#242 – UL Listed and FM Approvals: Which Listings Matter for Fire Protection Under NFPA 13?

This information was printed from Quick Response Fire Supply at QRFS.com and provides good overview and explanation of listings and approvals. It is provided as supplemental study material. Candidates should review this information for exams.

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Listings are required for essential system components, but acceptance of specific approvals—UL Listed, FM Approved, or otherwise—is determined by local code officials

"UL Listed" and "FM Approval"—along with their lesser-mentioned cousin, "certified"—are terms that circulate freely in the world of fire protection. Fire pumps, fire sprinklers, pipes, extinguishers, and a vast array of other products regularly undergo rigorous, third-party testing according to the standards of groups like FM Global and UL (formerly known as Underwriters Laboratories). But for many consumers, what remains unclear is the matter of *which* certifications to use and *when* they're required.

In this article, we bring some clarity to the subject of listings and approvals. We explain what terms like these mean and who decides when a particular organization—be it UL, FM Global, or another group—has the credibility needed to certify specific types of fire protection products. Finally, we present readers with an overview of products requiring these certifications in *NFPA 13: Standard for the Installation of Sprinkler Systems*.

UL-listed and/or FM-approved residential and commercial fire sprinkler heads, check valves, hose angle valves, and CPVC pipe are just part of our vast catalog of certified equipment—just take a look.

UL listed and FM approval act as industry synonyms for "listed" or "certified"—but the different terms have distinct definitions under NFPA codes and standards

Manufacturers, retailers, and consumers often describe fire protection products as "UL-Listed," "FM-Approved," having "FM approval," and even "UL and FM approved." But as Bruce Rose at *CUI Insights* notes, there's really no such thing as "UL-approved"—and for good reason. "[I]f you look at their website, the only mention of 'approvals' is in examples of incorrect terms.

UL avoids the word as a way of indicating that it really is the manufacturer's responsibility to ensure safety and that UL only acts as an auditor[.]"

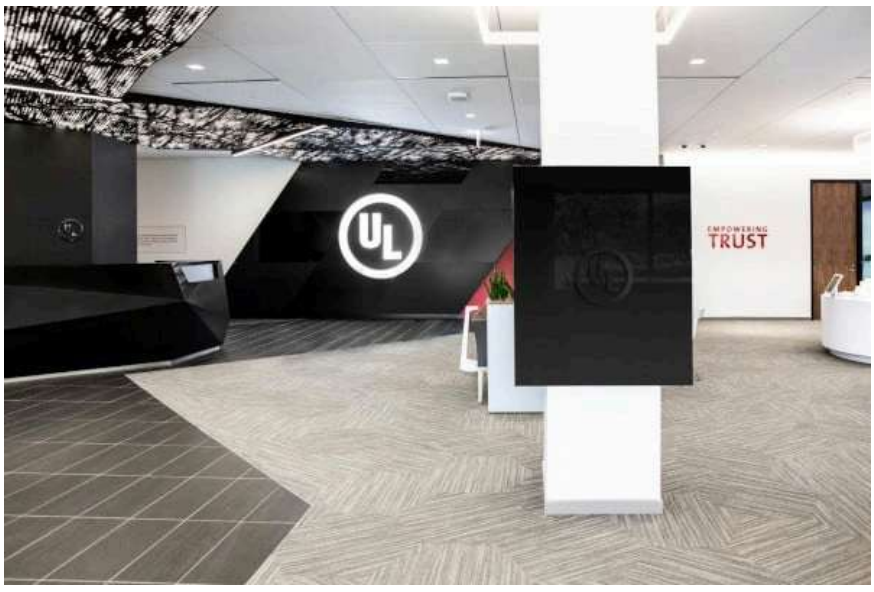
While this shorthand is popular (including, at times, in our own product pages), there's another good reason to understand the difference between "listed" and "approved:" NFPA draws a sharp distinction between those products or installations that are "listed" and those that are "approved."

