LEAVENWORTH FIRE DEPARTMENT

Home and Building Fire Sprinkler Systems

What You Need to Know About NFPA 13, NFPA 13R, and NFPA 13D

This guide is based on the 2018 International Fire Code (IFC) and the applicable National Fire Protection Association standards for water-based fire protection systems, including NFPA 13, NFPA 13R, and NFPA 13D. It is intended as a general information resource and does not replace the specific requirements found in these adopted codes and standards or guidance from the local Authority Having Jurisdiction (AHJ).

Fire sprinkler systems save lives and protect property. If you're building, buying, or renovating a home or commercial building, you may hear about different types of sprinkler systems. This guide explains the three main types in plain language.

Three Types of Sprinkler Systems

What It Means	NFPA 13 (Commercial)	NFPA 13R (Multi-Family)	NFPA 13D (Single-Family)
Main Purpose	Protect lives AND save the building from major fire damage	Protect lives by giving people time to escape safely	Protect lives in one- and two-family homes
Where It's Used	Offices, stores, warehouses, factories, tall apartment buildings, hotels	Low-rise apartment buildings and condos (typically 4 stories or less)	Single-family homes, duplexes, townhouses, manufactured homes
Sprinkler Coverage	Sprinklers in almost every room and space, including attics and storage areas	Sprinklers in living spaces; some small closets, bathrooms, and attics may not need sprinklers	Sprinklers in main living areas; garages, attics, and small spaces often do not need sprinklers
Water Supply	Larger water supply needed; may require a fire pump	Smaller water supply is acceptable; usually no fire pump needed	Can use municipal water supply; typically no fire pump needed
System Cost	Most expensive (more sprinklers, bigger pipes, stronger water supply)	Moderate cost (fewer sprinklers, smaller pipes)	Least expensive (minimal coverage, smaller pipes, simpler design)
Pipe Types	Steel or copper pipes; some approved plastic pipe (CPVC); PEX plastic tubing is NOT allowed	Steel, copper, or approved plastic pipes (CPVC); PEX plastic tubing is allowed in apartments	Copper, CPVC, or PEX plastic tubing where approved for home use

Which System Does My Building Need?

You Need NFPA 13 (Commercial System) If:

- Your building is a business, store, warehouse, or factory
- Your apartment or condo building is more than 4 stories tall
- Your building has mixed uses (like apartments over retail stores) without proper fire-rated walls between them

- Your building design uses special code allowances for taller or larger buildings by having sprinklers throughout

You May Use NFPA 13R (Multi-Family Residential System) If:

- Your building is an apartment or condo building with 4 stories or less
- The building is designed following basic height and size rules (not using special allowances)
- If the building has mixed uses (apartments and retail), there must be proper fire-rated walls separating them

You May Use NFPA 13D (Single-Family Home System) If:

- Sprinkler systems in a single-family home, duplex, townhouse, or manufactured home are **NOT** required, only recommended
- The home does not exceed height limits set by local building codes (typically not more than 2 stories)
- If you choose to install residential fire sprinklers for added safety
- You're building or significantly renovating your home

What About Buildings with Apartments AND Businesses?

Many modern buildings combine apartments with retail stores, offices, or parking garages. Here's what that means for sprinklers:

- **If spaces are mixed together** (no fire-rated walls between apartments and businesses): The entire building needs an NFPA 13 commercial system
- **If spaces are properly separated** (fire-rated walls and floors between apartments and businesses): The apartment portion may use an NFPA 13R residential system, and the business portion uses an NFPA 13 commercial system
- **Podium buildings** (apartments built on top of a concrete parking garage): The parking garage needs NFPA 13; the apartments above may use NFPA 13R if they meet the requirements

Historic Downtown Buildings with New Upstairs Apartments

Leavenworth’s historic downtown areas have older two- and three-story buildings with shops or offices on the street level and empty upper floors. Property owners often want to turn those upper floors into apartments. When that happens, fire sprinkler rules usually change.

What Changes When You Add Apartments Upstairs?

