



CHECKLIST: FIRE SPRINKLER (13 or 13R) SYSTEM

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OFFICE USE ONLY

APPLICATION #:

PERMIT #:

All supporting documentation showing items listed below are required for review. The checklist is based on the 2016 Edition of NFPA 13, and the 2018 Edition of International Building Code.

PROJECT NAME:

PARCEL ID NUMBER:

PROJECT ADDRESS:

DATE:

Plans/Specifications submitted for review must include:

General (All submissions shall include the following):

- A minimum of four copies of shop drawings, calculations and submittal data shall be provided with the permit application permitting evaluation of the system prior to installation. The permit application shall clearly designate the system as being required for compliance with Virginia Uniform Statewide Building Code, or installed as an elective system at the discretion of the owner.
- A signed copy of the completed owner's certificate shall be attached to each set of plans. NFPA 13 – Section 22.1.4 and Figure A22.1 (b)
- Name and address of project or tenant space where system will be installed or modified.
- Name, address, and telephone number for the designer of the system.
- Drawings are to be uniform in size and drawn to a recognized scale.
- The submitted plans and calculations shall clearly indicate the design standard(s) and edition, such as NFPA 13, 2016 Edition, that are used to prepare the submission.
- The submitted plans shall include a schematic drawing of the fire protection underground showing point of entry into building, size and the length of the pipe, the point of connection to the county main and the location of referenced water flow test. The schematic drawing shall also include the location and the type of all valves, meters, and backflow prevention devices. NFPA 13 – Section 22.1.3.
- The submitted plans shall clearly show a floor plan of each story, indicating the location of all walls, partitions, and fire rated assemblies. The intended use of each area, room, or void space shall be indicated on the plans. NFPA 13 - Section 22.1.3.
- The submitted plans shall clearly indicate total area, protected by each system riser on each floor. NFPA 13 – Section 22.1.3.
- The submitted plans shall include a full height cross-section elevation detail(s) indicating construction, and the vertical and horizontal distances of sprinklers relative to the underside of roof or ceiling and structural members to verify if the construction is obstructed or unobstructed. NFPA 13 – Section 22.1.3

- The submitted plans shall clearly indicate the type and the location of all control valves, drain valves, test connections, hose outlets, and related equipment and piping. NFPA 13 – Section 22.1.3
- The submitted plans shall clearly indicate the location and the type of audible and/or visual alarm devices located inside and outside of the building. NFPA 13 – Section 22.1.3 and IBC, Section 903.4.2 (2018 Edition).
- The submitted plans shall clearly indicate the manufacturer, the temperature rating, the orifice size, the hydraulic K-factor, whether the sprinklers are standard or quick response, and quantity of each type of sprinkler to be installed. NFPA 13 - Section 22.1.3.
- The submitted plans shall clearly indicate the location of all special sprinklers, such as extended coverage, sidewall, intermediate or high temperature sprinklers. NFPA 13 – Section 22.1.3.
- The submitted plans shall clearly indicate the pipe types and the wall thickness, the type of fittings and joints, and the type and locations of hangers, sleeves, braces, and methods to support sprinkler components. NFPA 13 – Section 22.1.3.
- The submitted plans shall clearly indicate the nominal pipe size and the cutting lengths of pipe, center-to-center dimensions, including riser nipples, drop nipples, and armovers. NFPA 13 – Section 22.1.3.
- The submitted plans shall clearly indicate the method of protection for non-metallic piping as required by pipe manufacturer (nailer plates and/or thermal insulation). NFPA 13 - Section 22.1.3.
- The submitted plans shall clearly indicate the method of maintaining a minimum temperature of 40° F for sprinkler system piping installed in unconditioned spaces. (Special note: tenting method requires properly secured, minimum R-30 unfaced batt insulation. See NFPA 13R – Annex A – Figures A 5.3.2 (a, b, c, d, and e for proper insulation method) NFPA 13 – Section -14.3.1.
- Hydraulically designed systems:
 1. Hydraulic data nameplate information. (NFPA 13 – Section 2.13)
 - a. The minimum rate of water application (density).
 - b. The location and size of the design area.
 - c. Inside and outside hose stream allowances as actually provided. (NFPA 13 – Chapters 12-20)
 - d. Required flow and residual pressure at base of riser.
 - e. Occupancy classification.
 2. Hydraulic reference points shall be indicated on the plan corresponding with hydraulic calculation sheets. (NFPA 13 – Section 22.1.3).
 3. Protection areas per sprinkler head. (NFPA 13 - Table 8.6.2.2.1 (a, b, c and d)).
 4. Provide a copy of the water flow test results (dated within six months of plan submission date). (NFPA 13 – Section 22.1.3).
- Graph sheet: A graphic representation of the hydraulic demand shall be plotted on graph paper ($Q^{1.85}$) or computer generated hydraulic program based upon: (NFPA 13- Section 22.1.3)
 1. Prince George County Department of Utilities flow data.
 2. Total sprinkler system hydraulic demand including hose streams.

