



Nashua Fire Rescue

Fire Marshal's Office
177 Lake Street, Nashua, NH 03060
www.nashuafire.com

Richard W. Wood
Fire Marshal
(603) 589-3460
Fax (603) 589-3474

PLAN REQUIREMENTS FIRE SPRINKLER SYSTEM

Project Name: _____
Project Address: _____
File Number: _____ Date: _____
Code Edition: _____

All supporting documentation, showing items listed below are required for review. The checklist is based on 2002 Edition of NFPA 13.

General (All submissions shall include the following):

- A minimum of two copies of dimensioned shop drawings, and submittal data shall be provided with the permit application permitting evaluation of the system PRIOR to installation.
- 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.
- Owners Information Certificate Form. (13:14.1)
- Drawings are to be uniform in size, dimensioned, and drawn to a recognized scale. (13:14.1.3)
- Plans and calculations shall clearly indicate the design standard(s) and edition (ex: NFPA 13, 2002 Edition) used to prepare the submission.
- Plans shall include a schematic drawing of the fire protection underground showing point of entry into building, size and length of pipe, point of connection to water main and location of referenced water flow test. Schematic drawing shall also include the location and type of all valves, meters and backflow prevention devices. (13:14.1.3)
- Plans and calculations shall clearly show a floor plan of each story, indicating the location of all walls, partitions, and fire rated assemblies; and the intended use of each area, room or void space. (13:14.1.3)
- A dimensioned reflective ceiling plan complete with shadow gram of all walls and obstructions shall be submitted indicating the placement of all sprinkler heads shall be provided.

- Plans shall indicate the location and pipe size of the device, located downstream of all backflow prevention valves, used to verify the full flow system demand in accordance with NFPA – 13, Article 5-15.4.6.1.
- Plans shall clearly indicate total area protected by each system riser on each floor. (13:14.1.3(14))
- Plans shall include full height cross-section elevation details indicating construction and vertical/horizontal distances of sprinklers relative to underside of roof/ceiling and structural members. (obstructed or unobstructed) (13:14.1.3)
- Plans shall clearly indicate the type and location of all control valves, drain valves, test connections, hose outlets, and related equipment and piping. (13:14.1.3(23))
- Plans shall clearly indicate the location and type of audible and/or visual alarm devices located inside and outside of the building. (13:14.1.3(26), IBC 2000 Edition, Section 903.4.2)
- Plans shall clearly indicate the make, model, temperature rating, nominal hydraulic K-factor, sprinkler identification number, and quantity of each type of sprinkler to be installed. (13:14.1.3(12))
- Plans shall clearly indicate the location of special sprinklers (Examples: extended coverage, sidewall, intermediate/high temperature sprinklers). (13:14.1.3(13))
- Plans shall clearly indicate pipe types and wall thickness, type of fittings and joints, and the type and locations of hangers, sleeves, braces, and methods to support sprinkler components. (13:14.1.3(21)(22))
- Plans shall clearly indicate nominal pipe size and cutting lengths of pipe (center to center), including riser nipples, drop nipples, and armovers. (13:14.1.3(19)(20))
- Plans shall clearly indicate method of protection for non-metallic piping as required by pipe manufacturer. (nailer plates and/or thermal insulation) (13:14.1.3(4))
- Plans shall clearly indicate method of maintaining minimum temperature of 40°F for sprinkler system piping installed in unconditioned spaces. (13:7.2.5.1)
(Special note: tenting method requires properly secured, minimum R-30 unfaced batt insulation.)
- Hydraulically designed systems:
 1. Hydraulic data nameplate information. (13:14.1.3(31))
 - 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.
 - 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. (13:14.1.3(34))
 3. Protection areas per sprinkler head. (13:8.5.2)
 4. Provide a copy of the Pennichuck Water Works water flow test results (dated within six months of plan submission date).

- Graph sheet. A graphic representation of the hydraulic demand shall be plotted on graph paper (Q1-85) or computer generated hydraulic program based upon: (13:14.3.4) Pennichuck Water Works flow data
1. Water supply curve
 2. Total sprinkler system hydraulic demand
 3. Hose streams demand.
 4. In-Rack sprinkler demand (where applicable)

Tenant Fit-up

- Where existing systems are to be modified, sufficient details of the existing system shall be shown on the plans to determine effect of proposed modification on total system. (13:14.1.3(30))
- Provide shopping center key plan or building complete floor plan indicating the location of tenant space.
- Plans shall clearly indicate location and floor level of the hydraulic remote area and its design criteria.
- Work being performed in the hydraulic remote area shall include hydraulic calculations and Pennichuck Water Works water flow test results (dated within 6 months of plan submission date).

Limited area sprinkler system:

- Provide key plan showing the room or space to be sprinklered. Provide location in the building and room number(s), floor, etc.
- Provide hydraulic calculations in accordance with NFPA 13:14.3; IBC 903.3.5.1.1
- a. Where sprinkler is supplied through domestic water meter provide Pennichuck Water Works water meter sizing form.
 - b. Where sprinkler is supplied through a separate fire line connection 2" or smaller Pennichuck Water Work Specification FIR-1 shall be used.
- When a valve is provided downstream from the domestic water control valve the limited area sprinkler system shall be supervised in accordance with IBC, 2000 Edition, Section 907.6.3 or International Plumbing Code 2000 Edition.

