

# RESIDENTIAL FIRE SPRINKLER SYSTEMS

## FREQUENTLY ASKED QUESTIONS

Licensing, Certification and Installation – Based on the 2012 International Residential Code and 2015 Minnesota Residential Code

### Code Requirements

Minnesota Rule chapter 1309.0313, Section R313, Automatic Fire Sprinkler Systems

IRC section R313 is amended to read as follows:

**R313.1 Townhouse automatic fire sprinkler systems.** An automatic residential fire sprinkler system shall be installed in townhouses.

**Exception:** An automatic residential fire sprinkler system shall not be required when additions or alterations are made to existing townhouses that do not have an automatic residential fire sprinkler system installed.

**R313.1.1 Design and installation.** Automatic residential fire sprinkler systems for townhouses shall be designed and installed in accordance with IRC section P2904 or NFPA 13D.

**R313.2 One-and-two-family dwellings automatic fire systems.** An automatic residential fire sprinkler system shall be installed in one- and two-family dwellings.

#### Exceptions:

1. Detached one-family dwelling, less than 4500 square feet of floor area. Floor area shall include all floors and basements, excluding garages.
2. An automatic residential fire sprinkler system shall not be required if additions, alterations, or repairs are made to existing buildings that do not have an automatic residential sprinkler system installed.

**R313.2.1 Design and installation.** Automatic residential fire sprinkler systems shall be designed and installed in accordance with IRC section P2904 or NFPA 13D

**R313.3 Installation requirements.** When an automatic sprinkler system is required in two-family dwellings, it shall be installed in accordance with IRC section P2904 or NFPA 13D

Automatic sprinkler systems required in two-family dwellings and townhouse buildings shall be installed in accordance with the following:

1. Attached garages are required to have one dry head sprinkler located within 5 lineal feet of each door installed in the common wall separating the dwelling unit and the attached garage;
2. Attached covered patios, covered decks, covered porches, and similar structures are required to have automatic sprinklers with a minimum of one dry head for every 20 lineal feet (6.096 m) of common wall between the dwelling unit and the covered patio, covered deck, covered porch, or similar structure.

**Exception:**

Attached roofs of covered patios, covered decks, covered porches, or similar structures that do not exceed 40 square feet (3,716 m<sup>2</sup>) of floor area.

**R313.4 State licensed facilities.** One-and two-family dwellings and townhouse buildings containing facilities required to be licensed or registered by the state of Minnesota shall be provided with an automatic sprinkler system required by the applicable licensing provisions of that agency or according to this part, whichever is more restrictive.

**Definitions**

**Fire protection system.** "Fire protection system" means a sprinkler, standpipe, hose system, or other special hazard system for fire protection purposes only, that is composed of an integrated system of underground and overhead piping connected to a water source. "Fire protection system" does not include the water service piping to a city water main, or piping used for potable water purposes, or piping used for heating or cooling purposes. Openings from potable water piping for fire protection systems must be made by persons properly licensed under section 326B.46. Persons properly licensed under section 326B.46 may also sell, design, install, modify or inspect a standpipe, hose system only. [MS § 299M.01Subd. 7]

**Fire protection contractor.** "Fire protection contractor" means a person who contracts to sell, design, install, modify, alter, or inspect a fire protection system or its parts or related equipment. [MS § 299M.01Subd. 8]

**Journeyman sprinkler fitter.** "Journeyman sprinkler fitter" means a person who is certified as competent to engage in installing, connecting, altering, repairing, or adding to a fire protection system for and under the supervision of a fire protection contractor. [MS § 299M.01Subd. 8]

**Multipurpose potable water piping system contractor.** "Multipurpose potable water piping system contractor" means a person who contracts to sell, design, install, modify, or inspect a multipurpose potable water piping system, its parts, or related equipment. [MS § 299M.01Subd. 8a]

**Multipurpose potable water piping system.** "Multipurpose potable water piping system" means a potable water piping system that is intended to serve both domestic and fire protection needs throughout a one- or two-family dwelling unit. No person may install a multipurpose potable water piping system unless that person is licensed pursuant to section 326B.46 and is certified pursuant to section 299M.03. [MS § 299M.01Subd. 8b]

**Multipurpose potable water piping system.** A multipurpose fire sprinkler system shall provide domestic water to both fire sprinklers and plumbing fixtures. [IRC Section P2904.1 text]

**Multipurpose potable water piping system installer.** "Multipurpose potable water piping system installer" means a person who is certified as competent to engage in installing, connecting, altering, repairing, or adding to a residential multipurpose potable water piping system in a one- or two-family dwelling unit. [MS § 299M.01Subd. 8c]

**Stand-alone sprinkler system.** A stand-alone sprinkler system shall be separate and independent from the water distribution system. [IRC Section P2904.1 text]

## FREQUENTLY ASKED QUESTIONS

### Licensing and Certification

**Question:** Is there a license required to install a residential fire sprinkler system?

**Answer:** In most cases yes. A person may not sell, design, install, modify, or inspect a fire protection system, its parts, or related equipment, or offer to do so, unless annually licensed to perform these duties. A multipurpose potable water piping system requires a multipurpose potable water piping system contractor – this person must also be a plumbing contractor. A stand-alone sprinkler system requires a fire sprinkler contractor.

