# AUTOMATIC FIRE SPRINKLER
# PLAN REVIEW AND PERMIT REQUIREMENTS

**Town of Brighton**
**Office of the Fire Marshal**

**MAY 2020**

# Automatic Fire Sprinkler Plan Review and Permit Requirements

## Purpose

This information packet has been developed to provide the highest level of service to the residents and visitors of the Town of Brighton. The major goal of automatic fire sprinkler plan reviews conducted by the Office of the Fire Marshal is to ensure the design of automatic fire sprinkler systems meet the minimum requirements of the adopted codes and ordinances. To meet this goal, the submitted plans and supporting documentation must contain the information needed to conduct a thorough review.

## Scope

This packet outlines the minimum requirements set forth in the Fire Code of New York State, local amendments, and departmental policies and procedures as they relate to the installation of Automatic Fire Sprinkler Systems. This packet is not intended to provide an all-inclusive listing of submittal and inspections requirements, as it would be virtually impossible to cover all situations. This packet only covers requirements set forth in the adopted 2016 edition of NFPA 13 and may be used as guidance for submitting NFPA 13D and 13R systems as well. Also included in this packet is information covering items required to be included on the working drawings and supporting documents.

## Administration

A design engineer or licensed design professional will typically provide a preliminary design within the construction documents that will contain sufficient detail to identify the scope of the work and allow for competitive bidding. The design engineer's or licensed design professional's responsibilities include but are not limited to:

1. Evaluate the broad range of hazards and fire protection schemes required to develop a workable, integrated fire sprinkler solution.
2. Provide design documents as outlined in this guideline.
3. Review shop drawings and submittals to ensure conformance with design documents and applicable codes and standards.
4. Monitor the installation of fire protection systems and participate in their acceptance and commissioning.

## Construction Documents

Fire Protection drawings and specifications prepared by the design engineer or licensed design professional and included in the bid documents constitute a 'preliminary design' and shall be sealed by the design engineer or licensed design professional of record registered in New York State as required by the New York State Department of Education Law.

This 'preliminary' design is a basis for bidding and may be referenced to herein as 'construction documents'. A basic understanding of hazard and occupancy classifications; and a working knowledge of fire protection codes and standards is expected from the design engineer or licensed design professional of record.

Construction Documents should comply as applicable with NFPA 13, NFPA 14, NFPA 20, NFPA 24, Fire Code of New York State and this guideline.

Details such as piping sizes and head locations are not required to be part of the Construction Documents. Such layouts when provided shall be denoted as being provided for general coordination and information only.

## Review and Approval of Shop Drawings and Hydraulic Calculations

The following procedure for review and approval of working shop drawings is applicable and shall be included in the construction documents as necessary to ensure the fire sprinkler contractor understands their responsibility.

Working shop drawings can be produced by technicians, designers or contractors meeting the minimum standards of NICET Level III or better “Water-Based Fire Protection Systems Layout". However, the working shop drawings, hydraulic calculations, and product data shall be reviewed and approved by the design professional or licensed design professional in responsible charge prior to submittal to the Office of the Fire Marshal.

Working Shop drawings shall include and be in accordance with working plan requirements of Chapter 22 of NFPA 13.

Product data should include and identify all material, equipment, and accessory selections to be installed. A copy of the water flow test should be included.

The fire sprinkler contractor must provide all necessary materials and labor for a system fully compliant with all applicable NFPA requirements and the construction documents.

Any discrepancies should be brought to the attention of the Specifying Engineer or licensed design professional of record.

The Specifying Engineer or licensed design professional has primary responsibility for review and approval of fire suppression system working shop drawings and hydraulic calculations. The Specifying Engineer or licensed design professional review shall determine compliance with applicable codes and standards and the project contract documentation.

Accompanying the shop drawings shall be a stamp on the drawings or sealed letter from the design professional in responsible charge stating the shop drawings have been reviewed and have been found in general compliance to the design document(s).

