NFPA 14

3.3.5

3.3.5 High-Rise Building. A building where the floor of an occupiable story is greater than 55 ft (17 m) ~~75 ft (23 m)~~ above the lowest level of fire department vehicle access.

4.2.3.2

4.2.3.2 Where system pressures exceed 300 psi, piping expected to experience greater than 300 psi at zero flow shall be rated for the pressures expected, and have minimum nominal pipe wall thickness in accordance with Schedule 40.

4.6.1.1.1

4.6.1.1.1 Within the cabinet, the hose connections shall be located so that there is at least 1 in. (25.4 mm) between any part of the cabinet and the handle of the valve when the valve is in any position ranging from fully open to fully closed, 6 in (150 mm) clearance perpendicular from the valve handle to any part of the cabinet, and 6 in (150 mm) clearance around the circumference of outlet to any part of the cabinet. The door shall not be considered to be part of the cabinet for the purposes of this section.

4.8.2

4.8.2 Each fire department connection shall have at least two, and not less than one for each 250 gpm of system demand or fraction thereof, 2 ½ inch (65 mm) internal threaded fittings having NHS threads, as specified in NFPA 1963, *Standard for Fire Hose Connections.* Fire Department Connections shall be provided with internal check valve(s) such that water being supplied into any inlet will not flow back out of any other inlet. For the purposes of this section, internal clapper valve devices provided by the manufacturer in listed Fire Department Connections shall be considered internal check valves. *(See Section 7.7 and 7.12 for design requirements)*

4.8.2.3

4.8.2.3 Fire department connection piping shall be a minimum of 4 in (100 mm) for three or fewer inlets, a minimum of 6 in (150 mm) for four or more inlets, and shall in all cases have a diameter equal or greater to the largest supply line.

5.2.1.2.1

5.2.1.2.1 Piping volume shall not be limited where the system is designed in accordance with Section 5.2.1.3.2. ~~Not more than 750 gal (2839 L) system capacity shall be controlled by one dry pipe valve~~

5.2.1.2.2

5.2.1.2.2 ~~Piping volume shall be permitted to exceed the requirements of 5.2.1.3.1 where the~~ S~~s~~ystem design shall be ~~is~~ such that water is delivered to the system at the most remote hose connection in not more than 3 minutes, starting at the normal air pressure on the system and at the time of fully opened hose connection.

6.1.2.2.1

6.1.2.2.1 In buildings constructed of Type I or Type II construction in accordance with the International Building Code or in buildings equipped with an approved automatic sprinkler system, standpipes ~~lateral piping to 2 ½ in. (65 mm) hose connections~~ shall not be required to be protected by fire rated construction.

6.3.2.1

6.3.2.1 Individual hose valves fed from the feed main shall each be provided with an isolation valve, such that maintenance of the individual hose valve can be accomplished without interrupting the supply to standpipes fed from the feed main.

6.3.7.1

6.3.7.1 System water supply valves, isolation control valves, and other valves in feed mains shall be electrically supervised in an approved manner in the open position by ~~one of the following methods:~~

~~(1) A~~ a central station, proprietary, or remote station signaling service

~~(2) A local signaling service that initiates an audible signal to a constantly attended location~~

~~(3) Locking of valves in the open position~~

~~(4) Sealing of valves and an approved weekly recorded inspection where valves are located within fenced enclosures under the control of the owner~~

6.4.5.2.2

~~6.4.5.2.2 A sign also shall indicate the pressure required at the inlets to deliver the system demand~~

6.4.5.3

6.4.5.3 Signs shall be provided at fire department connections, indicating the areas of the building served and the minimum required pressure and flow to be delivered through the inlets. Where a fire department connection services multiple buildings, structures, or locations, ~~a~~ the sign shall ~~be provided~~ indicate ~~indicating~~ the buildings, structures, or locations served.