> **From the 2022 edition of NFPA 13**
>
> **3.2.1* Approved.** Acceptable to the authority having jurisdiction.
>
> **3.2.3* Listed.** Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.
>
> **A.3.2.3 Listed.** The means for identifying listed equipment may vary for each organization concerned with product evaluation; some organizations do not recognize equipment as listed unless it is also labeled. The authority having jurisdiction should utilize the system employed by the listing organization to identify a listed product.

Code officials decide what's **approved,** but it takes **third-party evaluation** to make a product **listed.** Based on tests assessing durability, longevity, and proper function—along with audits of manufacturers' processes—listings from organizations like UL and FM Approvals provide stakeholders with a measure of confidence in products' performance that's not otherwise possible.

And here's where it gets even more confusing: FM Approvals (the name of the independent testing branch of the FM Global insurance company) spurs the description "FM Approved." This is NOT an "approval" according to the NFPA definitions above, as *only the authority having jurisdiction can **approve** something* (more on who that authority is in a second).

Thus, when you see either "UL listed" or "FM approved," it essentially means it was tested by the safety organizations for a specific application and "**listed**."



UL's services boost consumer confidence and promote a safer world. Image source: UL

Are all listings equal? Only if the AHJ says so

A wide variety of organizations test and attest to the suitability of fire protection equipment. But even listed equipment must be "acceptable to the authority having jurisdiction," or AHJ (NFPA 13 2022, 3.2.3). But who—or what—qualifies as an AHJ?

> **From the 2022 edition of NFPA 13**
>
> **3.2.2* Authority Having Jurisdiction (AHJ).** An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

According to the *NFPA 13 Handbook*, the AHJ is often a fire marshal or building code official. But the term can cover a variety of public and private people or entities tasked with enforcing standards. In some instances, even an insurance company or corporate safety officer could be an AHJ.

Applied haphazardly, AHJs' authority to decide which listings are acceptable—and which aren't—could cause some rather arbitrary problems. However, while some contractors claim to have encountered this exact problem, Michael Johnston at *Electrical Contractor* suggests that AHJs in the world of electrical work, for example, often rely on lists of testing laboratories—published by the Occupational Safety and Health Administration (OSHA)—for the sake of "consistency."

Those lists are provided as part of OSHA's Nationally Recognized Testing Laboratory (NRTL) program. The NTRL "[r]ecognizes private sector organizations" that evaluate products for compliance with various standards. In fact, federal regulations require some products to have approval from an NRTL, including:

- Automatic fire sprinkler systems
- Portable fire extinguishers
- Fire doors (self-closing and not)
- Fixed extinguishing systems
- Automatic fire detection devices and equipment

In the world of fire protection, thankfully, an authority having jurisdiction is often your local or state fire official or government inspector, and they usually put great stock in items that are tested and listed by UL, FM, and other organizations recognized by the Nationally Recognized Testing Laboratory program.

A handful of nationally recognized testing laboratories, including UL and FM, are responsible for a wide variety of listed fire protection products

OSHA's list of NRTLs, then, is often a starting point for local fire officials. The quick-reference guide below provides a current list of laboratories that test fire equipment ranging from fire sprinklers to amplifiers for fire alarms. While our list is extensive, it isn't comprehensive—a single laboratory may be recognized for work with hundreds of standards. For more options, check out the current list of NRTLs available at OSHA.

Otherwise, review this select list:

Fire Protection Products in the OSHA list of Nationally Recognized Testing Laboratories (August 2019)	
Testing Laboratory	*Products*
CSA Group Testing and Certification	• Fire pumps and electrical accessories • Control units, cables, and amplifiers for fire alarm and protection systems