If comments by the design engineer or licensed design professional are limited, the specifying engineer may, at their discretion, forward the shop drawings to the Office of the Fire Marshal in parallel with comment resolution by the fire sprinkler contractor.

All comments made by the specifying designer or licensed design professional shall be forwarded to the Office of the Fire Marshal with the review package including comments from previous review iterations, if any.

As noted above the documents outlining the design strategy must be stamped by the registered Engineer \ Architect and the shop drawings and other supporting documents must bear a **SHOP DRAWING REVIEW** stamp indicating review and approval from the originating design engineer or licensed design professional.

## Minimum Required Submittal Information

### Construction Documents

Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provision of the Fire Code of New York State, and relevant laws, ordinances, rules and regulations as determined by the Town of Brighton – Office of the Fire Marshal.

Plans shall be legible, dark-lined and reproducible with conventional copying equipment. Please do not use colored highlighting as these are frequently not reproducible. Also, do not use colored or gray back ground shading as these interfere with archiving.

When working on an existing system, you must provide details on that system such as original installation date, original requirements of the system or its intent, requirements based on occupancy and occupant load, etc.

Distinguish new from existing alarm equipment with “N “and “E” subscripts

Refer to the attachments within this packet for a checklist of items to be included on your drawings.

### Drawing Size

Drawings shall be submitted on sheets no less than 24 x 36 inches and shall be drawn to ⅛” = 1’ scale. Where ⅛” scale is not large enough to show pertinent details, then a ¼” = 1’ scale shall be used in a detail drawing. Other scales may be accepted on an as-needed basis, please contact the Chief Fire Marshal if you have questions regarding the use of different scales.

### Number of Drawing Sets

1. A minimum of three (3) sets of working shop drawings designed by NICET Level III or better “Water-Based (formerly Automatic Sprinkler) Systems Layout"" shall be submitted and shall include the items found in the checklist provided within this packet.
2. One (1) copy of the construction documents plans stamped by a New York State licensed design professional shall be submitted for review.
3. Copies shall all be the same size, drawn in indelible ink. Plans that are not legible may be rejected as unacceptable for plan review purposes
4. Sheets that are cut and pasted, taped, or that have been altered by any means (pen, pencil, marking pen, etc.) will not be accepted for plan check.

### Owner’s Information Certificate

**NFPA 13: Section 23.1.4 and Figure A23.1 (b – 2016 Edition**

A new owner’s certificate must be submitted for all new systems and those buildings (existing systems) that have a change of occupancy or change of use. The intent of NFPA 13 is that the determination of the classification of the occupancy or commodity is the responsibility of the design professional, with the acceptance of the local authority having jurisdiction.

The submitted drawings must include a signed copy of the completed owner’s information certificate shall be attached to the set of plans.

### Cut Sheets/Specifications.

A minimum of two (2) sets of the manufacture’s product information (cut sheets) shall be provided. This is to include the information on all devices that are part of, or being connected to, the automatic fire sprinkler system.

One copy of the cut sheets will be returned to the contractor and must remain with the approved plans, on the job site.

1. When cut sheets show multiple models/type of devices, the specific item being installed shall be highlighted.

   *For example, in using extended coverage heads, the spacing utilized in the design and calculations shall be highlighted on the cut sheets as well as indicated on the drawings.*

2. Cut sheets shall be stapled, bound, placed in a binder or otherwise neatly organized when submitted.

3. Cut sheets shall be provided for all materials and devices essential to successful system operation; e.g. piping, fittings, FDC, valves, supervisory devises, ect.

**Hydraulic Calculations.** **(NFPA 13:23.3 - 2016 Edition)**

1. A minimum of two (2) sets of hydraulic calculations are required to be submitted and shall include the items found in the checklist provided with this packet. Calculations shall be rolled inside the plans to prevent them from becoming separated, if the hydraulics set is too large to feasibly roll them, a binder identifying the project, is acceptable.

One set will be retained by the Office of the Fire Marshal for our records.

## General Information and Requirements

**A. Fire Department Connections** **(NFPA 13 Section 8.17.2. – 2016 Edition)**

1. FDC's shall be readily visible and accessible. FDC's shall not be obstructed by any landscaping, parking or storage, fences, etc. at any time.
2. All FDC's shall be installed at locations approved by the Office of the Fire Marshal on the street side of the structure on which the buildings address numbers are placed. Typically, this is near the main entrance. There are some instances where this location is not possible, please contact Office of the Fire Marshal in these specific situations.
3. A fire hydrant capable of meeting the required sprinkler supply demand shall be provided within 100 feet of the FDC.
4. All standpipe and automatic fire sprinkler system FDC's shall be properly identified so as to indicate clearly the area of protection.
5. An approved weatherproof electric horn/strobe unit shall be installed in lieu of the exterior water motor gong directly above the FDC. The horn/strobe shall be at a height and location that is visible to responding emergency crews.
6. All Fire Department Connections for sprinkler and standpipe systems shall be a minimum of or (2) two 2 1/2-inch hose connections or provide One inlet for every 250 gpm in system demand shall be provided.
7. FDCs shall be arranged so the lowest point on the inlet connection is between thirty (30) and forty-two (42) inches above finished grade at its location.
8. FDC shall be provided with a check valve and drip valve **(NFPA 13 Section 8.17.2.6.)**

**B. Monitoring**

1. New automatic sprinkler systems shall be electronically supervised by an approved monitoring agency when there are 20 or more sprinklers in all occupancies. The Office of the Fire Marshal considers all UL listed or FM approved central, remote or proprietary supervising stations as approved supervising stations.
2. Existing automatic sprinkler systems (installed pre-January 1, 2003) may be supervised in accordance with the New York State Uniform Fire Prevention and Building Code as adopted at the time of original installation.

NFPA 13:8.16.1.1.2.1 provides some guidance on acceptable methods of supervision as indicated below in order of descending preference.

a. Electronically supervised by an approved monitoring company
b. Local signaling service that will cause an audible signal at a constantly attended point
c. Locked in the open position.
d. Located within a locked or fenced enclosure under the control of the owner, sealed in the open position, and inspected weekly as part of an approved procedure.

## C. Water Supply Information

**(NFPA 13: 23.2.1 - 2016 Edition)**

1. Shall be provided on either the layout drawings or as part of the hydraulic calculation sheets, and shall include the following information:
2. Water flow data may not be more than 1 year old.
3. Location and elevation of static and residual test gauge with relation to the riser reference point
    a) Flow Location
    b) Date
    c) Time
    d) Static pressure, psi (bar)
    e) Residual pressure, psi (bar)
    f) Flow, gpm (L/min) at 20 psi residual with graphed results
    g) Test conducted by or information supplied by
    h) Other sources of water supply, with pressure or elevation.
    i) Flow test: show gauge and flow hydrants

## D. Limited Area Systems

**(FCNYS 903.3.8.1)**

1. Limited area systems involve 6 or fewer sprinklers. These are permitted to be supplied from the domestic water system. Typically these systems are used in medical gas rooms or other isolated hazard areas in an otherwise non-sprinklered building
2. For protection of medical gas installations, remember the rooms are required to be ventilated, often to the exterior. Additionally, radiant heat sources are not recommended for heating of these rooms due to the fire hazard they create with the medical gases. This makes installation of wet pipe sprinklers a challenge in the least. Office of the Fire Marshal recommends the use of dry sprinklers for these areas.

## E. Electrical Rooms

1. Automatic sprinklers are not required to be installed in MAIN electrical equipment room as long as the following conditions apply:
    1. The room is dedicated to electrical equipment only
    2. Only dry type electrical equipment is used
    3. Equipment is installed in a two-hour enclosure
    4. No combustible storage is permitted to be stored in the room
    5. System smoke detection is provided and connected to a monitored fire alarm system
    6. A portable fire extinguisher rated not less than 2A:20B:C is provided at the door giving access into the room.

The Main electrical room is the room where the electrical service enters the building and is distributed to the sub-panels. All other electrical rooms, closets, telephone switch and similar rooms are required to be sprinklered.

## F. Vestibules

Vestibules have proven to be a frustrating feature during the freezing temperatures we experience in New York. Vestibules that are outside the building envelope, unheated vestibules and glass vestibules with no storage of saleable or combustible goods are good candidates for the omission of fire sprinklers. Each

vestibule will be reviewed on a case-by- case basis for the omission of fire sprinklers to prevent potential property damage due to frozen pipes.

**G. Approved Signage**

1. Approved signage must be provided on the door of the enclosure in which any sprinkler system valves/controls are located and shall be clearly labeled with a sign reading "**Fire Sprinkler Control Room**". Access to fire sprinkler control room to be provided to the Fire Department in a method acceptable to the Office of the Fire Marshal.
2. All indicating control valves and risers shall have permanent signs identifying the area of the building that is controlled by that valve or riser.
3. Signs shall be permanent, weatherproof and appropriately secured in accordance with NFPA 13:6.7.4.1
4. For hydraulically designed systems, the required information on the hydraulic data nameplate attached to the riser. **(NFPA 13: Section 23.13)**

    a. The minimum rate of water application (density)
    b. The location and size of the design area
    c. The inside and outside hose stream allowances as actually provided based on the actual hazard being protected in accordance with NFPA 13 – Chapters 12- 20.
    d. The required flow and residual pressure at base of riser
    e. The occupancy classification

5. A general information sign used to determine system design basis and information relative to the requirements of NFPA 25, shall be provided with a permanently marked weather-proof metal or rigid plastic sign, secured at each system control riser, antifreeze loop and auxiliary control valve,

    This sign shall include the following:

    1. Name and location of the facility
    2. Occupancy classification
    3. Commodity Classification
    4. Presence of high-pile or rack storage, and solid shelving
    5. Max height of storage and aisle widths
    6. Encapsulation of pallet loads
    7. Presence of other special storage
    8. Presence of hazardous materials including any flammable or combustible liquids
    9. Location of auxiliary drains, low point drains.
    10. Original main drain flow test results
    11. Installing contractor/designer
    12. Indicate of presence and location of antifreeze/other auxiliary systems (NFPA 13:25.6)

6. An 8 ½" x 11" laminated system map/building floor plan is required at each system riser.

**Please refer to the Office of the Fire Marshal - FACP and Sprinkler Zone Map Requirements Bulletin**

**H. Spare Sprinklers Cabinet**

1. A minimum of 6 spare sprinklers shall be provided and shall include all types and ratings installed and shall be as required. **(NFPA 13: Section 6.2.9)**
2. One sprinkler wrench as specified by the sprinkler manufacturer shall be provided in the cabinet for each type of sprinkler installed.
3. A list of the sprinklers installed in the property shall be posted in the sprinkler cabinet. This list shall include the following:

    1. SIN or manufacturer, model, orifice, deflector type, thermal sensitivity and pressure rating.
    2. General description
    3. Quantity of each type to be contained in the cabinet
    4. Issue or revision date of the list.

**I. Shell buildings**

Shell buildings that are required to be sprinkled shall be required to be designed and installed according to the requirements set forth for “Ordinary Hazard Group II” occupancies. Upon tenant finish, these buildings may be converted to lower hazard design density and coverage if applicable to the occupancy or use. Because there is no way of telling who a prospective tenant will be, or what kind of hazards that tenant will be bringing into the building, this requirement is intended to mitigate against those hazards which this department may be unaware of. In addition, this ensures the density is provided for most occupancies without system upgrades.

**J. High Volume Low Speed (HVLS) Fans.**

All HVLS fans shall be interlocked to shut down immediately upon receipt of a waterflow signal at the fire alarm control panel.

**K. Tenant Finish / Remodels**

1. Submittals shall include the entire project area including adjacent spaces and devices as necessary to show proper sprinkler coverage. New and existing equipment shall be designated with “N” and “E” subscripts.
2. Deficiencies caused by tenant finish or remodel work shall be corrected prior to final inspection. This means if the scope of work causes a deficiency in the system, that deficiency becomes your responsibility to correct.

