirements.

#### 1008.5 **Underground Pipe**

- a. 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.
- b. A strand of 3" wide non-detectable blue tape marked "Water" shall be placed 12 inches above all piping.
- c. Pipe shall be installed in accordance with the applicable water department's installation standards.
- d. Concrete thrust blocks or other approved restraints shall be installed at all locations where piping changes direction.
- e. A 200-PSI hydrostatic pressure test shall be performed on all installed piping and appurtenances for a period of two (2) hours. The piping shall be center-loaded during pressure testing with uncovered joints, fittings, and appurtenances.



- f. Underground fire sprinkler supply piping and fire department connection piping shall be flushed using a full pipe diameter discharge. The Fire Department shall witness the Flush test before connection to the above-ground fire sprinkler system. Piping shall be flushed until all foreign objects have been discharged and the water runs clear.
- g. 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 parts list with listing information for all parts prior to installation. A trench cross-sectional detail shall be included in the plans.
- h. Plastic piping approved for underground installations shall be PVC, C900, Class 150, or greater and be listed for such use.
- i. All runs of non-metallic water pipe shall have a No. 8 gauge solid soft-drawn copper locator wire taped on top of the pipe to facilitate locating the pipe after installation. The wire shall be stubbed up inside each valve box. Continuity tests shall be conducted on each splice at all locations.
- j. Non-metallic pipe shall not be used within five feet of a building.

#### 1008.6 **Rack Storage**

- a. Rack storage shall be protected in accordance with the applicable chapters of NFPA 13 and California Fire Code when the top shelf is more than 8 feet above the floor unless the storage commodity is called out as a high hazard and requires a lower height threshold.

#### 1008.7 **System Acceptance**

- a. Inspections: A new fire sprinkler system requires the following inspections included in the original permit fee. Fees for additional inspections shall be paid prior to scheduling the inspection.



1. Weld inspection is required for all piping with welded outlets before the piping is installed.
2. Installation inspection of all piping, sprinklers, hangers, seismic bracing, etc., and hydrostatic testing.
3. Final inspection, including any previously noted corrections.

b. Completed copies of the contractor's material and test certificates for the underground and aboveground piping shall be provided.

1008.8

### **Fire Pumps**

- a. Fire pumps shall be installed in accordance with NFPA 20, *Standard for the Installation of Stationary Fire Pumps for Fire Protection*.
- b. A fire pump shall serve only one building.

*Exception: Fire pumps serving a private development (campus), on a single property under one ownership, in accordance with California State Fire Marshal Interpretation 16005.*

- c. A fire pump shall have a by-pass line installed.
- d. 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 adopted California edition of NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems* shall be provided.

1008.9

### **Water Supply Criteria for Fire Sprinkler System Design**

- a. Commercial projects located within the jurisdiction of Sacramento County Water Agency Zone 40 shall use the following design criteria: 50 psi static, 20 psi residual at 3,000 GPM. Fire sprinkler plans shall indicate that the project is in Zone 40.
- b. Production housing projects located within the jurisdiction of Sacramento County Water Agency Zone 40 shall use the following



design criteria: 50 psi static, 20 psi residual at 1,500 GPM. Fire sprinkler plans shall indicate that the project is in Zone 40.

- c. Custom single-family dwellings shall meet the minimum fire flow requirements of the California Fire Code and Cosumnes Fire Department fire code ordinance.
- d. Commercial and residential projects located within the jurisdiction of the City of Galt require a fire department flow test. For more information, please call Cosumnes Fire Department at 916-405-7100. The flow test result sheet shall be included with the plan submittal.
- e. Commercial and residential projects located in the jurisdiction of Elk Grove Water District require a flow test conducted by the Water District. Call Elk Grove Water District directly at 916-685-3556 to schedule. Test results on Elk Grove Water District letterhead shall be included with the plan submittal.

#### 1008.10 **Fire Control Rooms**

- a. All new fire sprinklered buildings shall have a Fire Control Room in an approved location. See Fire Control Room Design Standard form FPCS-1005: <https://www.cosumnescsd.gov/documentcenter/view/21754>
- b. The fire sprinkler riser(s), fire pump, fire alarm panel, spare heads, and all other fire protection equipment shall be located inside the Fire Control Room.
- c. The sprinkler riser shall be located nearest the outside wall, between 12 and 18 inches from that wall, and a minimum of 12 inches from other walls.
- d. Fire Control Rooms shall have exterior access with minimum door dimensions of 36 x 80 inches and minimum interior dimensions of 5 feet x 7 feet.
- e. Fire Control Rooms shall have a hard-lid ceiling, a Knox Box, switch lighting, emergency illumination, and a NO STORAGE PERMITTED BY ORDER OF FIRE MARSHAL sign posted.



- f. The exterior door shall be labeled FIRE CONTROL ROOM in a minimum of 4-inch contrasting letters.
- g. The Fire Control Room may contain other building service equipment, but other equipment shall not be within 36 inches of the front of fire protection equipment.
- h. A key shall be located within an approved high-level Knox key box adjacent to, and on the latch side of, the access door on the exterior of the building, 5 feet above the finished floor.

#### 1008.11 **Residential Fire Sprinkler Systems**

- a. A fire sprinkler shall be installed in all fuel-fired water heater closets.
- b. Rooms with vanities or sink areas separate from the toilet/bathing area shall be provided with sprinkler protection.
- c. Detached garages and other structures within 6 feet of residential structures containing a fire sprinkler system shall be provided with fire sprinkler protection.
- d. One upright fire sprinkler shall be provided in the highest portion of each separate attic space and above any HVAC equipment.
- e. Condominiums, apartments, hotels, and motels shall be protected in accordance with the adopted California Building Standards.
- f. Residential fire sprinkler systems supplied by a public water system shall be provided with a passive purge design at the single most hydraulically or most remote toilet on each floor. The pipe connecting the sprinkler system to the toilet shall be CPVC.
- g. A system supplied by a well, including manufactured homes, shall provide a well and pump test report from the civil engineer or well contractor indicating that the well and tank have the capacity to provide the sprinkler demand (volume and pressure) for a minimum 10-minute duration.



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- h. For manufactured homes, the contractor or owner shall provide a photo or other approved verification of the Fire Sprinkler Information Label of the manufactured home. This label is sometimes found on the water heater compartment.

## **REFERENCES**

- 1008.12 NFPA 13, *Standard for the Installation of Sprinkler Systems*
- 1008.13 NFPA 13D, *Standard of Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes.*
- 1008.14 NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*
- 1008.15 California Fire Code
- 1008.16 NFPA 20, *Standard for the Installation of Stationary Fire Pumps for Fire Protection.*
- 1008.17 California State Fire Marshal Interpretation 16005
- 1008.18 California edition of NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*
- 1008.19 Cosumnes Fire Department *Fire Prevention Construction Standards Fire Control Room Design Standards FPCS-1005*
- 1008.20 NFPA 13R, *Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies*