



HILLSIDE FIRE PROTECTION DISTRICT

Fire Prevention Bureau Plan Review

Sprinkler Requirements

All new construction shall have fire sprinklers installed in accordance with the appropriate NFPA standard.

Any existing building undergoing a change in use group, must install a fire sprinkler system.

Any part of an existing building undergoing a change in use group shall install fire sprinklers when:

1. Renovations encompass 50% of the square footage of the overall building.
2. A new water service is part of the renovations.

If a new water service is installed in an existing building, it must be sized to accommodate a future fire sprinkler system.

For new construction, the fire department will not approve a permit until the applicant provides fire sprinkler plans and review fees for review.

For the installation or modification of fire sprinklers in existing buildings, the fire department will not approve the permit until the plans are approved and fees are received.

The basic submittal package shall contain the following:

1. Two sets of shop drawings (one being PDF electronic format)
2. Two sets of hydraulic calculations (one being PDF electronic format)

3. Two sets of manufacturer's specifications for all equipment (one being PDFelectronic format)
4. A copy of the applicant's state license

Shop drawings shall be drawn to scale on sheets of uniform paper with a plan of each floor and shall show those items from the following list that pertain to the design of the system (NFPA 13 Chapter 8)

1. Name of owner and occupant
2. Location including street address
3. Compass point
4. Full height cross-section, or schematic diagram, including structural
5. member information if required for clarity and including ceiling construction and method of protection for non-metallic piping.
6. Location of partitions
7. Location of firewalls
8. Occupancy class of each area or room
9. Location and size of concealed spaces, closets, attics, and bathrooms.
10. Any small enclosures in which no sprinklers are to be installed.
Size of water main in street and whether dead end or circulating; if dead end, direction and distance to nearest circulating main; and main test results* and system elevation relative to test hydrant.
11. Make, type, model, and nominal K-factor of sprinklers.
12. Temperature rating and location of high-temperature sprinklers.
13. Total area protected by each system on each floor.
14. Number of sprinklers on each riser per floor.
15. Total number of sprinklers on each dry pipe system, pre-action system, combined dry pipe system or deluge system.
16. Approximate capacity in gallons of each dry pipe system.
17. Pipe type and schedule of wall thickness.
18. Nominal pipe size and cutting lengths of pipe (or center-to-center dimensions). Where typical branch lines prevail, it shall be necessary to size only one typical line.
19. Location and size of riser nipples.
20. Type of fittings and joints and location of all welds and bends. The contractor shall specify on drawing any sections to be shop welded and the type of fittings or formations to be used.
21. Type and locations of hangers, sleeves, braces, and methods of securing sprinklers when applicable.
22. All control valves, check valves, drain pipes, and test connections.

23. Make, type, model, and size of alarm or dry pipe valve.
24. Make, type, model, and size of pre-action or deluge valve.
25. Kind and location of alarm bells.
26. Size and location of standpipe risers, hose outlets, hand hose, monitor nozzles, and related equipment.
27. Private fire service main sizes, lengths, locations, weights, materials, point of connection to water main; the sizes, types and locations of valves, valve indicators, regulators, meters, and valve pits; and the depth that the tip of the pipe is laid below grade.
28. Piping provisions for flushing
29. Where the equipment is to be installed as an addition to an existing system, enough of the existing system indicated on the plans to make all conditions clear.
30. For hydraulically designed systems, the information on the hydraulic data nameplate.
31. A graphic representation of the scale.
32. Name and address of contractor.
33. Hydraulic reference points shown on the plan that correspond with comparable reference points on the hydraulic calculations sheets.
34. The minimum rate of water application (density), the design area of water application, in-rack sprinkler demand, and the water required for hose streams both inside and outside.
35. The total quantity of water and the pressure required noted at a common reference point for each system.
36. Relative elevations of sprinklers, junction points, and supply are reference points.
37. If room design method is used, all unprotected wall opens throughout The floor protected.
38. The setting for pressure-reducing valves.
39. Information about backflow preventers (manufacturer, size, type)
40. Information about antifreeze solution used (Type and amount).

*Water supply information shall include the following items. Hydrant flow tests may only be conducted when temperatures are above 40° F. Please provide the fire department with four business days' notice to schedule the test. (NFPA 13 Chapter 8).

1. Location and elevation of static and residual test gauge with relation to the riser reference point

2. Flow location
3. Static pressure, PSI
4. Residual pressure, PSI
5. Flow, GPM
6. Date and time
7. Test conducted by or information supplied by
- 8.