No license is required for the following [MS § 299M.03Subd. 1]:

- Stand-alone systems installed by a person licensed as a professional engineer under section 326.03 who is competent in fire protection system design
- Stand-alone systems installed by a person licensed as an alarm and communication contractor under section 326B.34 for performing activities authorized by that license.
- Stand-alone systems installed by the owner of an occupied one- and two-family dwelling
- Multipurpose systems installed by the owner-occupant of a one- and two-family dwelling

**Question:** What license or certificate is required for residential fire sprinkler system installations? Who can provide information regarding the necessary license or certification?

**Answer:** The State Fire Marshal Division administers and issues the following licenses and certificates for residential fire sprinkler installations:

- Multipurpose potable water piping system contractor license
- Multipurpose potable water piping system installer certificate
- Journeyman sprinkler fitter certificate
- Fire protection contractor license

Contact the State Fire Marshal Division to obtain the necessary license or certificate. [MS § 299M.03Subd. 1, Minnesota Rule, chapter 7512.0400]

**Question:** Can a licensed or certified residential fire sprinkler system contractor, journeyman, or installer connect a multipurpose potable water piping sprinkler system to the potable water piping system of the dwelling?

**Answer:** No. Unless that person is properly licensed as a multipurpose potable water piping system contractor. The sprinkler contractor can install the fire sprinkler system after the water connection is made by a plumbing contractor.

[MS § 299M.01Subd. 7, MS § 326B.46 Subd. 1(a)]

**Question:** Can a plumbing contractor install a multipurpose potable water piping system?

**Answer:** The plumbing contractor must also be licensed as a multipurpose potable water piping system contractor in accordance with section 326B.46 and is certified pursuant to section 299M.03. Contact the State Fire Marshal for additional information.

**Question:** Who can install piping material proposed for a combination system that supplies both potable water and fire suppression?

**Answer:** If the piping is supplying both fire protection systems and domestic plumbing fixtures (from the same piping/tubing), this is called a multipurpose potable water piping system and can only be installed by a licensed plumbing contractor who is also certified by the system manufacturer.

**Question:** Who can install a stand-alone residential fire protection system?

**Answer:** A Stand-alone fire protection system with no domestic plumbing must be installed by a licensed fire protection contractor.

**Question:** Can a homeowner install a fire sprinkler system in their home?

**Answer:** Yes. The owner of an occupied one-or-two family dwelling can install a fire sprinkler system and connect the system to the potable water piping system. The dwelling shall be owned and physically occupied by the worker installing the fire sprinkler system. Minnesota Statutes 299M.03 and 326b.46, subd. 1 allows the owner to perform this work without a license or licensed installer. Any work in one-or-two family dwellings under R313.4 State licensed facilities must be performed by a licensed contractor.

The owner is required to obtain the necessary permits, inspections, and install the fire sprinkler system in accordance with IRC Section P2904 or NFPA 13D and Minnesota Plumbing Code, Chapter 4715.

## Design and Installation

**Question:** Is there a difference between NFPA 13D and 2012 IRC Section P2904 sprinkler requirements?

**Answer:** 2012 IRC Section P2904 applies only to wet-pipe sprinkler systems where the requirements of NFPA 13D apply to various system types (i.e. wet, dry, preaction, etc.).

The base requirements are very similar – the 2012 IRC Section P2904 is considered an equivalent to NFPA 13D; however, NFPA 13D has additional guidance/requirements regarding calculation methods, obstruction rules, sprinkler locations, etc.

**Question:** What type of residential fire sprinkler system is required?

**Answer:** Either a stand-alone or multipurpose system is required to be designed and installed in accordance with either the 2012 IRC Section P2904 or NFPA 13D [2010 edition]. Systems provided in townhomes are dependent on the water supply configuration. If each townhome unit is properly separated and has its own water supply, either a multipurpose potable water piping fire protection system or stand-alone sprinkler system can be installed. If a common water supply feeds the entire townhome complex, a stand-alone fire protection system installed by a licensed fire protection contractor would be required.

