

CITY OF PASADENA FIRE DEPARTMENT



INSTALLATION OF COMMERCIAL SPRINKLERS

(Revised 12/10/2014)

SCOPE: This standard applies to the design and installation of automatic fire sprinkler systems in conjunction with NFPA 13-2013, California Building Code 2013, California Fire Code 2013 and local amendments, and other applicable codes.

1. RESPONSIBILITY

- A. All individuals and companies who intend to engage in the installation or alteration of sprinkler systems are subject to the requirements of this standard.
- B. Installer: The sprinkler system shall be installed by an individual who holds a state of California C-16 (sprinklers) license.
- C. 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 individuals.
- D. C-16 contractors may only design systems that the firm has a contract to install.

2. PLANS SUBMITTAL PROCEDURE

- A. Please call the Fire Permit Counter at (626) 744-6885 to obtain the appropriate fees. The Fire Permit Counter hours are Monday through Thursday, 8:00 a.m. to 5:00 p.m. and Friday 8:00 a.m. to 12 p.m.
- B. Submit a minimum of three sets of plans, hydraulic calculations, To City of Pasadena Fire Department, Fire Plan Check Services Division.
- C. Plans will be checked and if approved, will be stamped "**Acceptable**", signed, and dated. The Fire Department will retain one set.
- D. The Fire Department has instituted the use of a "**FIR Case Number**" for tracking all projects submitted for review. To provide faster customer service, please refer to your FIR Case Number when contacting this Department. Your FIR Case Number will also be listed on the Fire Department approved plans.
- E. One copy of the Fire Department stamped plans shall be maintained on the job site.
- F. All modifications/changes to existing systems require a plan check and inspection by the Fire Department.
- G. Plan Check fees include the original plan check and one re-check. Please ensure that all corrections are made prior to re-submission to avoid additional fees.

- H. Excessive field changes may require re-submittal of plans along with additional plan check fees.
- I. Tennant improvement plans up to 20 heads without calculations can be plan checked over the counter.

3. SCHEDULING INSPECTIONS

- A. The inspection fee that is paid at the time of plan submittal will provide you with a limited number of inspections to complete the project. For projects that exceed the limit, inspection requests will not be accepted unless additional fees are paid prior to scheduling an inspection.
- B. It is the responsibility of the installing contractor/owner to be on the job site during the inspection with approved plans. Failure to do so will result in the cancellation of the inspection. Cancelled inspections will be counted as one inspection.
- C. Inspection requests can only be taken from the installing contractor.
- D. Call (626) 744-4668 three business days prior to the inspection day for scheduling an inspection. The inspection request line is available 24 hours.
- E. Inspection times are approximate and may vary because of delays at previous inspections or emergency response by Fire Department personnel. Please allow time on either side of the inspection time for the inspector to arrive.

4. UNDERGROUND PIPING

- A. General
 - 1. The underground fire protection line between the backflow device and the first joint above grade shall be designed by:
 - (a) General Engineering Contractors (A)
 - (b) Fire Protection Contractors (C-16)
 - (c) Plumbing Contractors (C-36)
 - (d) Pipeline Contractors (C-34)
 - (e) Professional Engineer holding a license as:
 - Civil Engineer
 - Mechanical Engineer
 - Fire Protection Engineer
 - (f) Thrust blocks to be designed, located, and installed per NFPA 24.
 - (g) Underground supply piping to be minimum PVC C900, Class 150, or lined ductile iron with a minimum bury of 36 inches.
 - (h) All bolted joint accessories shall be cleaned and thoroughly coated with asphalt or other corrosion retarding material, and then wrapped in plastic after installation and prior to backfill.
 - (i) Underground mains and lead-in connections to system risers shall be flushed before connection is made to sprinkler, standpipe, or other fire protection piping to remove foreign materials. Flushing shall be in the presence of a Fire Prevention representative and in accordance with
 - 2. Prior to installation, submit a minimum of three sets of underground plans with the contractor's or engineer's name, address, type of license, and

license number to the Pasadena Fire Department, Fire Plan Check Services Division.

