

# Plastic Pipe Residential Fire Sprinkler Systems



Depending upon the particular product listing, plastic pipe can be utilized in NFPA 13, 13R, or 13D fire sprinkler system installations. The purpose of residential sprinkler systems installed under the requirements of each standard can vary, but generally is to aid in detection and control of residential fires and thus, provide improved protection against injury and loss of life. While these systems may help minimize property damage, their primary function is to improve the chance of occupants to escape unharmed or be evacuated.

Listed plastic fire sprinkler system components are available from several manufacturers and are designed to be installed in certain residential, light hazard, or both applications. Fire sprinkler systems are listed by independent, OSHA accredited, third-party agencies acceptable to the Authority Having Jurisdiction (AHJ) for use in wet pipe fire sprinkler systems. They should be installed by trained and experienced contractors, in accordance with the product's listings, and all applicable codes. Listed plastic fire sprinkler systems offer an economical installation method that provides a reasonable degree of protection of life and property from the ravages of fire.

## Installation Standards

Applicable installation standards are updated approximately every three years. Check to be sure that you are using the latest edition adopted in your particular jurisdiction.

**NFPA 13D:** “*Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*”, allows for stand-alone, passive purge, or multipurpose systems. In some cases garages, bathrooms, attics, crawl spaces, and small closets are not required to have sprinklers, as long as they meeting the omission requirements of the standard. Systems are typically sized for two most remote sprinklers activating and meeting the hydraulic demand calculations specific in the standard. Listed pipe is installed per NFPA 13D, applicable plumbing code requirements (multipurpose systems), and the product manufacturer's installation instructions. When omission is allowed by standard, some system components (i.e., accessories such as hangers) are not required to be listed. Pipe and fittings must comply with plumbing codes to be integrated in multipurpose systems. Sprinkler systems installed in accordance with NFPA 13D are pressure-tested at normal system operating pressures.

**NFPA 13R:** “*Standard for the Installation of Sprinkler Systems in Low Rise Residential Occupancies*”, allows only stand-alone systems. Garages must be sprinklered, however, as in NFPA 13D, certain bathrooms, attics, and small closets are not required to be sprinklered as long as they meet the omission requirements as specified in the standard. Generally hydraulic sizing is done to allow for the four most remote sprinklers activating plus domestic water flow as described in the standard. NFPA 13R also requires all components, to be listed, including hangers. NFPA 13R applications include apartments, condos, and similar residential occupancies up to four stories in height. A fire department connection is required; therefore, all

system materials must be rated at a minimum of 175 psi. NFPA 13R systems are typically required to be pressure tested in accordance with NFPA 13, although some small systems may be tested at 50 psi higher than the maximum system pressure.

**NFPA 13:** “*Standard for the Installation of Sprinkler Systems*,” is used for residential occupancies greater than four stories in height, which exceeds the overall building height and square footage limitations defined in the International Plumbing Code. This standard is more demanding than 13R or 13D. Some listed CPVC systems can be used in light hazard occupancies. CPVC can be used in certain combustible concealed spaces with special listed sprinklers and piping components per NFPA 13 applications, but check with the manufacturer and product listings to confirm.

## System Types

**Stand-Alone Systems** – A sprinkler system where the aboveground piping serves only fire sprinklers.

**Multipurpose Systems** – A piping system unique to NFPA 13D installations where a single water source supplies both the fire sprinklers and the cold water to the plumbing fixtures for domestic water needs. As a result, one piping system is eliminated, reducing material and labor costs. The three common types of multipurpose sprinkler layouts for residential applications are gridded, loop, or tree.

**Passive Purge Systems** – A type of sprinkler system that serves a single toilet in addition to the fire sprinklers to ensure a minimum level of water circulation within the system to prevent stagnant water.

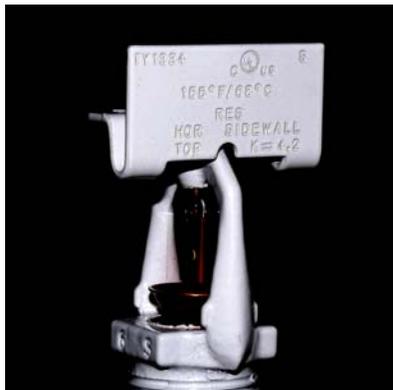


*Residential sprinklers have higher spray patterns than commercial sprinklers to wet the walls.*

Usually, the fire sprinkler piping is run overhead, supplying the sprinklers located in the ceiling. For multipurpose and passive purge systems, the cold water plumbing fixtures are then fed from the sprinkler piping.

Both NFPA 13D and 13R fire sprinkler systems are designed primarily for life safety while NFPA 13 also provides for property protection. The main goal for life safety is to allow occupants to safely evacuate the structure and save lives.

Typically plastic fire sprinkler systems are protected by a minimum of 3/8" gypsum wallboard, certain suspended ceilings, or 1/2" plywood. Some plastic piping may be installed unprotected in unfinished basements depending on specific product listings and limitations. For additional information consult the manufacturers' installation guide and product listings.



*Residential Sidewall Sprinkler – Note “RES” marking and other data marked on unit*

## Frequently Asked Questions

### What is the average cost?

This depends on a number of factors, but a thermoplastic sprinkler system usually falls between \$1.00 to \$2.50 per square foot – or about 1% to 1.5% of the total construction cost of a home, depending on the local market.

### Won't plastic pipes melt in a fire?

No, the sprinklers are designed to rapidly activate when ceiling or sidewall temperatures indicate a fire is occurring. This happens long before excessive temperatures are reached where the piping is typically installed (i.e., behind the drywall of the ceiling or wall – an effective fire barrier). Based on extensive fire exposure tests, some plastic piping systems are listed for use exposed or without protection.

### Don't all the sprinklers activate at once?

No, that only happens in the movies! Each individual sprinkler must reach a predetermined temperature to activate, and typically only one or two sprinklers are used to control or extinguish a fire in a residential building.

### Aren't sprinklers ugly or distracting?

Residential sprinklers are typically recessed in the ceiling or wall and are usually less obtrusive than lighting fixtures. The most commonly used sprinklers are concealed by a flat cover plate and can be custom matched to ceiling colors. Custom colored cover plates are required to be supplied by the sprinkler manufacturer. The cover is held in place by a heat activated metallic fuse, exposing the sprinkler when activated.

### Can I install the fire sprinkler system myself?

This is not recommended. Life safety systems must be installed in compliance with codes and standards so that the design is correct and an adequate water supply to the sprinklers is available. Properly trained and qualified contractors should install fire sprinklers.

### Can any plastic pipe be used to install a fire sprinkler system?

No. Only listed products that have been tested and certified to perform in the event of a fire are used for fire sprinkler systems.

### What else is important to know?

Always check the chemical compatibility of antifreezes, thread sealants, firestops, and other construction products used with the system manufacturer. Incompatible materials may damage the systems and void any warranty.

### Who manufactures plastic fire sprinkler pipe and fittings?

Follow the PPFA link below to contact our member companies for more information on these systems.

[www.ppfahome.org/firesprinkler/index.html](http://www.ppfahome.org/firesprinkler/index.html)