**Question:** Does the multipurpose potable water sprinkler piping system need to be listed to NSF Standard 61?

**Answer:** Yes, since this is part of the potable water supply, all products and materials including sprinkler heads used in this system must be approved for potable water use and be listed to NSF Standard 61, in accordance with the Minnesota Plumbing Code, Chapter 4715. Compliance to NSF 61 must meet the requirements of the Federal Reduction in Lead Drinking Water Act.

**Question:** Since multipurpose potable water piping systems use domestic water to serve both fire sprinklers and plumbing fixtures, what regulations are used to design and install these systems?

**Answer:** The design and installation of the system must meet both:

1. The Minnesota Plumbing Code, AND,
2. The 2012 IRC, section P2904; or NFPA 13D.

**Question:** In many cities, water services for one-and-two family dwellings and townhouse dwellings are typically 1-inch. Will the city need to plan future utilities for 1 ¼- inch or larger water service to accommodate residential fire sprinkler systems?

**Answer:** Probably not. Most stand-alone residential fire sprinkler systems can be properly designed and installed with a 1-inch water service. The code requires a maximum of two sprinkler heads calculated with a 13 gpm minimum for the majority of residential heads, and would require a minimum of a 1" water service based on the tables in the IRC. However, the fire sprinkler system designer needs to design each specific building accordingly based on available water service size and water pressure available. A 1-inch water supply is usually adequate.

**Question:** If a fire sprinkler system is not required by the code. Do all of the provisions of IRC Section P2904 or NFPA 13D need to be followed?

**Answer:** Yes. A fire sprinkler system or partial fire sprinkler system is required to comply with the 2012 IRC Section P2904 or NFPA 13D regarding design and installation requirements. The fire sprinkler system installation must also comply with the requirements of the Minnesota Plumbing Code, Chapter 4715.

**Question:** Is it required to have a dedicated fire protection well if there is not an adequate water supply from the city main?

**Answer:** No. A stored water supply or well (or combination of the two) can be utilized to supply the sprinkler system provided the required pressure and capacity of the sprinkler system demand is met.

**Question:** For a combined domestic and fire protection water supply, is the domestic demand required to be added to the fire protection demand?

**Answer:** NFPA 13D only requires an additional 5gpm be added to the fire sprinkler demand IF the system is serving more than one dwelling unit. See additional information from the State Fire Marshal Policy FP-02 regarding Water Supplies.

[https://dps.mn.gov/divisions/sfm/document-library/Documents/Fire%20Protection%20Program%20Policies/FP02\(2007\)-FPwater%20supplies.pdf](https://dps.mn.gov/divisions/sfm/document-library/Documents/Fire%20Protection%20Program%20Policies/FP02(2007)-FPwater%20supplies.pdf)

**Question:** Is the fire sprinkler design affected by the installation of a water softener or water filtration system?

**Answer:** Yes. NFPA 13D [2010 edition] Section 6.5.4 and the 2012 IRC Section P2904.6.2.2 require one of the following when water treatment/filtration systems are installed:

- Flow restriction/pressure loss through the equipment shall be included in the hydraulic calculations
- An automatic bypass shall be installed that directs all water to the sprinkler system

**Question:** In a well system water supply, is it required to have a pump listed for fire protection to serve the fire sprinkler system?

**Answer:** No. NFPA 13D does not require pumps supplying the sprinkler system to be listed as fire pumps - it only requires that the pump be automatic. Wiring is required to conform to NFPA 70 *National Electrical Code*. See additional information from the State Fire Marshal's Policy FP-10 the Use of Wells as a Water Supply for Fire Protection Systems.

[https://dps.mn.gov/divisions/sfm/document-library/Documents/Fire%20Protection%20Program%20Policies/FP-10%20\(2014\)%20Wells%20for%20Water%20Supplies.pdf](https://dps.mn.gov/divisions/sfm/document-library/Documents/Fire%20Protection%20Program%20Policies/FP-10%20(2014)%20Wells%20for%20Water%20Supplies.pdf)

**Question:** Is a back-up/emergency power source required for a pump supplying the fire sprinkler system?

**Answer:** No. There are no requirements in 13D regarding back-up/emergency power.

**Question:** Are backflow preventers required for an installation of an automatic residential fire sprinkler system?

**Answer:**

- For a multi-purpose potable water piping system, an additional backflow preventer is not required. However, compliance with backflow preventers required at the point of use in of a plumbing fixture or equipment must be in accordance with the Minnesota Plumbing Code.
- For a stand-alone sprinkler system, backflow-prevention consisting of at least a single check valve isolating the fire sprinkler system from the potable water system is required by the Minnesota Plumbing Code. Additional backflow is required if any chemical is added to the sprinkler system.

**Question:** Are devices such as tanks, expansion tanks, pumps, hangers, waterflow devices, and waterflow valves required to be listed?

**Answer:** No. NFPA 13D [2010 edition] Section 5.1.3 addresses devices/materials utilized for sprinkler systems that are not required to be listed.