3. **The following notes shall be completed and placed verbatim on the working underground plans. NFPA 13.**
4. All new private fire service mains shall be pressurized to 200 psi, or 50 psi above the maximum static pressure, when the maximum static pressure is in excess of 150 psi. The pressure shall be provided for at least 2 hours prior to the scheduled inspection time.
5. The trench shall be backfilled between joints before testing to prevent movement of pipe.
6. Underground pipe joints, thrust blocks, and other anchors shall be left exposed for inspection. Tests shall be made by the contractor in the presence of a Fire Prevention representative.
7. All control valves shall be indicating, with a tamper switch.
8. Fire department connection (FDC):
 - (a) Shall be accessible and visible.
 - (b) Shall be facing the public street and set back a maximum of 2 feet from the curb face or rear of the sidewalk, and at a height of 2 to 3 feet above the finished grade.
 - (c) Maintain a 3 foot clear radius around FDC's.
 - (d) Where subject to mechanical injury, protection shall be provided.
 - (e) Shall have an identification sign to indicate building address and what it controls.
 - (f) Shall be of all brass construction with two inlets, each with a clapper and protective metal cover or plug (no plastic).
 - (g) Shall be painted red.
 - (h) Shall be within 100 feet of a fire hydrant.
 - (i) Shall be located a minimum 25'-0" from the building. When this distance cannot be achieved, a minimum one-hour fire resistive wall shall be provided with no opening in the wall, 10 feet either direction of the FDC.
9. Inspection of underground piping will not be conducted until underground plans are approved.
10. All underground fire lines shall be pressurized to 200 psi, or 50 psi above the maximum static pressure, when the maximum static pressure is in excess of 150 psi. The pressure shall be provided for at least 2 hours prior to the scheduled inspection time.
11. Underground pipe joints, thrust blocks, and other anchors shall be left exposed for inspection.
12. All ferrous metal pipes shall be lined and additionally, steel pipe shall be coated and wrapped. For buried pipe, galvanizing, internally or externally, does not meet the requirements of this section.
13. Exception: Internal galvanizing shall be permitted as the lining for the pipe between the check valve and the FDC.
14. Buried joints shall be of an approved type. Steel pipe joints shall be field-coated and wrapped after assembly.

15. Buried fittings shall be an approved type with joints and pressure class ratings compatible with the pipe used. Steel pipe fittings shall be coated, wrapped and lined.
16. All private fire service mains shall be flushed prior to connection to the overhead piping.
17. A private fire service main may run up to a maximum of 10 feet under a structure to supply a riser, which cannot be located directly adjacent to an exterior wall.
18. Any pipe located under foundation shall be ductile iron or equivalent.
19. An annular space shall be provided for pipes passing through walls or slabs.

B. Valves

1. Backflow devices are not a requirement of the Fire Department. Please check with the Pasadena Water Department for information.
2. Indicating valves on backflow devices are acceptable for the system shut-off valves on installations with only one riser and with no system side hydrants.
3. Indicating valves on backflow devices shall be chained and locked in the open position prior to final inspection.
4. When one fire service line serves multiple buildings and/or hydrants, post indicator valves (PIV) or outside screw and yoke (OS&Y) valves are required for every connection from a private service main to a building.
5. All sprinkler control valves and sectional valves shall be painted red.
6. Sectional control valves shall be PIV type.
7. All control valves, including sectional control valves, shall have a permanent identification sign to indicate their function.

C. Fire Department Connections (FDC)

1. FDC shall be accessible and visible.
2. FDC shall be facing the public street and shall be set back a maximum of
 - (a) 2 feet from the face of the curb or the rear of the sidewalk, and at a height of
 - (b) 2 to 3 feet above the finished grade.
3. A public fire hydrant must be within 100 feet of FDC.
4. Maintain 3 feet clear radius around FDC.
5. Where subject to mechanical injury, protection shall be provided. The means of approved protection shall be arranged in a manner that will not interfere with the connection to the inlets.
6. FDC shall have a permanent identification sign to indicate building address, and what it controls.
7. FDC shall be located a minimum of 25 feet from the structure. When this distance cannot be achieved, a minimum one hour fire resistive wall shall be provided with no openings in the wall, 10 feet either direction of the FDC.
8. FDC heads shall be painted red.

