NFSA NATIONAL FIRE SPRINKLER ASSOCIATION
The Voice of the Fire Sprinkler Industry

TechNotes

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This issue of TechNotes was written by Terin Hopkins, NFSA's Manager of Public Fire Protection.

Pressure Regulating Devices

Pressure is a continuous physical force exerted on or against an object and is a constant balancing act when designing water-based fire protection systems in buildings. While it is basic science, with each cubic foot of water weighing 62.4 lb and exerting a force of .4333 psi for every foot of elevation. It becomes a greater challenge to deal with the higher we build.

A building is designated as a high-rise once the building is 75 feet/below the lowest level of fire department access, to the highest occupiable floor. This becomes the real starting point in the discussion of pressure requirements and only gets more complex as we reach for the stars. Read more here.

Pressure Maxims

These buildings require greater pressure the higher they go to achieve the flows needed for the water-based fire protection system installed within them. The requirements for regulating pressure come from the standards, and we commonly use 175 psi as a maximum system pressure provided by both NFPA 13 *Standard for the Installation of Sprinklers* and NFPA 14 *Standard for the Installation of Standpipe and Hose Systems*.
NFPA 20 *Standard for the Installation of Stationary Pumps for Fire Protection* defines a very tall building as a high-rise building where the fire protection water demand exceeds the pumping capacity of the fire department. NFPA 14 uses this definition to trigger the additional requirements for redundancy in buildings, doubling the complexity of regulating pressure.

NFPA 14 sets a maximum system pressure of 400 psi but has an exception for express risers in accordance with material listings. This makes the manufacturers listing the true only limitation for overall pressure maximums Read more here.

Managing Pressure

When we look at the usual ways of managing pressure within a building, it tends to fall into a few categories: zones, water supply, pressure-regulating valves, pump sizes/types and an overall combination approach.

1. **Zones**: Zones allow specific areas of the building to be divided into smaller areas, limiting pressure in those areas of the building.
2. **Water Supply**: Separate water supply sources including dedicated water tanks, gravity tanks, multiple municipal feeds all allow specific design areas to utilize distinctive design pressures.
3. **Pressure Regulating Valves**: The use of direct and indirect acting PRV's allow the regulation of pressure at specific points within the system or systemwide with a master piloted valve.
4. **Pumps**: Fire pumps increase the system pressure and the use of pumps with specifically designated curves, variable speed pumps or multiple pumps allowing for maximum options for pressure regulating.
5. **Combination**: The combined use of multiple design tools used to manage pressure in buildings will allow for more effective system design. Read more here.

Redundancy & Acceptance Testing

Buildings designated as above the level of fire department pump capabilities and/or reaching certain height thresholds will require redundancy making system design and the management of pressure more complicated. While many redundant systems are truly independent, in many designs they can build on one another, as is the case with zone used to feeding additional zones as a redundancy measure.

Fire protection system acceptance testing is a crucial step to ensure that the installed fire protection systems meet the required standards and specifications. This is a critical process which often lacks prescriptive requirements for buildings with complex pressure regulating systems, like multiple zoned buildings or when redundant systems are required. Read more here.

Join NFSA's Tech Tuesday on May 21st to Learn more about PRVs!

There are advantages, disadvantages, and limitations for all of the different tools used for the managing pressure within a building, and we will discuss these issues associated with the utilization of these methods during the upcoming May 21st Tech Tuesday: Pressure Regulating Devices. Details and registration are below.

Training and Education

LTP
LAYOUT TECHNICIAN PATHWAY

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
23-Apr-24	20-May-24	May 21-23, 2024	TX
1-Jul-24	28-Jul-24	July 29-31, 2024	CO
23-Sep-24	11-Oct-24	October 12-24, 2024	Virtual

Check Out All Options Here

Tech Tuesday: Pressure-Regulating Devices

Our next Tech Tuesday will be Tuesday, May 21, 2024, from 12:30 pm to 1:30 pm eastern time. The topic will be Pressure-Regulating Devices.

Join us for a dive into the world of pressure-regulating devices. This presentation will cover the history of pressure-restricting devices all the way though today's requirements for pressure-reducing valves. It will cover the use of indirect and direct acting pressure-regulating valves and a discussion on how design effect the fire department's tactical considerations for operations. We will finish up with the requirement for testing and the requirements for drains.

Member Cost: **Free**
Non-member Cost: $50.00 Learn more about membership.

**NFSA now uses Adobe Connect for Tech Tuesdays. The link to the virtual classroom will be included in your confirmation and reminder emails. When entering the virtual classroom, log on using your NFSA username and password. All participants must be individually registered and must individually access the class to receive credit. You may find it easier to access the meeting if you download Adobe Connect.

Register for the next Tech Tuesday Here

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