6.4.5.3.1

6.4.5.3.1 Signs shall have a red background and be professionally engraved with white lettering a minimum of 1 in. (25.4 mm) in height, with a minimum stroke of ¼ in. Signs shall consist of durable, weatherproof materials, subject to approval by the authority having jurisdiction.

7.2.1

7.2.1 The maximum pressure at any point in the system at any time shall not exceed 350 psi (24 bar), except where components are rated for higher pressures and are approved by an alternative materials and methods report approved by the authority having jurisdiction.

7.2.3.2

7.2.3.2 Where the static pressure ~~at a hose connection~~ exceeds 175 psi (12.1 bar) at a 1½ in. (40 mm) hose connection or exceeds 200 psi (13.9 bar) at a 2½ in. (65 mm) hose connection, an approved pressure-regulating device shall be provided to limit static and residual pressures at the outlet of the hose connection to 100 psi (6.9 bar) for 1½ in. (40 mm) hose connections and 200 ~~175~~ psi (13.9 bar) ~~(12.1 bar)~~ for other hose connections. The pressure on the inlet side of the pressure-regulating device shall not exceed the device's rated working pressure.

7.2.3.4

7.2.3.4 Where hose valve pressure regulating devices are installed on 2 ½ in. (65 mm) outlets, they shall be field adjustable, capable of being adjusted through the full adjustment range by a 3/8 in. (12 mm) rod with a maximum required torque of 30 foot-pounds (41 nm) while flowing water. Field adjustment shall not require any hose valve disassembly.

7.2.4

7.2.4 When system pressure-regulating devices are used in lieu of providing separate pumps, multiple zones shall be permitted to be supplied by a single pump and pressure regulating device(s) under the following conditions:

(1) Pressure-regulating device(s) shall be permitted to control pressure in the lower zone(s). A redundant pressure-regulating device shall be provided in parallel configuration for the full range of anticipated system flow. Where multiple sizes of pressure-regulating devices are required to achieve flow through the entire range of anticipated system flow, each size shall have a redundant pressure-regulating device installed.

(2) A method to isolate each of the pressure-regulating device(s) shall be provided for maintenance and repair by providing control valves on the supply and discharge side of each pressure-regulating device. in a manner where only the device being maintained and repaired is out of service.

(3) Regulating devices shall be arranged so that the failure of any single device does not allow pressure in excess of 200 ~~175~~ psi (13.9 ~~12.1~~ bar) to not more than two hose connections

(4) An equally sized bypass around the pressure regulating device(s), with a normally closed valve, shall be installed.

(5) Pressure-regulating devices and the bypass valve shall be installed not more than 7ft 6in (2.31 m) above the floor.

(6) The pressure-regulating device shall be provided with inlet and outlet pressure gauges.

(7) The fire department connection(s) shall be connected between the system fire pump(s) and the pressure-regulating device(s) and shall be sized and designed to allow the fire department connection to provide full back-up for the system fire pump to all pressure zones ~~to the system side of the outlet isolation valve.~~

(8) The pressure-regulating device shall be provided with a pressure relief valve sized for the full anticipated system flow and capable of maintaining downstream system pressures below the maximum pressure ratings for all system components ~~in accordance with manufacturer recommendations~~.

(9) Remote monitoring and supervision for detecting high pressure failure of the pressure of the pressure-regulating device shall be provided in accordance with *NFPA 72, National Fire Alarm Code*. Such failure shall be detected by providing a flow switch downstream on the pressure relief valve.

(10) A drain sufficient to allow flow of the full anticipated system flow shall be provided adjacent to the pressure-regulating devices. Use of this drain line for discharge from the pressure relief valve shall be permitted.