   *For example, a demising wall is erected for a new tenant and that demising wall creates a spacing issue of sprinklers outside the new tenant space, you must correct that spacing issue prior to final inspection*.
3. Additionally, you must provide the design criteria (density and operating area), the code edition the system was originally designed and installed to as well as the system demand and a current static pressure reading from the riser.

**L. Fire Sprinkler Affidavit for Alterations or Tenant Improvement - 20-Heads or Fewer**

1. If the work consists of 20 heads or fewer, the work may be submitted to Office of the Fire Marshal as a Fire Sprinkler Affidavit for Alterations or Tenant Improvement Application. Only ONE affidavit application per project is permitted.

   Such submissions shall include the following information:

   a. Completed Application
   b. There is no change in occupancy classification or hazard classification.
   c. The water supply is of sufficient capacity and no hydraulic overloading exists.
   d. The system shall be installed in accord with all applicable local and national standards.
   e. Scope of work being conducted including the building name and address as well as interior area location. A sketch is required to be attached to the application showing the area of work within the building’s structure
   f. The number of heads being affected.
   g. Time schedule for the work being performed, including start and completion dates.
2. At the time the work is completed, a certificate of compliance shall be filed with the Office of the Fire Marshal.
3. Revisions to the scope of work conducted under a Fire Sprinkler Affidavit for Alterations or Tenant Improvement now require a revised letter to be submitted. If the revisions cause the scope of work to exceed 20-heads, you must submit plans and obtain a physical permit

**J. Flex Connections.**

Systems utilizing flexible sprinkler connections shall be approved for such use. Hydraulic calculations shall be provided proving their use will not adversely affect the system design. This is applicable for both newly installed systems and existing system being modified.

## Inspection and Testing

It shall be the duty of the person doing the work authorized by a permit to notify the Office of the Fire Marshal that the work is ready for inspection. It shall also be the responsibility of the person requesting the inspections to provide access to and means for proper inspection of the work.

Systems shall undergo an acceptance test witnessed by Office of the Fire Marshal. It shall be unlawful to occupy any portion of a building or structure until the required systems have been tested and approved by the Office of the Fire Marshal.

1. **Visual Inspection**.

   Sprinkler piping and hangers shall not be covered and/or concealed by any means prior to a visual inspection being conducted and accepted by Office of the Fire Marshal.

   THIS INCLUDES DROP GRID STYLE CEILINGS! Ceilings, including finished sheet rock, will be required to be removed if necessary for inspection.

2. **Hydrostatic Test**.

   All piping and joints, including the FDC piping, in standpipe and/or sprinkler systems require a 200 psi hydrostatic test per NFPA 13:10.10.2 and 25.2.1.1. All pipe joints shall be exposed to expedite the verification of leak-free joints. The test shall be witnessed and accepted by a member of the Office of the Fire Marshal.

   Where system working pressure exceeds 150 psi, the hydrostatic test shall be performed at 50 psi in excess of the system working pressure per NFPA 13:25.2.1.2.

   Additions/Modification to existing systems involving more than 20 sprinklers, the area shall be isolated and tested at not less than 200 psi for a minimum of 2 hours. If the area cannot be isolated, it shall be tested at the system's normal static pressure.

3. **System Operational Tests.**

   **Main Drain.** Sprinkler and/or standpipe systems shall undergo a main drain test to establish a base line residual pressure for future reference in accordance with NFPA 13:25.2.3.4.

   **Trip Test.** Dry Pipe/Preaction/Deluge valves shall undergo a working trip test or automatic operation in accordance with NFPA 13:25.2.3.2.

   **PRV's/BFP's** shall undergo testing to ensure proper operation per NFPA 13:25.2.4 and 25.2.5.

4. **Riser Room**

   Verify riser room requirements, including floor drain for fire pumps, heat, light, markings, signage, spare sprinkler heads and wrench, ect.

