

This edition of TechNotes was written by Jeff Dunkel, P.E., Fire Protection Engineer for the NFSA.

Technical Careers in the Fire Sprinkler Industry

Fire sprinkler systems often go unnoticed by the public. People not familiar with the industry often overlook the systems as simply another portion of the building they are in, and they do not understand the highly technical process the design of that system requires. To understand the level of comprehension on how the systems are designed and how they function, you only need to look at Hollywood. Most of the time when sprinklers are depicted in films a fire is started or a fire alarm pull station is activated which in turn activates every fire sprinkler in the building. Either Hollywood would like you to believe that all sprinkler systems are deluge systems, or they simply do not know any better.

The fact of the matter is that for each building equipped with a fire sprinkler system there is an extensive team involved in the development of that design, starting from simply reviewing the hazard to determining the building code requirements, all the way to the final acceptance test for each system. Each individual in that team has an important but not always distinct role. The intent of this article is to review the roles involved in the highly technical fire sprinkler system design process. For this review we will define each technical role along with the certifications required for that role.

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Technical Team Members and Responsibilities

While there are many roles in the design process including but not limited to estimators, fabricators, and project managers we are going to focus on the technical roles required for the design of a fire sprinkler system which include a Licensed Professional Engineer, a Fire Sprinkler Layout Technician, and the Authority Having Jurisdiction.

Licensed Fire Protection Engineer

The Society of Fire Protection Engineers (SFPE) defines a Fire Protection Engineer (FPE) as:

“A Fire Protection Engineer is an individual who, by formal training and professional experience, carries the necessary competency, and has the skills to provide guidance and direction to protect life, property, and environment from threats posed by fire and its related mechanism.”

The FPE's role is most often not dedicated solely to the fire sprinkler system design. In fact, the FPE is often tasked with ensuring the safe design of a building or structure in all aspects of fire safety. It is common for an FPE to be responsible to provide an analysis of the

building to determine the active systems such as fire alarm and fire suppression, the passive systems such as fire barrier or fire wall placement, as well as the minimum egress requirements.

Depending on the specific location and project requirements, the FPE could either provide general conceptual documentation which describes the minimum protection criteria for the building, or they could go as far as providing full design documents. At a minimum, regarding the fire sprinkler design, the FPE should determine where sprinklers are required and the necessary design criteria for that system.

NFPA 13 defines Hazard and Commodity Classifications in broad terms and only provides specific examples in the annex which are not enforceable unless adopted separately. This is intentional. The expectation is for the hazard of a given building to be analyzed by a licensed FPE or other responsible design professional with knowledge of the specific hazard to determine the proper design criteria.



Licensing Requirement for Fire Protection Engineers

There is no national requirement to obtain a license as a fire protection engineer, each state dictates the minimum requirements to obtain a license to practice engineering in that state. The first engineering licensure law was enacted in 1907 in Wyoming. All other states have followed suit with their own laws since. In general, most states require the same four minimum credentials before a license can be obtained:

1. Obtain an Engineering Degree from a program accredited by the Accreditation Board for Engineering and Technology (ABET).
2. Pass the Fundamentals of Engineering (FE) exam.
3. Obtain work experience ranging from 4-10 years depending on the state or degree.
4. Pass the Professional Engineering Exam.

Layout Technician

The role of the Layout Technician is crucial. While other disciplines are permitted leeway in their designs, NFPA 13 provides detailed requirements for fire sprinkler design. The prescriptive requirements provided by NFPA 13 often make it difficult to reduce costs through creative design. This puts all contractors on an equal playing field. For this reason, a talented and experienced designer can develop sprinkler designs that are both code compliant and economical.

While the technician's primary responsibility is to provide a code-compliant design, designing a system while considering how it will be installed is equally important. Developing an efficient sprinkler layout is important, but choosing the right materials, joining methods, and pipe support, and where to route the pipe are all crucial and needed for a successful project.



Licensing Requirements for a Layout Technician

While an individual with a professional engineering license may be permitted to act in this role, that license is not required, and may not indicate that an individual has the proper experience to provide a detailed design. In many states a sprinkler design is required to be completed by a layout technician with certification from the National Institute for Certification in Engineering Technologies (NICET). There are four levels of a Water-Based Systems Layout certification:

- **NICET Level I:** Trainees and entry-level technicians who perform limited job tasks under frequent supervision. To obtain a NICET Level I certification, an individual must pass the NICET level I exam and have a minimum of 6 months of technical experience in plan preparation for water-based fire protection systems.
- **NICET Level II:** Technician who performs routine tasks under general daily supervision. To obtain a NICET Level II certification, an individual must pass the LEVEL I and II exams and have a minimum of 2 years of experience. 12 Months of that total experience must be specifically in water-based fire protection systems designed in accordance with NFPA 13, 13D or 13R. The remaining 12 months can be related to either water-based designs or can consist of designs for special hazard systems or actual sprinkler system installation.
- **NICET Level III:** Technicians who can work independently with standards, plans, and specifications, to produce complete plans for typical/standard systems for approval. To obtain a NICET Level III certification, you must both pass the Levels I, II, and III exams including general plans and preparation, exam and hydraulics and water supply planning exam, as well as obtain 5 years of experience in water-based suppression systems design.
- **NICET Level IV:** Senior-Level Technicians whose work includes complex or specialized systems and supervision of others. Level IV certification requires all previous exams and at least 10 years of experience in water-based suppression system designs, including supervision of others.