Hydraulic calculations shall be prepared on form sheets that include a summary sheet, detailed worksheets, and a graph sheet. (NFPA 13 Chapter 8) The summary sheet shall contain the following information where applicable. (NFPA 13 Chapter 8)

1. Date
2. Location
3. Name of owner and occupant
4. Building identification
5. Description of hazard
6. Name and address of contractor or designer
7. Name of approving agency
8. System design requirements, as follows
9. Design area of water application, FT²
10. Minimum rate of water application density GPM/FT²
11. Area per sprinkler, FT²
12. Total water requirements as calculated, including allowance for inside hose, outside hydrants and water curtain and exposure sprinklers.
13. Allowance for in-rack sprinklers, GPM
14. Limitations (dimension, flow, and pressure) on extended cover or other listed special sprinklers.

The detailed worksheets or computer printout sheets shall contain the following information. (NFPA 13 Chapter 8)

1. Sheet number.
2. Sprinkler description and discharge constant (K).
3. Hydraulic reference points.
4. Flow in GPM.
5. Pipe size.

6. Pipe lengths, center-to-center of fittings.
7. Equivalent pipe lengths for fittings and devices.
8. Friction loss in PSI/FT.
9. Total friction loss between reference points.
10. In-rack sprinkler demand balanced to ceiling demand.
11. Elevation head in PSI between reference points.
12. Required pressure in PSI at each reference point.
13. Velocity pressure and normal pressure if included in calculations to indicate starting points or reference to other sheets or to clarify data shown.
14. Notes to indicate starting points or reference to other sheets or to clarify data shown.
15. Diagram to accompany gridded system calculations to indicate flow quantities and directions for lines with sprinklers operating in the remote area.
16. Combined K-factor calculations for sprinklers on drops, armovers, or sprigs where calculations do not begin at the sprinkler.

A graphic representation of the complete hydraulic calculation shall be plotted on semi exponential graph paper (Q1.85) and shall include the following. (NFPA 13 Chapter 8)

1. Water supply curve.
2. Sprinkler system demand.
3. Hose demand (where applicable).
4. In-rack sprinkler demand (where applicable).

The following tests are required. Please notify the fire department four business days in advance to witness the tests. Other tests may be required depending on the type of system. Approved sprinkler plans must be on site in order to conduct any tests or inspections.

1. Fire service mains shall be flushed at a minimum velocity of 10 feet/second until the water runs clear prior to connection to the Sprinkler system. The fire department does not need to witness this test for NFPA 13-D systems.
2. Hydrostatically test the sprinkler system at 200 PSI for two hours, or

50 PSI over working pressure whichever is greater. This test shall include the fire department connection. The contractor shall provide the fire department with the Material and Test Certificate.

3. For dry-pipe systems, in addition to the hydrostatic test, an air pressure test shall be conducted. The system shall be pressurized to 40 PSI for 24 hours. Any loss greater than 1 1/2PSI shall be corrected.

The fire department will conduct a rough inspection of the sprinkler system prior to closing the walls and ceilings. Please allow four business days' notice to schedule the inspection. Approved plans must be on site to conduct the inspection. The rough inspection is usually done in conjunction with the hydrostatic test. The following items will be checked:

1. Pipesizes.
2. Hanger spacing.
3. Conformance to approved plans.
4. Insulation and freeze protection (where applicable).
5. Overall workmanship

The fire department will conduct a final inspection of the system and a main drain test and inspectors' test will be performed. The following items will be checked.

1. Proper activation of the fire alarm devices.
2. For dry pipe systems, water must reach the inspector's connection within 60 seconds.
3. A supply of spare sprinkler heads and approved wrenches.
4. All valves must be identified with approved signs.
5. Backflow certification.
6. Insulation and freeze protection (where applicable).

The fire department requires the following tests to accept a fire pump. A representative of the installing contractor must be on the scene. A copy of the manufacturer's test curve shall be available for comparison. The actual performance of the pump must equal or exceed this curve. Please allow four business days' notice to schedule the test.

1. The fire pump shall perform at minimum, rated and peak loads for a period of not less than one hour and measurements taken in

accordance with NFPA 20.

2. Load start test.
3. Phase reversal test.
4. At least six manual operations of the controller.
5. At least six automatic operations of the controller.
6. Manual emergency operation from each power source.
7. Emergency power supply test (where applicable)