7.3.2

7.3.2 Class I Systems. Class I systems shall be provided with 2 ½ in. (65 mm) hose connections in the following locations:

(1) At the main floor landing in exit stairways

(2) On each side of the wall adjacent to the exit openings of horizontal exits, unless permitted to be omitted by the Fire Code

(3) In other than covered mall buildings, in each exit passageway at the entrance from the building areas into the passageway

(4) In covered mall buildings, at the entrance to each exit passageway or exit corridor, and at the interior side of public entrances from the exterior to the mall

(5) At the highest landing of stairways with stairway access to a roof, and on roofs with a slope of less than 4 in 12 where stairways do not access the roof

7.3.2.2

7.3.2.2 Class I hose systems shall be designed so that all floor areas of the floor or story are protected by hose valve coverage, with 100 feet of hose and 30 feet of stream from each hose valve connection. The length of hose shall be measured along approved walking paths, and the stream distance shall not be expected to turn corners. Where the most remote portion of a ~~nonsprinklered~~ floor or story is not protected with the hose valves already provided in accordance with 7.3.2 subject to these distance limitations. ~~is located in excess of 150 ft (45.7 m) of travel distance from a required exit containing or adjacent to a hose connection, or the most remote portion of a sprinklered floor or story is located in excess of 200 ft (61 m) of travel distance from a required exit containing or adjacent to a hose connection,~~ additional hose connections shall be provided, in approved locations~~, where required by the local fire department or the authority having jurisdiction~~.

7.3.3.1

7.3.3.1 Class II systems shall be provided with 1 ½ in. (40 mm) hose stations so that all portions of each floor level of the building or area thereof required to be protected are within 130 ft (39.7 m) of a hose connection provided with 1 ½ in. (40 mm) ~~hose or within 120 ft of a hose connection provided with less than 1 ½ in (40 mm) hose~~.

7.4

7.4 Number of Standpipes. Separate standpipes shall be provided in each required exit stairway. Scissor stairs having two separate landings on each level shall be provided with a separate hose connection on each stair landing.

7.8.1

7.8.1 Minimum Design Pressure for Hydraulically Designed Systems. Hydraulically designed standpipe systems shall be designed to provide the waterflow rate required by Section 7.10 at a minimum residual pressure of 125 psi ~~100 psi~~ (8.6 ~~6.9~~ bar) at the outlet of the hydraulically most remote 2 ½ in. (65 mm) hose connection and 65 psi (4.5 bar) at the outlet of the hydraulically most remote 1 ½ in. (40 mm) hose station.

7.8.1.1

7.8.1.1 Manual standpipe systems shall be designed to provide 125 psi (8.6 bar) ~~100 psi (6.9 bar)~~ at the topmost outlet with the calculations terminating at the fire department connection.

7.9.1.3

7.9.1.3 Where pumps are used in structures with an occupied floor located greater than 250 ft in height above the lowest level of fire department access, a redundant fire pump shall be provided for each required fire pump.

7.11.1.1

7.11.1.1 The drain riser shall be equipped with tees that are of the same size as the discharge outlets of the pressure-regulating devices to be tested with internal threaded swivel fitting having NHS threads, as specified in NFPA 1963, *Standard for Fire Hose Connections*, with plugs, and shall be located ~~on~~ at ~~least~~ every ~~other~~ floor with a hose valve pressure-regulating device. A drain connection shall be provided adjacent to every hose valve pressure-regulating device, even if the pressure-regulating device is not on a vertical standpipe riser.

7.11.1.3

7.11.1.3 Where drain risers are interconnected and run to a common discharge point, all piping shall be sized for the maximum possible combined flow.

7.12.1.1

7.12.1.1 In buildings with multiple pump zones, each zone shall be provided with an express main and fire department connection from the street to each pump zone. ~~The high zone fire department connection(s) shall not be required to be provided where 7.9.3 applies.~~

7.12.2.1

~~**7.12.2.1** A single connection for each zone shall be permitted where acceptable to the fire department~~

7.12.3

7.12.3 Fire department connection sizes shall be based on the greater of the sprinkler system demand (if a combined system) or the standpipe system demand and shall include one 2 ½ in. (65 mm) inlet per every 250 gpm (946 L/min)

7.12.3.1

~~7.12.3.1 An approved large diameter hose connection of a size to accommodate the required flow shall be permitted.~~

8.1.1

8.1.1 Plans accurately showing the details and arrangement of the standpipe system shall be furnished to, reviewed, and stamped accepted by the authority having jurisdiction prior to the installation of the system.