At a minimum, the lead technician on a project should be NICET Level III and the plans should also include the stamp and certification number of that technician.

Authority Having Jurisdiction

An Authority Having Jurisdiction (AHJ) is a broad title that can be applied to anyone who has the responsibility or authority to review and approve plans. Any given project can and often does have multiple AHJ's. This can include personnel with the government jurisdiction such as a fire marshal, plans examiner, or building official. It can also include insurance companies, or a company hired by the AHJ. Owners, cities, counties, states, and insurance companies are all jurisdictions that may have requirements for a project within their prevue. The AHJ is effectively the person or persons who are responsible for ensuring those requirements are met. The individual acting as the AHJ only must be approved by the entity

they work for. There are no specific certifications required. While not specifically required, it is often desired or necessary for that individual to obtain available certifications if they do not currently hold a PE license or a NICET certification. Other certification options include Certified Building Official (CBO) through the International Code Council, Certified Fire Protection Specialist (CFPS) through the National Fire Protection Association (NFPA), or Certified Plan Examiner also through the NFPA.

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Conclusion

While the team responsible for the proper design, approval, installation, and commissioning of a fire sprinkler system is expansive and consists of much more than just the three roles discussed here, these individuals are responsible to ensure the system is designed and coordinated per the appropriate codes and standards. Open and effective communication between the technical team of each project is key to any successful project. It is important to note that each state has specific requirements for projects within their jurisdiction, and those requirements will dictate the roles and responsibilities within that state. The descriptions provided in this article are simply basic descriptions that can be generically applied.

Training and Education



Sign-Up for one of our Layout Technician Pathway Courses

NFSA's newly updated fire sprinkler Layout Technician Pathway (LTP) prepares fire sprinkler layout and design professionals for NICET Levels I & II certifications. It also provides a great refresher for those who have been designing systems but need a comprehensive refresher. Students will receive a hard copy of the recently updated and revised "Layout Book" as well as a copy of the 2022 edition of the NFPA 13 standard.

The LTP consists of two parts. Students must first complete the on-line Part 1: Fundamentals before attending the in-person Part 2: Application session. The 25 self-paced online modules cover everything from "Parts of a Sprinkler" to "Introduction to Fire Sprinkler Calculations." The 3-day in-person instructor-led Part 2: Application class applies the content learned in the previous Fundamentals course. There are four in-person and one virtual session offered in 2023.

NOTE: Students must register for Part 1: Application at least one month before the start of in-person Part 2: session in order to allow enough time to complete the on-line modules.

Layout Technician Pathway cost:

Members: \$2,200.00

Non-members: \$4,400.00 – [Join here](#) to save 50%!

Registration Deadline for Fundamental & Application	Layout Technician: Fundamentals Completion Deadline	Layout Technician: Application Class Dates	Location
August 28, 2023	September 25, 2023	September 26-28, 2023	WA
October 14, 2023	November 13, 2023	November 14-16, 2023	MD
January 2, 2024	January 29, 2024	January 30-February 1, 2024	FL
February 20, 2024	March 18, 2024	March 19-21, 2024	Online

[Check Out All Options Here](#)

Get registered for the LAST two Tech Tuesdays in 2023!

As the year is coming to an end, don't let an opportunity to earn CEUs pass you by. Register for our November and December Tech Tuesday now!

November

Tech Tuesday: Technical Paths for Careers in Sprinklers

Like any construction related career field the fire sprinkler industry has many different areas of focus and paths to take. Whichever path is chosen, the proper training, certifications, and licensing is required. While each state differs between the required licensing and certifications there are core principles and training required throughout all states. This course will discuss the different technical paths within the sprinkler industry along with the required education, certifications, and licensing required for each.

December

Tech Tuesday: 2024 Codes and Their Standards

This course will provide attendees with the updates to the 2024 editions of the International Building Code, International Fire Code, NFPA 1 Fire Code, and NFPA 101 Life Safety Code. Updates to the referenced standards will also be addressed.

Member Cost: Free

Non-member Cost: \$50.00 [Learn more about membership.](#)

***** As of October 2023, NFSA has transitioned back to Microsoft Teams using the Webinar client to deliver Tech Tuesdays.**

With this process, once you have registered for the event you be sent an email with a Microsoft link that will bring you to the Microsoft Teams Event registration page. You must provide simple identifying information here to generate your email with the "Join" link to the Webinar.

We must be able to identify each participant as accessing, being present, engaging, and evaluating the course to issue a CEU Certificate.

Thank you for your patience, we will continue to improve the user experience as we continue this transition back to Microsoft Teams. Your feedback is always welcome!

[Register for November Here](#)

Register for
December Here

National Fire Sprinkler Association
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Linthicum Heights, MD 21090
1-800-683-NFSA (6372)



The National Fire Sprinkler Association is proud to present our NEW 2019-2020 Edition EOD Handbook

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