**Question:** Are spare sprinkler heads required as in NFPA13 systems?

**Answer:** No. Although NFPA 13D and 2012 IRC Section P2904 do not have a requirement to provide spare sprinklers, it is good practice to keep spare sprinkler/escutcheon plates. Any required modifications to the sprinkler system should be made by the appropriate installer as allowed per Minnesota Statutes 299M.03.

**Question:** Are pressure gauges required for one-family, two-family, and townhouse buildings?

**Answer:** There are no requirements listed in 2012 IRC Section P2904 for pressure gauges. NFPA 13D [2010 edition] Section 7.3 requires pressure gauges for the following situations:

- A dry system
- When the water supply is provided by a pressure tank

**Question:** Can the sprinkler heads be installed in the piping prior to cementing the piping fittings?

**Answer:** No. NFPA 13D [2010 edition] Section 7.5.8 and 2012 IRC Section P2904.2.5 requires fittings to be cemented in place prior to the sprinkler head installation.



**Question:** Does a residential fire sprinkler system require a waterflow alarm?

**Answer:** NFPA 13D [2010 edition] Section 7.6 requires waterflow alarms only if the home is not equipped with smoke alarms/detectors in accordance with NFPA 72. The 2012 IRC, Section R314 requires smoke alarms compliant with NFPA 72.

**Question:** Are there minimum pipe sizes for installing sprinkler piping?

**Answer:** Yes. NFPA 13D [2010 edition] requires a minimum pipe size of 1" for steel pipe and a minimum pipe size of ¾" for other than steel pipe. The 2012 IRC Section P2904 requires a minimum pipe size of ¾" regardless of pipe type.

**Question:** Is exposed piping allowed in unfinished rooms such as a basement or storage rooms?

**Answer:** Exposed piping is allowed. Each pipe manufacturer has installation instructions that should be followed and requirements should be determined on a case-by-case basis.

**Question:** Should sprinkler heads in an unfinished basement area be installed upward since it is unfinished or downward assuming the basement will be finished?

**Answer:** Sprinkler heads in an unfinished space can be installed in either the pendent (downward) or upright position as long as the deflector distance requirements of NFPA 13D [2010 edition] Section 8.2 and the manufacturer's listing requirements are met. In unfinished areas where changes to the sprinkler head location are likely, residential sprinkler piping shall be sized and positioned to accommodate future modifications.

**Question:** In building a home with a vaulted or cathedral ceiling, are sprinkler heads in the attic or rafter framing required? Is freezing of the fire sprinkler system a concern?

**Answer:** Potentially. Sprinklers can be pendent (downward), upright or sidewall style and depending upon the room configuration, piping can run vertically in walls, above ceilings, etc. If possible, routing sprinkler piping through unheated spaces should be avoided. If the sprinkler locations require piping to run through an attic or unheated space, the piping needs to be maintained at or above 40 degrees for a wet system to prevent freezing. If this temperature cannot be maintained, then a dry sprinkler system may be required.

**Question:** If it is necessary to install fire sprinklers in an unheated area, is a dry sprinkler system required?

**Answer:** Not necessarily. Dry-type pendent and sidewall sprinklers are allowed in unheated areas not intended for living purposes. Dry-type sprinklers connect to the wet system in the heated area and then extend through the wall/ceiling to protect the unheated space. As long as spacing requirements are satisfied, this method of protection would not require a dry sprinkler system. In larger, unheated areas that contain exposed piping and sprinklers, a dry sprinkler system may be necessary.



**Question:** Are fire department connections, hydrostatic tests, monitoring, or notification required with NFPA 13D systems?

**Answer:** NFPA 13D [2010 edition] does not require a fire department connection. Hydrostatic testing is required in accordance with NFPA 13D Section 4.2; and the Minnesota Plumbing Code. Monitoring and notification shall be in accordance with NFPA 72 *National Fire Alarm and Signaling Code* and NFPA 13D Section 7.6.

**Question:** Is there maintenance and/or yearly inspections required?

**Answer:** There are no mandatory annual inspections or maintenance required per NFPA 13D.

**Question:** Who can inspect a standalone residential fire sprinkler systems installation?

**Answer:** The person conducting the inspections must be knowledgeable about the installation requirements of IRC Section P2904 and NFPA 13D. Except for state licensed facilities, these inspections would be performed by the Municipal Building Official/Inspector or Fire Marshal/Inspector.

**Question:** Who can inspect a multipurpose potable water piping system (i.e. Plumbing inspector, local building inspector, State Fire Marshal inspectors, or the local fire marshal)?

**Answer:** As the system is both plumbing and fire protection, inspector(s) representing both disciplines need to inspect according to their respective code requirements.