8.1.6

8.1.6 Plans shall include the following items:

1. Provide a detailed narrative describing the scope of work to be conducted associated with the plans.
2. Name of owner and occupant.
3. Location, including street address.
4. Name address, phone number, and contractor's license number of sprinkler contractor.
5. Nevada State Fire Marshal registration number.
6. Signature and NICET number, or engineer's seal, of the designer.
7. General notes as required by the AHJ.
8. Point of compass.
9. The plan must show a top view of all areas on a common architectural scale, i.e. 1/8", 3/16", 1/4", etc. All walls and doors need to be shown, and each room must be labeled according to use. The top view must show supply and drain pipe layout, pipe dimensions, attachments, braces, hangers, standpipe hose outlets, hydraulic nodes, and the coverage area from each hose valve to the remote areas of the floor plan. The coverage area shall be shown on plans and be measured along the path of travel from hose valves, around walls and through doors, to the most remote areas of the floor. The 30 feet distance assigned to the hose stream shall not be allowed to bend or turn.
10. The plan must show section views with a riser diagram to describe the locations of mains, lines, and hose valves within the structure. A minimum of one view is required, although additional views may be necessary to determine compliance with NFPA 14. The section view must be drawn to a common architectural scale, i.e. 1/8", 3/16", 1/4", etc. The riser diagram must indicate all components on the riser, including fire department connections; water supply components, including fire pumps and supply lines; interconnecting horizontal pipe; all standpipes on the system; control valves at the base of all standpipes; hose valves fed by the standpipes; and, where required for testing of pressure regulating valves, the drain lines.
11. The plans shall include an isometric view showing the entire system in one view.
12. A graphic representation of the scale used on all plans.
13. Ceiling construction.
14. Full height cross section.
15. Location of fire walls.
16. Location of horizontal exits.
17. Location of partitions.
18. Label and name of each area or room.
19. General notes shall be provided, as follows:
    a. Indicate compliance with NFPA 14.
    b. Indicate the type of system per Section 5.2 and the class of the system per Section 5.3.
    c. Indicate the minimum and maximum pressure requirements for the system.
    d. Indicate the minimum flow for the system and for each individual valve.
    e. Provide a description of hose valves used, detailing the manufacturer, model number(s), and outlet size.
    f. Manufacturer, schedule and type of piping.
    g. Manufacturer and type of fittings.
    h. Type of freeze protection (building heated, dry system, anti-freeze system, heat-trace, etc).