9. FDC connections shall be of all brass construction.
10. All FDC's shall have two inlets, each with a clapper.
11. Protective metal covers or plugs shall be provided on the inlets. (No plastic)
12. When system side (yard) hydrants are connected to the underground fire sprinkler piping, a UL listed 6 inch FDC with four 2 ½ inch inlets shall be provided. Each inlet shall be equipped with its own clapper.

D. Fire Hydrants

1. Prior to construction, fire hydrant type, location, and required fire flow are determined by this department for each building, in accordance with the California Fire Code (CFC). See Pasadena Fire Department Fire Prevention Standard.
2. Fire hydrants shall be provided with shut-off valves located in the street or driveway, within 4 to 10 feet of the hydrant.

E. System Side Hydrants

Definition of system side (yard) hydrants: Connected to underground piping between the FDC and the sprinkler riser of a fire sprinkler system.

1. Requires Fire Department approval and is only allowed when design constraints provide no other alternative.
2. If system side hydrants are used, the mains must be sized to meet the fire flow determined by this department. Hydraulic calculations shall be submitted to verify that the pipe size will provide the required GPM at 20 psi residual pressure.
3. Requires a UL listed 6 inch FDC with four 2 ½ inch inlets. Each inlet shall be equipped with its own clapper.
4. System side hydrants shall be painted yellow with blue caps.
5. Each system side hydrant shall have "SS" stenciled on the barrel to indicate it is on the system side. Following the "SS" shall be the total number of system side hydrants. For example, if there are four system side hydrants, each shall be stenciled with "SS-4". The letters and numbers shall be blue and a minimum of 1 ½ inch high.
6. System side hydrants shall be provided with shut-off valves located in the street or driveway, within 4 to 10 feet of the hydrant.

5. OVERHEAD PIPING

A. General

1) Overhead fire protection systems shall be designed by:

- a) Fire Protection Contractors (C-16)

Note: Contractors may only design the system(s) if they will be the installing contractor.

- b) The following professional engineers:
- Civil Engineer
 - Mechanical Engineer
 - Fire Protection Engineer
- 2) Inspection of overhead piping will not be conducted until plans are approved.
- 3) All pipes shall be exposed for rough inspection.
- 4) Floor control valves (indicating type) are required on each floor when the building has three floor levels or more. The valves shall be readily accessible to Fire Department personnel, and shut off the entire floor without affecting other floors. Floor control valves shall be locked in the open position. Each floor shall be provided with an auxiliary drain valve and an inspector's test valve.
- 5) Inspector's test valves for the fire sprinkler systems shall meet the following requirements:
- a) Connected to the hydraulically most demanding area.
 - b) Located inside the building in a readily accessible location.
 - c) Test valves located within a wall shall be protected by a wall panel door with a simple turn knob. Panel doors kept closed by screws or locks may be acceptable. The panel door shall have an **"Inspector Test Valve"** identification sign posted on the outside.
- 6) For maintenance and repair purposes, a clearance of 3 feet shall be provided around all risers. If a riser is to be concealed by a wall or closet, access to the riser shall be provided by a door with minimum dimensions of 2 feet by 6 feet 8 inches. The door shall have a **"Sprinkler Riser"** identification sign posted on the outside.
- 7) All trash areas designed for storage in excess of 1.5 cubic yards (40.5 cubic feet) that are located within 5 feet of combustible walls, openings or combustible roof eave lines, shall be protected by an automatic sprinkler system.
- 8) Plans submitted for plan check must show complete hanger and sway bracing details. When the attachment method of hangers and sway braces is different than those shown in NFPA 13, or hanging larger than 4 inch pipe, the design must be certified by a registered Professional Structural Engineer.
- 9) Water flow alarm bells shall be visible on the address side of the building.
- 10) A hydrostatic test is required on all tenant improvement projects involving pipe sizes 2 ½ inches or larger.
- 11) When drop-out ceiling tiles or panels are installed beneath the sprinklers, the installation shall comply with the following conditions:
- a) Drop-out tiles or panels shall be listed for the use, and shall be installed in accordance with the listing.
 - b) Drop-out tiles or panels shall not be used in conjunction with dry-pipe sprinkler systems.
 - c) Drop-out tiles or panels shall be located no more than 5 feet below the sprinkler heads.