Tenant upfit

- Where existing systems are to be modified, sufficient details of the existing system shall be shown on the plans to determine the effect of proposed modification on total system. NFPA 13 – Section 22.1.3
- The submitted plans shall include a shopping center key plan or complete building floor plan indicating the location of the affected tenant space(s).
- The submitted plans shall clearly indicate the location and the floor level of the hydraulic remote area and its design criteria.
- Work being performed in the hydraulic remote area shall include hydraulic calculations and the water flow test results dated within six months of plan submission date.

Limited area sprinkler system:

- The submitted plans shall provide a key plan showing the room or space to be sprinklered. The plans shall indicate the location in the building, room number (s) or floor where the work is to be performed.
- Hydraulic calculations shall be provided in accordance with NFPA 13 - Sections 22.2, 22.3 and the International Building Code (2018 Edition) Section 903.3.5.1.1.
 1. Where sprinkler is supplied through domestic water meter provide water meter size in accordance with Prince George County Department of Utilities
 2. Where sprinkler is supplied through a separate fire line connection 2” or smaller Prince George County Department of Utilities Specifications shall be used.
- When a control valve is provided downstream from the domestic water control valve the limited area sprinkler system shall be supervised in accordance with International Building Code (2018 Edition) Section 903.3.5.1.1 - Exception and Section 903.4.

Storage Occupancy:

Miscellaneous Storage ≤ twelve feet in height:

- The submitted plans shall clearly identify and indicate the commodity classification, the maximum storage height, the proposed storage arrangement, the widths and locations of all aisles. NFPA 13 - Chapter 13, Figure 13.2.1; Table 13.2.1.
- The submitted plans shall clearly indicate the roof or ceiling height within the storage area.

Storage Commodities

- The submitted plans shall clearly indicate which of the following sprinkler system design is to be used in accordance with NFPA 13 – Chapters 15, 16, 17, 18, 19, 20, 21, NFPA 30, NFPA 30B, and NFPA 33.
 1. Control Mode Sprinklers
 2. Large Drop and Specific Application Control Mode Sprinklers
 3. Suppression Mode Sprinklers (ESFR)

- The submitted plans shall clearly indicate the commodity classification, the maximum storage height, the proposed storage arrangement, the widths and locations of all aisles. NFPA 13 – Section 22.1.3.
- The submitted plans shall clearly indicate the minimum and the maximum distance between the sprinkler deflector and the top of the storage.
- The submitted plans shall clearly indicate the rack configuration, the width and height of the racks and the location and size of the rack flue spaces for the following arrangements:
 1. Single Row Racks
 2. Double Row Racks
 3. Multiple Rows Racks
 4. Shelf Storage Units, as defined by NFPA 13 – Section 3.9.2.6
- The submitted plans shall clearly indicate the method of storage to be used:
 1. Wood pallets on racks
 2. Expanded plastic pallets on racks
 3. Solid shelving
 4. Open shelving
 5. Encapsulated wrapping materials
- The submitted plans shall clearly indicate the location of all interior small hose stations or an approved alternative design. NFPA 13 – Section 12.8.4.

Manufacturers Data Sheet:

All submissions shall include the appropriate Manufacturers Data Sheets for the following:
 (Where manufacturer's data sheets cover multiple devices, the submitted data sheet shall indicate those devices used in the system)

- Pipe – Indicate if pipe is factory or field anti-microbial coated, if applicable
- Fittings (Threaded, Grooved, Welded)
- Valves (O.S. & Y., Butterfly, PIVs)
- Hangers/Rod/Fasteners/Clamps
- Alarm Check Valve/Retard Chamber/Water Motor Alarm
- Swing Check Valves
- Fire Department Connections
- Sprinkler Heads/Spray Nozzles
- Inspectors Test Connections/Drain Assemblies
- Riser Manifolds
- Backflow Prevention Devices/RPZ's/Detector Check Valves – Including friction
- loss tables
- Pressure Regulating Valves – Indicating the factory pressure setting
- Dry Pipe Valves/Accelerators/Exhausters/Actuation Devices and System/Trim
- Deluge Valves/Preaction Valves/Actuation Devices and Systems/Trim
- Valve Supervisory Switches
- Waterflow Vane Switches
- Pressure Switches
- Fire Pumps/Accessories
- Fire Pump Drivers/Accessories
- Fire Pump Controllers

- Jockey Pumps
- Jockey Pump Controllers
- Relief Valves
- Fire Hose Valves
- Special System Components (Foam, Antifreeze, Water Mist, Etc.)
- Other _____
- Other _____

Where multiple contractors are involved in the system design and installation, the plan approval requires the concurrent submittal and review of the fire suppression and detection systems.

