

NFPA 13D

1.1

1.1 This standard shall cover the design and installation of automatic sprinkler systems for protection against the fire hazards in one- and two-family dwellings and manufactured homes.

When sprinkler protection is being provided to mitigate the minimum Fire Code requirements for fire flow, number of fire hydrants, or fire department access, the minimum design criteria shall be as outlined in Section 8.7 Protection Matrix for Group R Division 3 Occupancies and buildings built under the IRC.

3.3.9.3

3.3.9.3 Flush Multipurpose Piping System. A piping system, other than a network system, intended to serve ~~both~~ one or more domestic toilet fixture(s) and fire protection needs.

3.3.9.4

3.3.9.4 Network System. A type of multipurpose system utilizing a common piping system supplying all domestic fixtures and fire sprinklers ~~where each sprinkler is supplied by a minimum of three separate paths.~~

4.1.1

4.1.1 The installer shall provide to the owner/occupant instructions on inspecting, testing, and maintaining the system. The instructions shall be attached to the riser or the inside of the panel access door. The instructions shall be weatherproof.

4.7

4.7 Working Plans ~~Documentation~~

~~Documentation shall be available on request to ensure adequate water supply, listed devices, and adequate sprinkler coverage have been addressed.~~

Working plans shall be drawn to an indicated scale, on sheets of uniform size, with a plan of each floor, and shall show those items from the following list that pertain to the design of the system:

1. Name of owner.
2. Location, including street address.
3. Point of compass.
4. Full height cross section.
5. Ceiling/roof heights and slopes not shown in the full height cross section.
6. Location of partitions, lintels, and doorways. Lintel openings require a cross section view to indicate the area of the opening.
7. Name and label for each area or room.
8. For systems supplied by city mains, location and size of city main in street, and location, size, and type of domestic line, including length to city connection, and water meter location and size. Static and residual hydrants that were used in flow tests shall be shown. The location of the 5 gpm domestic demand shall be indicated.
9. Make, type, model, temperature rating, nominal K-factor, and number of each type of sprinkler, including sprinkler identification number.
10. Pipe type and schedule of wall thickness.

11. 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.
12. Location and size of riser nipples and drops.
13. Type of fittings and joints.
14. Type and locations of hangers, and methods of securing sprinklers when applicable.
15. Location and size of all valves and drain pipes.
16. Location and size of water gauges.
17. 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.
18. A summary of the hydraulics, including the static pressure, residual pressure, and flow of the water supply, the pressure and flow demands at the point of connection to the water supply, and the pressure and flow demands at the bottom of the system riser.
19. Hydraulic reference points shown on the plan that correspond with comparable reference points on the hydraulic calculation sheets.
20. Relative elevations of sprinklers, junction points, and supply or reference points.
21. A graphic representation of the scale used on all plans.
22. Name, address, phone number, and contractor's license number of contractor.
23. Nevada State Fire Marshal registration number.
24. Signature and NICET number, or engineer's seal, of the designer.
25. Indicate by note the minimum rate of water application per sprinkler head, the maximum spacing for each head, and the domestic demand.
26. Information about antifreeze solution used. Indicate the type of antifreeze used, the amount of antifreeze in the system, and information about antifreeze compatibility with the pipe.
27. General notes as required by the AHJ.
28. Edition year of NFPA 13D to which the sprinkler system is designed.
29. Utility plans and/or plumbing plans necessary to show connection from water supply to fire sprinkler system.

6.2.3.1

6.2.3.1 The control valve shall be required ~~permitted~~ to serve the domestic water supply.

6.3.1

6.3.1 A multipurpose piping system shall be installed in accordance with 6.3-2 through 6.6-5.4

6.3.1.1

6.3.1.1 All one and two-family dwellings sprinkler systems supplied by the water purveyor shall be multi-purpose, in accordance with this section. This requirement applies both to systems fed with a single-outlet water meter and to systems fed with a dual-outlet water meter, which may be required by the water purveyor.

6.5

6.5 Common Supply Piping Flush Multipurpose Systems. Flush multipurpose systems shall supply a minimum of one toilet fixture. These systems may be used both with a single-outlet meter or a dual-outlet water meter, which may be required by the water purveyor. Such systems shall be considered acceptable by this standard where designed in accordance with 6.5.1 through 6.5.7.

6.5.1 Where common supply pipes serve both fire sprinkler and domestic use, they shall comply with 6.5.2 through 6.5-4. An accessible check valve shall be installed on the fire sprinkler riser to maintain system pressure.

6.5.2 In common water supply connections serving more than one dwelling unit, 5 gpm (19 L/min) shall be added to the sprinkler system demand to determine the size of common piping and the size of the total water supply requirements where no provision is made to prevent flow into the domestic water system upon operation of a sprinkler. A minimum demand of 5 gpm (19 L/min) shall be added to the sprinkler system demand at the point of domestic demand to determine the size of common piping and the size of the total water supply requirements where no provision is made to prevent flow into the domestic water system upon operation of a sprinkler.