- Adding apartments creates a **residential occupancy (Group R)** above a **business or mercantile occupancy**, which often triggers sprinkler requirements for the whole building.
- Older downtown buildings were usually built **before modern fire and life safety codes**, so converting upper floors to apartments often requires sprinkler upgrades, fire-rated separations, and improved exits.
- In many cases, once apartments are added, the building will need **a full NFPA 13 sprinkler system** in at least the ground-floor business area, and sometimes throughout the building, depending on how spaces are separated and connected.
- In some situations, if the apartments are properly separated from the business space with fire-rated floors and walls, the residential portion may be allowed to use an **NFPA 13R residential system**. Your local code official and Fire Marshal will decide what applies.

Common Issues in Historic Downtown Conversions

- **Single old stairways** or narrow stairs that do not meet modern exit requirements.
- **Combustible construction** (wood framing, old finishes) and concealed spaces that make fire spread easier without sprinklers.
- **Shared utilities and open shafts** (like old dumbwaiters or chases) that connect floors and occupancies.
- Lack of **fire-rated separation** between ground-floor businesses and new upstairs apartments.

What Property Owners Should Do

- Talk with the **local building department and fire department early** in the planning process—before design work is finalized.
- Hire a **design professional** (architect/engineer) familiar with mixed-use and historic building codes.
- Expect that **sprinklers, alarms, and fire-rated construction** may be required as part of making upstairs apartments legal and safe.
- Understand that these upgrades **protect both the business and the residents** and can help preserve historic buildings by stopping small fires from becoming total losses.

What About the Pipes?

Different sprinkler systems can use different types of pipes:

Pipe Type	NFPA 13 (Commercial)	NFPA 13R (Multi-Family)	NFPA 13D (Single-Family)
Steel (Black or Galvanized)	Yes, commonly used	Yes, allowed	Yes, allowed
Copper	Yes, heavy-duty (Type K or L)	Yes, standard type (Type M) okay	Yes, Type M okay
CPVC (Plastic)	Yes, with restrictions	Yes, where approved	Yes, where approved
PEX (Flexible Plastic)	NO - not allowed	Yes, where approved for residential	Yes, commonly used in homes

Important: All pipes and fittings must be approved and listed for fire sprinkler use. Regular plumbing pipe is not the same as fire sprinkler pipe.

Why This Matters to You

If You're Building or Renovating:

- Your architect or builder will determine which system your building needs based on building codes
- NFPA 13 systems cost more but provide the highest level of protection for commercial buildings
- NFPA 13R systems are more affordable for qualifying apartment buildings
- NFPA 13D systems are the most affordable option for single-family homes
- The system type affects your building design, construction costs, and insurance rates

If You're Buying or Renting:

- All three system types are designed to save lives in a fire
- NFPA 13 systems offer the most complete protection and may reduce property damage
- NFPA 13R systems provide excellent life safety protection for apartment residents
- NFPA 13D systems give homeowners critical extra time to escape a house fire
- Ask your landlord, building manager, or home inspector what type of system protects your property

Common Questions

Q: Do sprinklers go off when they detect smoke?
A: No. Each sprinkler head activates individually when it detects high heat directly at that location. Only the sprinkler nearest the fire activates—not all sprinklers in the building.

Q: Will a sprinkler system ruin my belongings with water damage?
A: Sprinklers use much less water than fire hoses and activate quickly, typically causing far less damage than letting a fire grow. Fire damage is almost always worse than water damage from sprinklers.

Q: Are sprinkler systems reliable?
A: Yes. Modern sprinkler systems are highly reliable when properly installed and maintained. They activate successfully in over 90% of fires large enough to trigger them.

Q: Who maintains the sprinkler system?
A: Building owners are responsible for regular inspections and maintenance by licensed professionals. Residents should never paint, hang items from, or tamper with sprinkler heads.

Q: What if I see a leak or problem?
A: Report any leaks, damaged sprinkler heads, or system problems to your landlord or building manager immediately.

Want to Learn More?

Contact The Leavenworth Fire Department for information about fire sprinkler systems and fire safety in your community.

This guide is for general information only. Consult with licensed architects, engineers, and contractors for your specific project.