- d) The sprinklers shall be installed in accordance with NFPA 13 above the ceiling, including separation from obstructions.
- e) Installation is prohibited in all exit components, such as corridors, stairways, horizontal exits, pressurized enclosures, and exit passageways as defined in Chapter 10 and malls as defined in Chapter 4 of the California Building Code (CBC).
- f) Drop-out ceiling tiles or panels may be installed in Light Hazard and Ordinary Group 1 Occupancies.

12) For design and installation of automatic sprinkler systems to protect against fires in residential occupancies up to and including four stories in height, refer to NFPA 13R with the following amendments:

- a) Heating and cooling units or any other equipment installed in a concealed space (i.e. attic) shall be protected by sprinklers.

B. Sprinkler System Monitoring and Alarm

1) All valves controlling the water supply and water-flow switches for automatic sprinkler systems shall be electrically monitored where the numbers of sprinklers are:

20 or more in all occupancies, except R-3 and R-3.1 occupancies.

2) Valve monitoring and water-flow alarm and trouble signals shall be distinctly different and shall be automatically transmitted to an approved central station, remote station, or proprietary monitoring station as defined by CFC 2013.

Exception: Underground key or hub valves in roadway boxes provided by the municipality or public utility need not be monitored.

3) When fire sprinkler systems are required in buildings of undetermined use with ceiling height of 20 feet or less, they shall be designed and installed to have a sprinkler density of no less than that required for an Ordinary Hazard Group 2 with a minimum design area of 3,000 square feet. For buildings of undetermined use with ceiling height of over 20 feet, the system shall be designed as Extra Hazard Group 1, with a density of 0.33 square feet and a minimum design area of 3,000 square feet.

4) Tandem System are NOT allowed by this department.

Definition: A sprinkler system in a detached building which is supplied from the overhead fire sprinkler system piping of another building or has its supply piping running through the other building.

5) Systems shall be designed not to exceed 90% demand of available water supply.

6) Fire protection for spray booths shall be hydraulically calculated based on Extra Hazard Group 2. Pipe schedule is not allowed.

7) Subject to the approval of fire chief, sprinklers may be omitted in rooms or areas as follows:

a) When sprinklers are considered undesirable because of the nature of the contents or in rooms or areas, which are of noncombustible construction or contains electrical equipment.

b) Sprinklers shall not be installed when the application of water, or flame and water, to the contents may constitute a serious life or fire hazard, as in the manufacture or storage of quantities of aluminum powder, calcium carbide, calcium phosphate, metallic sodium and potassium, quicklime, magnesium powder, and sodium peroxide.

c) Safe deposit or other vaults of fire-resistive construction, when used for the storage of records, files, and other documents, and the files are stored in metal cabinets.

d) Communication equipment areas under the exclusive control of a public communication utility agency provided all of the following requirements:

- The equipment areas are separated from the remainder of the building by two-hour fire resistive occupancy separation.
- Such areas are used exclusively for such equipment.
- An approved automatic smoke detection system is installed in such areas and is supervised by an approved central, proprietary or remote station service, or a local alarm which will give an audible signal at a constantly attended location.
- Other approved fire protection equipment such as portable fire extinguishers or Class II standpipes is installed in such areas.

e) Other approved automatic fire extinguishing systems may be installed to protect special hazards or occupancies in lieu of automatic sprinklers.

f) The top of elevator shafts and elevator equipment rooms when machine rooms, shafts, and passenger cars meet ASME A17.1 requirements for fire resistive construction.

8) At the time of system acceptance, an installation tag shall be affixed to the riser with the installers name and date of installation.