FM Approvals 	• Automatic and ESFR fire sprinklers • Plastic pipe and fittings for fire protection service • Foam, dry chemical, and carbon dioxide fire extinguishers • Heat detectors • Fire alarm control panels, signaling devices, and detection products
Intertek Testing Services NA, Inc. 	• Thermoplastic pipe and gasketed joints for fire protection service • Foam and carbon dioxide fire extinguishers • Fire doors • Alarm valves for fire protection • Detectors, boxes, and accessories for fire alarm systems • Foam fire extinguishers • Fire pumps and controllers
NSF International 	• PVC and thermoplastic pipe and fittings for fire protection service
QAI Laboratories, LTD 	• Fire door assemblies
Southwest Research Institute	• Plastic pipe for fire protection service • Fire doors and dampers

	• Flame arrestors
UL (aka Underwriters Laboratories) 	• Fire sprinklers, including residential and ESFR • Sprinkler system pipe (metal, thermoplastic, and underground), flexible fittings, and adjustable nipples • Alarm, pressure-reducing, check, and fire pump relief valves • Fire alarm system signaling, power, amplification • Dry chemical, foam, and carbon dioxide fire extinguishers • Fire doors • Fire pumps and accessories • Indicating pressure gauges for fire protection

Nearly all essential fire sprinkler system components need listings—and those that don't have to meet other standards

One overarching rule guides NFPA 13's requirements for system components and hardware: **listings are required for any product that impacts a sprinkler system's ability to control fires**.

> **From the 2022 edition of NFPA 13**
>
> **7.1.1.2** Unless the requirements of 7.1.1.3, 7.1.1.4, or 7.1.1.5 are met, all materials and devices essential to successful system operation shall be listed.
>
> **7.1.1.2.1** Valve components (including valve trim, internal parts, gaskets, and the like) shall not be required to be individually listed.
>
> **7.1.1.3** Equipment as permitted in Table 7.3.1.1 and Table 7.4.1 [**select aboveground pipes and fittings discussed below**] shall not be required to be listed.
>
> **7.1.1.3.1** Nonmetallic pipe and fittings included in Table 7.3.1.1 and Table 7.4.1 shall be listed.
>
> **7.1.1.4** Materials meeting the requirements of 17.1.2, 17.1.6.2, 17.1.6.3, and 17.1.7.3 shall not be required to be listed.
>
> **7.1.1.5*** Components that do not affect system performance shall not be required to be listed.

The *NFPA 13 Handbook* clarifies that "system performance" pertains only to a sprinkler system's ability to discharge water as designed. Thus, signs, drains, and pressure gauges don't need to be listed—but fire sprinklers sure do. That said, NFPA and local

governments also prescribe **specific requirements** for signs, drains, and pressure gauges; thus, any component used in a system must meet these enforced standards, and the **local requirements (specified in fire codes) dominate.**

Because this fire sprinkler points down, the spur-shaped deflector should be convex rather than concave. That's a tell-tale sign that this is an upright fire sprinkler—which isn't listed for this use. Image source: *Fire Protection Deficiencies*

Before we get to NFPA 13's listing requirements, it's worthwhile to remember that **listed products stay listed only when properly installed.** In the example above, the fire sprinkler—which may otherwise be perfectly fine—isn't listed for use in the pendent (hanging) orientation. The deflector, which distributes water as it flows from the pipes, won't give the water the proper shape, putting areas nearby at risk.

Whether they're UL listed, they have an FM, approval, or they're built to NFPA specifications, pipes must meet rigorous standards in NFPA 13

Underground pipes and fittings (private fire service mains)

Underground pipes for fire service mains are a good example of an "either-or" scenario. These underground pipes must ***either*** meet one of several manufacturing standards listed in section 6.1.1.1 ***or*** they must be listed.

If it doesn't meet the specific manufacturing standards in 6.1.1.1, a pipe otherwise **listed specifically for use as part of a fire service main may be used** instead, so long as it's installed in accordance with its listings (6.1.1.2, 6.1.1.2.1). Likewise, the underground fittings listed in section 6.2 may comply with *either* specific manufacturing guidelines for cast iron, ductile iron, or malleable iron, *or* be specifically listed for this use. FM Global offers approvals (listings) for both underground fittings and pipes, including those made from iron, polyvinyl chloride (PVC), and polyethylene.