Special Notes

- The submitted plans shall clearly indicate the location of the device to be used for flow tests at system demand, downstream of all backflow prevention valves. NFPA 13 – Section 8.17.4.6.1.
- All sprinkler systems are required to be monitored off-site to an approved supervising station, with the exception of NFPA 13D – One and Two-Family Dwellings and Manufactured Housing and Limited Area Sprinkler Systems as permitted by the International Building Code (2018 Edition). International Building Code (2018 Edition) Section 901.6.1 Exceptions 1 and 2.
- All piping between the sprinkler system and a pressure actuated water flow alarm initiating device or High/Low Air Pressure Switch supervisory device shall be galvanized, nonferrous metal, or other approved corrosion resistant material. NFPA-72. (2016 Edition) Section A5.11.1.
- The submitted plans shall clearly indicate the make, type, model, and size of all dry pipe valves, pre-action valves, or deluge valves. NFPA 13 – Section 22.1.3
- The submitted plans shall clearly indicate the water capacity, in gallons, of each dry pipe and pre-action system. NFPA 13 – Section 22.1.3
- The submitted plans shall clearly indicate the air pressure settings for dry pipe valves and the supervisory air functions at normal and abnormal conditions. Antifreeze systems shall be prepared with minimum freezing point of -26° F, and a recommended maximum 40-gallon capacity. NFPA 13 – Section 7.6
- In addition to standard hydraulic calculations, antifreeze systems with a solution capacity greater than 40 gallons shall also be calculated using the Darcy-Weisbach formula. A copy of the annotated Moody diagram shall be included. NFPA 13 – Section 22.4.2.1.3
- An approved reduced pressure principle backflow prevention device, RPZ-listed assembly, including approved indicating control valves shall be provided at the point of connection of the wet pipe sprinkler system supplying the anti-freeze sprinkler system.
- An approved, listed reduced pressure backflow prevention device is required on all antifreeze systems. NFPA 13 – Section 7.6.3.2; Figure 7.6.3.2
- An approved, listed expansion chamber shall be provided on all antifreeze systems. NFPA 13 – Section 7.6.3.3
- All fire pump and booster fire pump installations shall comply with NFPA 20.

Hydraulic Calculation Forms

Non- Computer Generated Hydraulic Calculations

- Hydraulic calculations shall be prepared on form sheets that include a summary sheet, detailed worksheets and a graph sheet. NFPA 13 - Figures A22.3.2 (a), A22.3.3 and A22.3.4
- The calculation summary sheet shall indicate the hazard classification for the system design. When multiple designs are required to protect various hazards with a common system area, separate calculations shall be provided for each hazard area. NFPA 13 - Section 22.3
- The required calculation summary sheet shall include:
 1. The design density and the total design area, such as a 0.1 gpm per square foot over the hydraulically most demanding 1500 square feet. NFPA 13 - Section 22.3.
 2. The maximum area of coverage per sprinkler. NFPA 13 – Section 22.3.
 3. The total system demand at the base of the riser. Water for inside and outside hose streams shall be represented as it is actually provided. NFPA 13 – Section 22.3.
- Graph sheet. A graphic representation of the hydraulic demand shall be plotted on graph paper (Q) or computer generated hydraulic program based upon: (8-3.4)
 1. Chesterfield County Department of Utilities flow data.
 2. Total sprinkler system hydraulic demand including hose streams.
- The hydraulic calculations provided shall include the domestic water demand if sprinkler system is supplied through a common domestic meter. NFPA 13 - Section 22.3 and the International Building Code - Section 903.3.5.1.

Computer Generated Hydraulic Reports

- The hydraulic calculations shall be prepared on form sheets that include a summary sheet, a graph sheet, a water supply analysis, a node analysis and detailed worksheets. NFPA 13 – Sections 22.3.5.2, 22.3.5.3, 22.3.5.4, 22.3.5.5 and 22.3.5.6
- The data developed from computer generated hydraulic calculations shall be presented in the order shown in NFPA 13 - Figures 22.3.5.1 (a, b, c, and d).