6.5.3 Where a single-outlet meter is provided, a common underground supply for both domestic and fire sprinkler needs is permitted. No separate control valve controlling only the fire sprinkler system shall be permitted. The domestic supply shall serve all domestic fixtures except for the toilet in the master bathroom.

6.5.3 A warning sign, with minimum 1/4 in. (6.4 mm) letters, shall be affixed adjacent to the main shutoff valve and state the following:

~~**Warning:** The water system for this home supplies fire sprinklers that require certain flows and pressures to fight a fire. Devices that restrict the flow or decrease the pressure or automatically shut off the water to the fire sprinkler system, such as water softeners, filtration systems, and automatic shutoff valves, shall not be added to this system without a review of the fire sprinkler system by a fire protection specialist. Do not remove this sign.~~

6.5.4 Where a dual-outlet meter is provided, the fire sprinkler system shall be piped separately from the domestic system starting at the discharge side of the water meter. There shall be no separate control valve that controls only the fire sprinkler system (See UDACS for details). The domestic supply shall serve all hot water fixtures, and all cold water fixtures except for the toilet in the master bathroom.

~~Where water treatment and filtration are installed, one of the following conditions shall be met:~~

- ~~a. The flow restriction and pressure loss through the water treatment equipment shall be taken into account in the hydraulic calculations.~~
- ~~b. An automatic bypass shall be installed around the water treatment equipment that directs all water directly to the system.~~

6.5.5 The installation of a backflow preventer, water treatment and filtration device, or a pressure reducing valve between the water meter and the fire sprinkler system is prohibited.

6.5.6 The fire sprinkler system piping shall be designed as a looped system, with vertical and horizontal looping, in a manner that water circulates throughout the system. Dead-end supply lines off of the loop to individual sprinkler heads shall be permitted where each individual dead end does not exceed 50 feet in total length.

6.5.7 A supply line from the sprinkler system loop shall feed into the toilet in the master bathroom.

6.5.8 A pressure gauge shall be installed on the supply side of the check valve

6.6

6.6 Network Multipurpose Systems. Network multipurpose systems shall provide supply for all interior domestic fixtures and fire sprinkler needs. This design may be used with a single-outlet meter, but is prohibited from use with a dual-outlet meter, which may be required by the water purveyor. Such systems shall be considered acceptable by this standard where designed in accordance with 6.6.1 through 6.6.7

6.6.1 A minimum demand of 5 gpm (19 L/min) shall be added to the sprinkler system demand at the point of domestic demand to determine the size of common piping and the size of the total water supply requirements where no provision is made to prevent flow into the domestic water system upon operation of a sprinkler.

6.6.2 Where a single-outlet meter is provided, a common underground supply for both domestic and fire sprinkler needs is required. No separate control valve controlling only the fire sprinkler system shall be permitted. The network system shall serve all cold water domestic fixtures served by the water softener loop and all fire sprinklers.

6.6.3 Where a dual-outlet meter is provided, the use of a network system is prohibited. System design shall be in accordance with 6.5.

6.6.4 The fire sprinkler system piping shall be designed as a networked system, with interconnection of all domestic fixtures and fire sprinkler heads, in a manner that water circulates throughout the system when any domestic fixture is flowing. Dead-end supply lines shall only be permitted to supply domestic fixtures.

6.6.5 Where required by the fire code official, networked systems shall be performance tested to prove one-head and two-head flow scenarios, in addition to other inspections and approvals required by this code. Testing shall replicate the effect of devices that restrict flow and pressure, such as water filtration systems, water softeners and pressure reducing valves.

6.6.6 A warning sign, with minimum ¼ in. (6.4 mm) letters, shall be affixed adjacent to the main shutoff valve and state the following:

Warning: The water system for this home supplies fire sprinklers that require certain flows and pressures to fight a fire. Devices that restrict the flow or decrease the pressure or automatically shut off the water to the fire sprinkler system, such as water softeners, filtration systems, and automatic shutoff valves, shall not be added to this system without a review of the fire sprinkler system by a fire protection specialist. Do not remove this sign.

6.6.7 Where water treatment and filtration loops are installed, the network sprinkler design shall incorporate one of the following conditions:

1. The flow restriction and pressure loss through the water treatment equipment shall be taken into account in the hydraulic calculations.
2. An automatic bypass shall be installed around the water treatment equipment that directs all water directly to the system.

6.6.8 A pressure gauge shall be installed on the supply side of the dwelling unit control valve in the garage or other accessible location. Where a pressure reducing valve is installed after the control valve, the pressure gauge shall be installed on the outlet side of the pressure reducing valve.

7.1.1

7.1.1 A single control valve arranged to shut off both the domestic system and the sprinkler system shall be installed unless a separate shutoff valve for the sprinkler system is installed in accordance with 7.1.2.