## Completion Documents

The completed Contractor's Material and Test Certificate for Aboveground Piping form is to be provided to the fire inspector at the time of final inspection. Be sure to use the updated form in the 2016 edition of NFPA 13. Previous editions will NOT be accepted.

The completed Contractor's Material and Test Certificate for Underground Piping form is to be provided to the fire inspector at the time of the underground and hydrostatic inspection. Be sure to use the updated form in the 2016 edition of NFPA 13. Previous editions will NOT be accepted.

An owner's manual and installation instructions covering the fire sprinkler systems equipment.

A copy of the completed Fire Sprinkler System Installer's Certification.

Permanent records such as hydraulic nameplate and general information in accordance with NFPA 13, as well as copy of NFPA 25 Inspection Testing and Maintenance of Water-Based Fire Protection Systems shall be provided to the building owner.

## As-Built Drawings

When installation is complete, all deviations from approved plans shall be documented and the Contractor must revise all Fire Protection Design files, calculations, manuals, and operating instructions to agree with the construction as actually accomplished.

Reviews will not be conducted on ”as-build”, unless specifically required, as these field changes are often verified as compliant by the Chief Fire Marshal.

“AS-BUILT DRAWING” or “RECORD DRAWING” shall be clearly labeled on each sheet.

At the completion of the project a set of as-built drawings shall be left with the owner/occupant and a copy sent to the Office of the Fire Marshal. Information left with the owner/occupant shall include maintenance, testing and operating instructions. This information shall be left in a location for easy accessibility to maintenance contractors, building engineers and the Office of the Fire Marshal.

## Working Drawing Plan Requirements

### Title Block Information

- ❑ Applicable codes: Ensure the current codes and editions are listed on the plans.
- ❑ Authority Having Jurisdiction (Town of Brighton – Office of the Fire Marshal)
- ❑ Include description of occupancy and BCNYS classification and proposed use of structure(s).
- ❑ Construction type and occupant load
- ❑ All wet piping and heads shall be kept above 40 degrees F
- ❑ Project location, including street address
- ❑ Owner's name, address, and telephone number.
- ❑ Occupant's name, address and telephone number, if different from owner.
- ❑ Contractor/Professional contact name, address, telephone, fax numbers
- ❑ Installation Company, address and telephone number
- ❑ Fire Alarm / Automatic Fire Sprinkler signal monitoring company name, address and telephone number. **(Refer to FCNYS 903.4 and 903.4.2)**
- ❑ A 3"x 4" space labeled for "Fire Marshal Use Only".
  *This will be used for the Office of the Fire Marshal review comments, approval stamp, date, and signature*

## Information required on Drawings **(NFPA 13: 23.1.1.1 - 2016 Edition)**

### Site Plan Information (If Applicable)

- ❑ North Arrow
- ❑ Size of city main in street and whether dead end or circulating; if dead end, direction and distance to nearest circulating main; and city main test results and system elevation relative to test hydrant. **(See A.NFPA 13: 23.1.8)**
- ❑ Private fire service main sizes, lengths, locations, weights, materials, point of connection to city main; the sizes, types and locations of valves, valve indicators, regulators, meters, and valve pits; and the depth that the top of the pipe is laid below grade.
- ❑ Size and location of hydrants, showing size and number of outlets and if outlets are to be equipped with independent gate valves. Whether hose houses and equipment are to be provided, and by whom, shall be indicated. Static and residual hydrants that were used in flow tests shall be shown.
- ❑ Flow test: show gauge and flow hydrants or other sources of water supply, with pressure or elevation.
- ❑ Locations of all "Exterior Audible" appliances include Fire Sprinkler Bells or Horns as applicable.
- ❑ Locations of all PIV's, Sprinkler Risers, Detector Check Valves, Water Flow indicators, and other devices with supervisory capability.