Storage Occupancy:

Miscellaneous Storage ≤ twelve feet in height:

- Plans shall clearly indicate commodity classification, maximum storage height, proposed storage arrangement, widths and locations of all aisles. (7-2.3.2.2)
- Plans shall clearly indicate roof/ceiling height within storage area.

Storage Commodities

- Plans shall clearly indicate fire control approach for storage commodities, such as: (13:12.1; 13:13.1)
- Plans shall clearly indicate commodity classification, maximum storage height, proposed storage arrangement, widths and locations of all aisles.
- Plans shall clearly indicate minimum and maximum distance between the sprinkler deflector and the top of storage.
- Plans shall clearly indicate rack configuration (width and height) and flue spaces: (Single row, Double row, Multiple rows).
- Plans shall clearly indicate the method of storage, i.e.; wood pallets on racks, expanded plastic pallets on racks, solid shelving, open shelving; or encapsulated wrapping materials.
- Plans shall clearly indicate interior small hose stations or approved alternative.

Manufacturers Data Sheet:

All submissions shall include the appropriate Manufacturers Data Sheets for the following:

- Pipe
- Fittings (Threaded, Grooved, Etc.)
- Valves (O.S. & Y., Butterfly, Etc.)
- 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 Preventers / RPZ's Valves
- Pressure Regulating Valves
- Dry Valves / Preaction Valves / Actuation Devices and Systems / Trim
- Valve Supervisory Switches
- Water flow Vane Switches
- Pressure Switches
- Fire Pumps / Accessories
- Fire Pump Drivers / Accessories
- Fire Pump Controllers
- Jockey Pumps
- Jockey Pump Controllers
- Relief Valves
- Fire Hose Valves, Fire Hose and Nozzles
- Special System Components (Foam, Antifreeze, Water Mist, Etc.)
- Other _____
- Other _____

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

Special Notes

- A low-pressure switch is required to be installed each riser on the system side of main control valve. In zoned systems, this will be required on the system side of each zone. (Local Requirement)
- Sprinkler systems required to be monitored off-site in accordance with IBC Section 901.6.
- Piping between the sprinkler system and a pressure actuated water flow alarm-initiating device shall be galvanized, nonferrous metal, or other approved corrosion resistant material. (1999 Revised NFPA-73:2-6.3)
- Plans shall clearly indicate the make, type, model, and size of dry pipe, pre-action, or deluge valves. (13:14.1.3(24); 13.14.1.3(25))
- Plans shall clearly indicate the water capacity in gallons of each dry pipe system. (13:7.2.3)
- Plans shall clearly indicate air pressure settings for valves and supervisory air functions at normal and abnormal conditions. (13:7.2.6.7)
- Information about antifreeze used (type and amount). (13:14.1.3(42))
- Calculation of loads for sizing and details of sway bracing (13:14.1.3(39))
- An approved reduced pressure principle backflow prevention device (RPZ-listed assembly) including approved indicating control valves shall be provided on all antifreeze systems. (2000 ICC International Plumbing, 3-5.31).
- An approved listed expansion chamber shall be provided on all antifreeze systems (13:7.5.3.3).
- Fire pump and booster fire pump installations shall comply with NFPA 20.

Hydraulic Calculation Forms

Hydraulic calculations shall be prepared on form sheets that include a summary sheet, detailed work sheets, and a graph sheet. (13:14.3.1)

- When multiple designs are required to protect various hazards with a common system area, separate calculations shall be provided for each hazard area.
- All code credits/exceptions utilized in the design must be clearly marked on the plan complete with the calculation and code cite referenced.
- Calculation summary sheet shall include: (13:14.3.2)
 1. Date
 2. Location
 3. Description of Hazard
 4. System Design Requirements
 - a. Total design area (ft²)

- b. Minimum rate of water application (density), gpm/ft².
- c. Area of coverage per sprinkler.
- 5. Total system demand at base of riser. Water for inside and outside hose streams shall be represented as actually provided.
- 6. Allowance for in-rack sprinklers, gpm.
- 7. Limitation (dimension, flow, and pressure) on extended coverage or other listed special sprinklers.



Graph sheet. A graphic representation of the hydraulic demand shall be plotted on graph paper (Q) or computer generated hydraulic program based upon: (13:14.3.4)

- 1. Pennichuck Water Works flow data.
- 2. Total sprinkler system hydraulic demand including hose streams.



Detailed Worksheets (13:14.3.3)

- 1. Sheet number
- 2. Sprinkler description and discharge constant (K)
- 3. Hydraulic reference points
- 4. Flow in GPM
- 5. Pipe Size
- 6. Pipe Lengths, center-to-center of fittings
- 7. Equivalent pipe lengths for fittings and devices
- 8. Friction loss in psi of pipe
- 9. Total friction loss between reference points
- 10. In-rack sprinkler demand balanced on ceiling demand
- 11. Elevation head in psi between reference points
- 12. Required pressure in psi at each reference point
- 13. Velocity pressure and normal pressure if included in calculations
- 14. Notes to indicate starting points or reference to other sheets or to clarify data shown
- 15. Diagram to accompany gridded system calculations to indicate flow quantities and directions for lines with sprinklers operating in the remote area.
- 16. Combine K-factor calculations for sprinklers on drops, armovers, or sprigs where calculations do not begin at the sprinkler.