7.1.2

7.1.2 The sprinkler system piping shall not have a separate control valve installed unless supervised by one of the following methods:

- (1) Central station, proprietary, or remote station alarm service
- (2) Local alarm service that causes the sounding of an audible signal at a constantly attended location
- (3) Valves that are locked open

7.7

7.7 Attics. Unconditioned Spaces

When nonmetallic piping is installed in unconditioned spaces attics, the piping shall be insulated or covered with insulation to a minimum of R-2 level. ~~adequate~~ insulation shall be provided on the unconditioned space attic side of the piping to avoid exposure of the piping to temperatures in excess of the pipe's rated temperature.

7.8

7.8 Stock of Spare Sprinklers. A supply of at least two spare sprinklers for each type installed shall be provided. Where the amount of spare sprinklers is 4 or less sprinkler heads, the spare sprinklers shall be permitted to be zipped or wire tied to fire sprinkler riser piping. Where the amount of spare sprinklers exceeds 4 sprinkler heads, a sprinkler head box shall be installed adjacent to the fire riser access panel. Where no distinct fire riser is part of the design, spare sprinklers shall be installed in a sprinkler head box adjacent to the pressure reducing valve.

8.1.1.2.2

8.1.1.2.2* The system shall provide at least the flow required to produce a minimum discharge density of 0.05 gpm/ft² (2.04 mm/min) to the design sprinklers including fire sprinklers required in garages per section 8.6.4.1.

8.1.3.1.2

8.1.3.1.2 Where construction features or other special conditions exist that are outside the scope of sprinkler listings, listed sprinklers shall be permitted to be installed beyond their listing limitations, provided the installation conforms to a modification or alternative materials and methods report that has been approved by the authority having jurisdiction.

8.6.4.1

8.6.4.1 Attached garages with any habitable rooms above shall be required to be protected with fire sprinklers

8.6.5

8.6.5 Sprinklers shall not be required in attics, penthouse equipment rooms, elevator machine rooms, concealed spaces dedicated exclusively to and containing dwelling unit ventilation equipment, floor/ceiling spaces, elevator shafts, crawl spaces, and other concealed spaces that are not used or intended to be used for living purposes ~~and do not contain fuel-fired equipment.~~

8.7

8.7 Protection Matrix for Group R Division 3 Occupancies and buildings built under the IRC

8.7.1 General. When a sprinkler system is being installed to mitigate the minimum Fire Code requirements for fire flow, number of fire hydrants, or fire department access, the design requirements in Table 8.7 shall be applied.

Table 8.7 Protection Matrix for Group R Division 3 Occupancies and buildings built under the IRC⁴

Building Area SIZE RANGE ⁶	Mitigation Residential SYSTEM TYPE ^{1,3}	SEPARATE SPRINKLER LEAD-IN REQUIRED ⁵	MINIMUM UNDERGROUND PIPE SIZE ⁵	MINIMUM WATER METER SIZE ⁷	SPRINKLERS REQUIRED IN AREAS SUBJECT TO FREEZING.
< 3,600 sq.ft.	Standard NFPA 13D ²	No	1"	¾"	No
≥ 3,600 sq.ft. and < 10,000 sq.ft.	Enhanced NFPA 13D ^{1,2}	No	1"	¾"	No
≥ 10,000 sq.ft. and < 15,000 sq.ft.	Enhanced NFPA 13R ¹	See NFPA 13R for design requirements (section 6.8.5)			
≥15,000 sq.ft.	Modified NFPA 13 ¹	See NFPA 13 for design requirements (section 21.37)			

N/A = Not Applicable

1. This mitigation constitutes a building "protected with an approved fire sprinkler system" per the IFC.
2. Domestic demand of 5 gpm is required to be added to the sprinkler demand in the hydraulic calculations.
3. Free-standing detached buildings with one or more sleeping rooms shall be protected by a minimum Enhanced NFPA 13D system.
4. Excluding Group Care Homes.
5. U.G. lead-in shall be the minimum size required hydraulically as proven by the sprinkler contractor and shall be hydrostatically tested and flushed, witnessed by the fire dept.
6. Building area is defined as all areas under roof except for porches, patios, balconies, carports and porte cocheres.
7. Water meters used for residential sprinkler systems shall be residential fire service meters or other meters approved by the water purveyor.

8.7.2.1 Where required. When Table 8.7 requires an Enhanced 13D design, sprinklers shall be installed throughout the structure except where omissions are permitted by sections 8.6.6 and 8.6.7, and the following:

1. Unheated attic spaces.
2. Floor/ceiling spaces.
3. Concealed combustible spaces with no access for storage or living purposes.
4. Exterior overhangs, porches, and carports

8.7.3 Other Protection Designs. For other protection designs listed in Table 8.7, see the respective revised codes for NFPA 13 and NFPA 13R minimum design requirements.