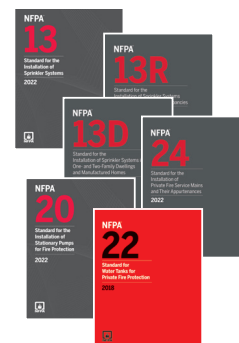


RESIDENTIAL SPRINKLER DESIGN COMPARISON

This chart outlines the major differences between the 2022 editions of NFPA 13R, NFPA 13D, and NFPA 13 when designing sprinkler protection for residential occupancies. The respective standard should be consulted for additional detail.

The following NFPA® documents are referenced in the chart:

- NFPA 13, *Standard for the Installation of Sprinkler Systems* (2022)
- NFPA 13R, *Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies* (2022)
- NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes* (2022)
- NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection* (2022)
- NFPA 22, *Standard for Water Tanks for Private Fire Protection* (2018)
- NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances* (2022)



System Feature	NFPA 13	NFPA 13R	NFPA 13D
Purpose	Property protection and life safety	Life safety and lesser degree of property protection than NFPA 13	Life safety
Building/Occupancy Limitation	No limitation	Residential occupancies in buildings up to and including four stories in height not exceeding 60 ft (18 m) in height	One- and two-family dwellings, manufactured homes, and town-houses
Water Supply	• 30-minute duration • Pumps per NFPA 20 • Tanks per NFPA 22	• 30-minute duration • Pumps per NFPA 20 • Tanks per NFPA 22	• 10-minute duration OR 7 minutes for a 1-story under 2,000 ft² (185 m²) • Pumps not required to conform to NFPA 20 • Tanks not required to conform to NFPA 22
Components – Listing	Listing required for all except: hanger rods and pipes identified in standard	Listing required for all except: hanger rods and pipes identified in standard	Listing required for all except: water supply pipe and fittings, tanks, expansion tanks, pumps, valves, gauges, waterflow devices, hangers, water meters, and back-flow prevention devices
Pipe and Fittings	Minimum working pressure: • 175 psi (12.1 bar) aboveground • 150 psi (10 bar) underground	Minimum working pressure: • 175 psi (12.1 bar) aboveground • 150 psi (10 bar) underground	Minimum working pressure: • 130 psi (9 bar) • Allows the use of multipurpose fire sprinkler and domestic systems • Permits the use of pipe as small as ½ in. (15mm) in network systems
Underground Piping	In accordance with NFPA 24	• Less than 4 in. (100 mm) conform to local plumbing codes • 4 in. (100 mm) or greater per NFPA 24	Conform to local plumbing codes



RESIDENTIAL SPRINKLER DESIGN COMPARISON *Continued*

System Feature	NFPA 13	NFPA 13R	NFPA 13D
Sprinkler Type	- Residential sprinklers in dwelling unit - Quick-response in light hazard occupancies	- Residential - Quick-response if up to four in dwelling unit	Residential
Fire Department Connection	- Minimum of two 2-1/2 in. (65 mm) connections - Not required for single-story buildings not exceeding 2000 ft² (185 m²)	- Minimum of 1 1/2 in. (40 mm) connection; - Not required for single-story buildings not exceeding 2000 ft² (185 m²)	None required
Waterflow Alarms	Local waterflow required for systems greater than 20 sprinklers. (Supervision may be required by other codes or standards.)	- Local waterflow required on all systems - Connected to building fire alarm system if one is installed	Not required if smoke alarms or detectors are installed throughout dwelling
Design – Sprinklers	Four adjacent sprinklers with greatest demand (residential design approach)	Number of sprinklers within a compartment up to a maximum of four	Number of sprinklers within a compartment up to a maximum of two
Design – Discharge	0.1 gpm/ft ² (4.1 mm/min) or listing of sprinkler, whichever is greater	0.05 gpm/ft ² (2.0 mm/min) or listing of sprinkler, whichever is greater	0.05 gpm/ft ² (2.0 mm/min) or listing of sprinkler, whichever is greater
Sprinkler Omissions	- Bathrooms less than 55 ft² (5.1 m²) with thermal barrier - Closets less than 24 ft² (2.2 m²) in hotels and motels	- Bathrooms less than 55 ft² (5.1 m²) - Closets less than 24 ft² (2.2 m²) without equipment - Exterior closets - Open porches, carports, stairs, and corridors not in means of egress - Attics, crawl spaces, and other concealed spaces not intended for occupancy, storage, or spaces containing fuel-fired equipment	- Bathrooms less than 55 ft² (5.1 m²) - Closets less than 24 ft² (2.2 m²) without equipment - Exterior closet - Garages, porches, and carports - Attics, crawl spaces, and other concealed spaces. (Fuel-fired equipment below a dwelling unit requires protection.) - Unheated enclosures at entrance or exit with another exit
Sprinklers for Dwelling Unit Balconies	Yes	Required for Type V construction	None
Demand Calculations	Use NFPA 13 hydraulic calculations	Use NFPA 13 hydraulic calculations	Pipe sized using simplified NFPA 13D methods or NFPA 13 hydraulic calculations

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