



White Paper Series Purpose

The purpose of our **Fire Protection System Basics** white paper series is to provide owners and architects with a summary of the basic requirements found in the *National Fire Protection Association (NFPA) Standards* and the *International Building Code (IBC)* that have a direct impact on space planning, architectural design, and operational requirements of their buildings.

This white paper series will focus on these key aspects:

- Sprinkler systems basics
- Fire pump basics
- Maintenance requirements
- Inspection requirements
- Other considerations regarding fire protection systems for your building

Codes/Standards Used Throughout Series

The information within this white paper series is based on the *2022 NFPA 13*, *2019 NFPA 14*, *2022 NFPA 20*, *2020 NFPA 25*, and *2021 IBC*.

It is important to note that previous versions of the *NFPA Standards* and *IBC codes* may have different requirements. Additionally, while the codes/standards referenced in this series are the most current, many local jurisdictions may have adopted earlier versions or local amendments that may be more stringent than the requirements outlined in this white paper series and the base code/standard.

Introduction

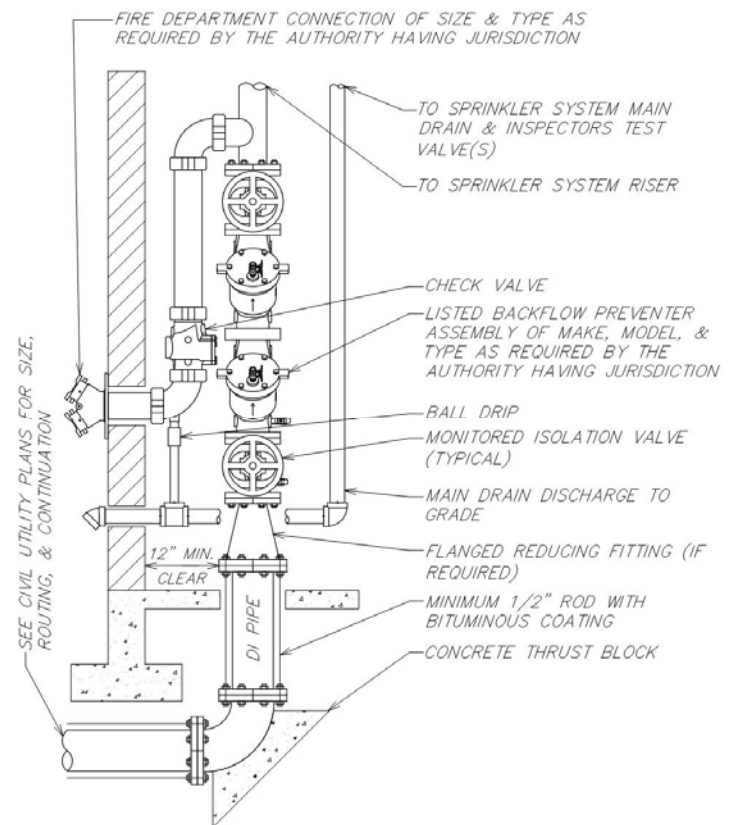
Because fire protection systems can become complex, it is important to be familiar with the different components and terminology of fire protection systems in order to apply the requirements appropriately.

This first white paper is intended to familiarize the audience with the basic terminology and general characteristics of fire sprinkler service risers, fire sprinkler heads, and fire sprinkler standpipes.

We'll close this introduction white paper with a look at what's to come and why this series is important to building owners and architects.

Sprinkler Services

The detail below shows a basic vertical fire sprinkler service entrance into a building.



You can see the backflow preventer, fire department connection (FDC), FDC check valve, as well as the main system drain which discharges to grade outside the building. The main service riser may utilize a vertical assembly, as shown, or a horizontal installation.

Backflow preventers may be installed inside the building or outside on site, according to local authority having jurisdiction (AHJ) requirements and environmental conditions.



Fire Department connections and indicator valves may be installed on the exterior wall or remotely on site, depending on site conditions and local AHJ requirements. The FDC and indicator valves are required to



be located in a readily accessible and visible location to the fire department access of the building. The FDC is used by the fire department to connect fire hoses from a pumper truck to supplement the water supply to the fire sprinkler system in the building.



Indicator valves provide the fire department a visual indication regarding whether the main fire service valve is open or closed. The image below shows an example of a post indicator valve and a wall indicator valve. Post indicator valves are common and are required to be 40' from the building it serves, but still within the property lines. Prior approval from the local authority having jurisdiction is required to reduce the 40' requirement. Prior approval is also required for the installation of the wall



indicator valve which would be installed on the exterior wall of the building it serves.

Types of Sprinkler Heads

- **Pendent** - A sprinkler designed to be installed in such a way that the water stream is directed downward against the deflector.



- **Upright** - A sprinkler designed to be installed in such a way that the water spray is directed upwards against the deflector.



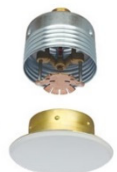
- **Sidewall** - A sprinkler having special deflectors that are designed to discharge most of the water away from the nearby wall in a pattern resembling one-quarter of a sphere, with a small portion of the discharge directed at the wall behind the sprinkler.



- **Dry** - A sprinkler secured in an extension nipple that has a seal at the inlet end to prevent water from entering the nipple until the sprinkler operates.



- **Concealed** - A recessed sprinkler with cover plates. When exposed to heat, the cover plate falls off, exposing the sprinkler.





Sprinkler Standpipes

A standpipe system is the piping which runs vertically from floor to floor delivering the water supply for hose connections, and for sprinklers on each floor in the case of a combined sprinkler/standpipe system. There are many different types and layouts for sprinkler standpipe systems; however, they most commonly occur in the stairwells of multi-story buildings, as pictured here. These systems allow firefighters to connect hoses to the wet system and attack the fire from inside the building. If your building is four or more stories above or below grade, or the highest or lowest level is more than 30 feet away from fire department vehicle access, a standpipe system will likely be required.



Your building may require a combined system, which is a standpipe system that supplies both the normal hose connections and also supplies the automatic sprinklers on the floor/zone. The image below is a typical zone control

valve used in a combined standpipe system. This control valve would serve the sprinklers in the zone.



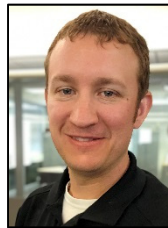
What to Look Forward To

Fire protection systems are becoming more common and are required in most jurisdictions for all public buildings. This white paper series will help you become more familiar with the requirements that fire protection systems bring to your facility. Next, we will be taking a look at common fire sprinkler systems. We will then review fire pump requirements. The fourth paper in the series will discuss maintenance and inspection requirements. Finally, we'll wrap up the series with a discussion regarding how to best determine the right system for your building.

Summary

Schnackel Engineers can assist you with a thorough evaluation of your facility to ensure all fire protection requirements are addressed. Please give us a call at (800) 581-0963 or email us at info@schnackel.com for a consultation.

About Layne



Layne Micek, P.E., Vice President of Plumbing Engineering, has been involved in the design of plumbing and fire protection systems for malls, mixed-use developments, corporate offices, national retail rollouts, schools, hospitals, medical facilities, commercial, and institutional buildings for over 18 years with Schnackel Engineers.

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About Greg



Gregory Schnackel, P.E., LEED AP, President, has been involved in the design of mechanical, electrical, plumbing, fire protections, and information technology systems for malls, mixed-use developments, corporate offices, national retail rollouts, schools, hospitals, medical facilities, commercial, and institutional buildings for over 40 years with Schnackel Engineers.

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