### Building floor plan(s)

- ❑ Plans must be clearly legible and where possible, drawn to 1'0" = 1/8" scale
- ❑ A graphic representation of the scale used on all plans.
- ❑ Symbol Legend & Abbreviation key
- ❑ Point of compass.
- ❑ Date of drawing
- ❑ Occupancy class and label of each area or room. *(If Hazard Classification is not obvious provide further information.)*
- ❑ Location of partitions, fire walls and /or area separation walls and rating classifications

- ❑ Rating of any fire walls, partitions and doors; in particular when using the room design method

  Room design method or irregular areas not meeting the 1.2√ A requirement

  If room design method is used, all unprotected wall openings throughout the floor protected.
- ❑ Ceiling construction and height
- ❑ Full height cross section, or schematic diagram, including structural member information if required for clarity and including ceiling construction and method of protection for nonmetallic piping. **(NFPA 13: 23.1.3 - 2016 Edition)**
- ❑ Location and size of concealed spaces, closets, attics, and bathrooms.
- ❑ Location areas where sprinklers have been intentionally omitted.
  *Must also note with a code reference why sprinklers were omitted from these areas.*

## System Information

- ☐ Sprinkler Legend to include: Make, type, temperature rating, K-factor, SIN and nominal orifice size of sprinklers. Sprinkler head spacing dimensions and the listed spacing used for special sprinklers.
- ☐ Piping Legend to include: Pipe type and schedule of wall thickness, actual internal diameter.
- ☐ Temperature rating and location of high temperature heads.
- ☐ Area protected by each system on each floor and total area being protected. **(NFPA 13 - Table 8.6.2.2.1 (a, b, c and d))**
- ☐ Number of sprinklers on each riser per floor and total number of sprinklers per building. Also, total number of sprinklers on each Dry, Pre-action, Antifreeze or Deluge System.
- ☐ Approximate capacity in gallons of each dry pipe and/or pre-action system.
- ☐ Information about antifreeze solution used (type and amount).
- ☐ Complete riser detail.
- ☐ Location, size and piping arrangement of FDC including kind and location of alarm bells (exterior horn/strobe).
- ☐ FDC is provided with an automatic drain
- ☐ Information about backflow preventers (manufacturer, size, type).
- ☐ Location and type (wet/dry, automatic/manual) of standpipe risers, outlets/valves and related equipment.
- ☐ Location and details of all control valves, check valves, drain pipes and test connections.
- ☐ Make, type, model and size of all alarm, dry, pre-action or deluge valves.
- ☐ Size, type and setting for Pressure-reducing valves.
- ☐ Fire Pump type (including manufacturer and model), capacity, speed, rated net pressure, diameter of impeller, inlet and outlet diameters, fuel or electrical requirements and location.
- ☐ Fire Pump Test Header is provided with an automatic drain
- ☐ Nominal pipe size and cutting lengths of pipe (center-to-center dimensions).
- ☐ Type of fittings, location and size of riser nipples, size of welds and bends. Including any flex connections
- ☐ Type and location of hangers, inserts and sleeves.
- ☐ Location of inspector’s test connection and location of discharge. If discharge is to a storm drain, size of drain.
- ☐ Wet system drains extend at least 4-feet into heated space, before entering an unheated space
- ☐ Dry system low point drains are provided and the inspector test connection provides an arrangement minimizing condensation collection.
- ☐ Piping provisions for flushing

- When a new system is an addition to an existing system, enough of the old system shall be indicated and included on the plans to show the total number of sprinklers to be supplied and to make all conditions clear.
- Hydraulic reference corresponding with comparable reference points on the hydraulic calculation sheets.
- System design criteria showing **minimum** density, the design area and the required water flow for hose streams, both inside and outside. Also indicate the **total** water and pressure required.
- For hydraulically designed systems, the information on the hydraulic data nameplate attached to the riser.
- Any adjustments to the design area(s) or density(ies) based upon code provisions.
- Relative elevation of sprinklers, junction points and supply or reference points.
- If room design method is used, all unprotected wall openings throughout the floor protected.
- System elevation relative to grade and other sprinkler heads, junction points and supplyor reference points.
- Hazard or commodity classification.
- Completed High-piled Packet #1 when applicable
- Edition year of NFPA 13 that the system was designed to.