Aboveground pipes and fittings

All aboveground pipe and tube must meet or exceed certain standards for metallic piping or, in the case of CPVC, nonmetallic piping.

CPVC pipe, however, **must also be listed** for installation in sprinkler systems (7.3.2.1), as must other types of nonmetallic pipe (7.3.2.1.1).

Select types of steel, brass, and copper pipes do not require sprinkler-system-specific listings if they are made in accordance with the standards of table 7.3.1.1. However, **all metallic pipes not meeting the standards presented in table 7.3.1.1 must be listed** (7.3.3.1).

Aboveground metal pipes are listed either to UL 852 or, in the case of steel pipe, to FM 1630. Similarly, thermoplastic pipes, including CPVC, are listed to UL 1821 or to FM 1635.

Thermoplastic CPVC couplings are one of many fittings that require listings under NFPA 13.

Devices connected to these pipes also require listings under NFPA 13, including:

- Nonmetallic pipe fittings (7.4.3)
- Fittings connecting threaded steel pipes, when those pipes have wall thicknesses less than Schedule 30 or Schedule 40 (7.5.1.2)
- Welded fittings not meeting standards provided in table 7.4.1 (7.5.2.3.1)
- Joining methods not specifically described in NFPA 13 (7.5.5.1)

One notable exception to these listing requirements is the grooved coupling, which must only be "dimensionally compatible" with pipes, valves, or fittings (7.5.3.1). However, listings are required when those couplings don't comply with the standard dimensions provided in ANSI/UL 213 (7.5.3.1.1).

Finally, **grooved couplings must always be listed when used with dry pipe systems** (7.5.3.2). The reason: due to reduced fire endurance and increased exposure to temperature extremes, grooved couplings serving dry pipe systems tend to degrade faster than their counterparts on wet-pipe systems.

Many other parts require listings, including fire sprinklers, accessories, and valves

Fire sprinklers

The standard for most fire sprinklers is UL 199, *Automatic Sprinklers for Fire Protection Service.* But sprinklers may be approved for **more specific** applications, including:

- Control mode sprinklers, which produce large droplets at low pressures. These are often approved (listed) under FM 2000
- Residential sprinklers (UL 1626, FM 2030), used in settings ranging from apartment complexes to family homes

- Early-suppression fast-response (ESFR) heads, listed in accordance with UL 1767 and/or FM 2008

The following fire sprinkler accessories also require listings:

- Nonmetallic hole-covering plates or escutcheons for fire sprinklers (2019 edition of NFPA 13: 7.2.6)
- Escutcheons for recessed, flush, or concealed sprinklers (7.2.6.2)
- Fire sprinkler cover plates (7.2.6.3)

It's worth noting that metallic escutcheons don't require listings for non-recessed pendent or horizontal sidewall sprinklers—but all other types do.

Valves

Valves that let contractors test the system or drain water during renovations don't need to be listed (16.9.1.1). However, valves designed to control water supplies do (16.9.3.1.1 – 16.9.3.1.2). According to section 16.9.3.2, these valves—called listed indicating valves—always require third-party listings, with an exception: wrench-operated outdoor valves installed under a road box.

Other types of valves requiring listings include:

- **Alarm (check) valves**
- **Dry pipe valves**
- **Pressure reducing valves**
- **Deluge valves**
- **Preaction valves**

So many listings, so little time

We've barely scratched the surface of the listings required by NFPA's various standards—to say nothing of the range of certifications offered by third-party organizations. Organizations like FM Approvals and UL have had more than a century to define what makes some products more reliable, effective, and safer than others, and their influence can be felt throughout the fire protection industry.

When in doubt about what's appropriate, contact your local authority having jurisdiction and a professional fire protection installer.

If you're looking for listed and approved fire protection products, take a look at QRFS's selection. We carry a variety of products tested to rigorous standards, including:

- All fire sprinklers
- Residential fire sprinklers
- Brand-name recessed escutcheons
- Hose angle valves
- CPVC pipe fittings