    i. Indicate the pressure required for the hydrostatic test, being 200 psi or 50 psi about pump churn pressure, whichever is higher.
    j. Indicate the quantity of hose valves shown on the submittal.
20. Underground pipe size, length, location with respect to the building, weight, material, and point of connection to city main; type of valves, meters, and valve pits; and depth at which the top of the pipe is laid below grade. Show the locations of fire hydrants used for water supply to the fire department connection(s), indicate the test and flow test results and label the test and flow hydrants.
21. Provide information regarding the fire pump, as applicable.
22. Other sources of water supply, including water storage tanks and fire department connections, shall be shown on plans.
23. Size, location, and piping arrangement of fire department connections, with details of the connection.
24. Fire Department Connection Signage: A sign shall be provided adjacent to each FDC indicating what systems are being served, what areas of the building are served, and the minimum required pressure and flow at the Fire Department Connection for correct system operation. Provide a detail of this sign on the plan.
25. Detail of Class I. Class II, or Class III hose valves located in cabinets. The cabinet size, and the placement of items within the cabinet, shall be such to provide a minimum clearance of 6 inches perpendicularly from the face of the valve, a minimum of 1 inch around the circumference of the valve, and a minimum of 6 inches around the circumference of the hose outlet cap.
26. Type of pipe and fittings.
27. Pipe type and schedule of wall thickness.
28. Nominal pipe size with lengths shown to scale.
29. Type of fittings and joints and the location of all welds and bends.
30. Type and locations of hangers, sleeves, braces, and methods of securing sprinklers, where applicable.
31. Show hanger locations, and provide details of hanger installations.
32. Seismic bracing information shall be provided, including locations, details, and calculations.
33. Provide details for penetrations of standpipe piping through walls, floors, and other structural members. Show detail to note clearances around the piping and/or locations of flexible connections.
34. Provide details for all penetrations in rated walls and floors, providing information regarding the method of maintaining fire rating of the wall or floor.
35. All control valves, check valves, drain pipes, and test connections.
36. Make, type, model, and size of alarm or dry pipe valve.
37. Piping provisions for flushing and for testing.
38. 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.
39. A detail of the hydraulic data nameplate.
40. Hydraulic reference points shown on the plan, including the top view, section view, and isometric view, that correspond with comparable reference points on the hydraulic calculation sheets.
41. The total quantity of water and the pressure required noted at a common reference point for each system.
42. Edition year of NFPA 14 to which the standpipe system is designed.
43. Pressure Reducing Valves: For all pressure reducing valves, including direct-acting and pilot-operated valves, which are shown on the plans, indicate the make, model, and setting of the pressure-reducing valve, and provide a detail for each unique installation configuration.
44. Where direct-acting pressure regulating hose valves are provided anywhere in the building, provide a chart on the plans. The chart shall have eight columns, as follows:
    a. Floor Level – Provide numerical designation for all floor levels in the building.
    b. Static Pressure, Inlet – Indicate the static pressure at the inlet of the hose valve on all floor levels. Provide a supporting hydraulic. calculation at zero flow with churn pressure, providing a node at the hose valve on each floor level to indicate the static pressure at each hose valve.
    c. Residual Pressure, Full Flow, Inlet – Indicate the residual pressure at the inlet of hose valves on each floor. Provide a supporting hydraulic calculation at full standpipe design flow per NFPA 14 (750 or 1,000 gpm), providing a node on each floor level to indicate the residual pressure at each hose valve.
    d. Residual Pressure, 250-gpm flow, inlet - Indicate the residual pressure at the inlet of hose valves on each floor while flowing 250 gpm. Provide a supporting hydraulic calculation at 250

gpm flow at the most remote standpipe outlet, providing a node on each floor level of the most remote standpipe to indicate the residual pressure at each hose valve.

e. Valve Make and Model – Indicate the manufacturer of the valve on all floors, and the model number for the specific valve. Provide supporting manufacturer specifications.
f. Valve Setting – Indicate the hose valve setting or bonnet number proposed for each valve. The setting or bonnet number must be associated with the manufacturer specifications for the valve.
g. Residual Pressure, Full Flow, Outlet – Indicate the residual outlet pressure at the outlet of the hose valve under the full-flow condition. For PRV installations, the residual pressure is taken from pressure relation charts provided by the manufacturer. For non-PRV installation, the residual pressure is taken by analysis of the equivalent lengths of the fittings and the hose valve.
h. Residual Pressure, 250-gpm flow, Outlet - Indicate the residual outlet pressure at the outlet of the hose valve when flowing 250 gpm. This is necessary to establish the residual pressure expected during field inspection. For PRV installations, the residual pressure is taken from pressure relation charts provided by the manufacturer.

11.5.6.2

11.5.6.2 The system shall deliver a minimum of 250 gpm (946 L/min) at the hose connection within 3 minutes of opening the hose valve. ~~if the system capacity exceeds 750 gal (2480 L)~~

12.7.2

12.7.2 Where temporary standpipes normally contain water, the piping shall be protected against freezing, unless otherwise approved by the authority having jurisdiction.