## Information Required on Hydraulic Calculations

### Summary Sheet

- Date, location, name of occupant, owner and building number or other pertinent identification (i.e. suite number).
- Name, address and phone number of installing contractor and designer.
- Description of hazard/commodity classification.
- Specific NFPA reference material for design density used in calculations.
- Total water requirements for the system as calculated, including the allowance for inside hose and outside hydrant.
- Total water requirements for the system as calculated, at the base of the riser, defined by Office of the Fire Marshal as being the Supply Side Pressure Gauge.
- Allowance for in-rack sprinklers, GPM where applicable

### System Design Requirements

- Design area in ft2.
- Minimum density in GPM/ ft2.
- Area of coverage per sprinkler in ft2.
- Spacing of sprinkler heads. When using special sprinklers, be sure to also indicate the manufacturer’s minimum flow and pressure requirements, or any other unusual requirements.

### Water Supply Summary

- Location and elevation of static and residual test hydrants with relation to the riser reference point.
- Static pressure in psi.
- Residual pressure in psi.
- Pitot pressure in psi (if known).
- Resulting flow in GPM. A theoretical flow model must be obtained from Colorado Springs Utilities.
- Diameter of flowing orifice in inches.

 Graphic representation showing the water supply curve and system requirements, including hose demand when applicable, plotted on semi-exponential graph paper (also known as N1.85 or hydraulic paper) so as to present a graphic summary of the complete hydraulic calculation.

This graph shall include the following:

- Water Supply curve.
- Sprinkler system demand.
- Hose demand.
- In-rack demand, if applicable.
- Fire pump points (churn, rated, 150%).
- Flow orifice diameter in inches.

**Detailed Worksheets – Actual Calculations.**

- Sprinkler description and K-factor.
- Hydraulic coefficient used in calculations.
- For gridded or looped systems, a sketch representing the flow quantities and directionfor lines with sprinklers operating in the hydraulically most remote area.
- Page numbers on every page.
- Pipe size (actual internal).
- Pipe lengths (center-to-center of fittings).
- Equivalent pipe lengths for all fittings and devices used in calculations.
- Friction loss in psi per foot of pipe.
- Total friction loss between reference points.
- Elevation head in psi at each reference point.
- Velocity pressure and normal pressure if included in calculations.
- Nodes to indicate hydraulic reference points, reference to other sheets, or to clarify data shown.
- Flow in GPM.
- In-rack sprinkler demand balanced to ceiling demand.
- Required pressure in psi at each reference point.
- Combined K-factor calculations for sprinklers on drops, arm-overs, or sprigs where calculations do not begin at the sprinkler

## Please read the information below and sign before submitting your application

Your application shall be deemed complete only if this checklist is reviewed and application completed and submitted. Accuracy of the submittal package, including this checklist, is the responsibility of the applicant.

Failure to submit an accurate submittal package will be considered an incomplete application by the Plan Reviewer. An incomplete submittal will result in a **HOLD**.

If work is found to have commenced without approved plans and/or a proper permit, this office reserves the right to shut down any/all portions of the entire project deemed necessary to inspect, investigate and confirm that work has been done.

All installations and/or operations must concur with the approved plans. Any deviation from the approved plans requires a re-submittal to the Office of the Fire Marshal. If changes, alteration or deviation from the approved plans are not submitted for review and approval prior to final inspection by the Office of the Fire Marshal, then the installation permit **fees immediately double.**

When work for which a permit is required has been conducted without a permit or approval, a stop work is immediately posted and all permit **fees immediately double** upon proper application for plan review and due upon issuance of a new installation permit.

If any portion of the work performed is not clearly visible or readily accessible, you will be ordered to demolish, disassemble or remove any and all obstructions regardless of the cost incurred. Failure to comply will result in the suspension/revocation of any building or other permits related to the site.

In addition, it is understood that the installation of fire protection systems shall be made only by persons properly trained and qualified to install the specific fire protection system being provided. The installer shall certify to this authority that the installation is in complete agreement with the terms of the listing and manufacturer's instructions and/or approved design plan.

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