



2.0 Fire Sprinkler Submittal Requirements

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Fire Sprinkler Systems

The NC Fire Prevention Code requires that a construction permit be obtained for the installation of/or modification to an automatic sprinkler or standpipe system. The code also requires that construction documents must be submitted for review and approval prior to system installation.

The following information and construction documents are required to be provided with the Construction Permit Application for an automatic sprinkler or standpipe system. Not every project will require the same amount of information, however, the more information that is provided with the plans, the less likelihood that additional information will be needed for the plan review process or the need for modifications being identified during the inspection process. **Some jobs, such as modifications or alterations to an existing system, may not require all of the following information or may not be available.** If some of the information is not needed or available, it is important that you call and discuss the circumstances before submitting the Construction Permit Application.

1. Three sets of plans and hydraulic calculations, one of each will be returned. Must include the location (street address) and point of compass. The plans must be drawn to scale, a graphic representation of scale used, a descriptive name and occupancy class of the various rooms and spaces.
2. Designer. The plans must include the name of the system designer, certification, and the date of design.
3. Plans must be legible and only contain the sprinkler/standpipe components and the building features necessary to review the plans.
4. Must include the location and size of partitions, firewalls, overhead doors, stairwells, elevators, concealed spaces, closets, attics, bathrooms, etc. Include any small enclosures in which no sprinklers are to be installed.
5. If riser or standpipe is located within a stairwell, then a detail of the riser or stairwell must be included showing their location in relation to the stairwell doors and landings.
6. Details of ceiling height, type of ceiling (obstructed or unobstructed) and construction type (beam and girder, bar joist, smooth, etc.) and the elevation of finish floors. Full height cross-section, or schematic diagram, including structural member information if required for clarity and including ceiling construction and method of protection or nonmetallic piping.
7. Nominal pipe size and cutting lengths of pipe (or center to center dimensions). Where typical branch lines prevail, it shall be necessary to size only one typical line.

8. Manufactures model numbers and listing information for equipment, devices, sprinkler heads, valves, compressors, quick opening devices, switches, back flow preventer, etc. If the specification sheets include several model numbers, then highlight the model numbers being used.
9. Total area protected by each system/riser on each floor.
10. Number of sprinklers on each system/riser per floor.
11. Total number of sprinklers on each dry pipe system, pre-action system, combined dry pipe-pre-action system, or deluge system.
12. Capacity in gallons of each dry pipe system.
13. Detail of anti-freeze systems. Must include the type and amount of solution (percent) as well as the freezing point expressed in Fahrenheit.
14. Show location of all control valves, relief valves, check valves, drain pipes, and test connections, switches, etc.
15. Show location, size, and piping arrangement of the Fire Department Connection.
16. When the equipment is to be installed as an addition to an old group of sprinklers without additional feed from the yard system, enough of the old system shall be indicated on the plans to show the total number of sprinklers to be supplied and to make all connections clear.
17. Identify the method(s) of design and any exceptions that allow for reduced or extended coverage. Must list the code sections including the tables, figures, curve used, manufacturer's listing, etc. Include enough information so the plan reviewer can verify how the design criterion was determined.
18. The classification of the commodity being protected including a description of the commodity, the height of storage, the method of storage, aisle widths, etc. Rack storage must include a rack detail that includes reference to flue spaces, type of racks, type of shelves, rack dimensions, etc.
19. The minimum rate of water application (density), the design area of water application, in-rack sprinkler demand, and the water required for hose streams both inside and outside.
20. The total quantity of water and the pressure required at base of riser and point of supply. (for each system)
21. Hydraulic reference points on the hydraulic reference sheets must correspond with comparable reference points on the plans. Must include test hydrants (source), elevation of test hydrants, back-flow, top of riser, etc.
22. Static and residual hydrants that were used in the flow tests shall be shown. Flow test information must be no older than 6 months.
23. Show underground pipe size, location, material, point of connection to city main; the type of valves, meters and valve pits; and the depth that top of the pipe is laid below grade.

24. Must provide a Hydraulic Calculations Information Sheet(s) for each design area. The intent is to provide allocation where critical information about the system design can be located. It must include the following information:
- The type of systems being installed such as Class 1 Standpipe, wet-pipe, dry-pipe system, pre-action, etc.
 - Water supply
 - Maximum spacing of sprinklers and sprinkler lines at specified discharge density
 - System demand at base of the riser Identify the reference points of sprinkler heads in design area and include each head's K-factor, elevation, flow (GPM) and pressure (PSI)
 - Sprinkler system flow in gallons per minute
 - Inside and outside hose allowances
 - Total system flow
 - Available pressure and flow
 - Operating pressure and flow
 - Remaining pressure
 - Friction loss for backflow preventer
25. Must provide a graph sheet showing water supply curves and system requirements including the hose demand plotted on semi-logarithmic graph paper to present a graphic summary of the complete hydraulic calculations.
26. Additional information necessary for complete review includes:
- Sprinkler description, temperature, discharge constant (K value), type, and Sprinkler Identification Number.
 - Flow in GPM
 - Pipe diameters (actual internal diameter)
 - Pipe lengths
 - Equivalent pipe length for fittings and components
 - Friction loss in psi per foot of pipe
 - Total friction loss between reference points
 - Elevation difference between reference points (in calculations)
 - Required pressure in psi at each reference point
 - Velocity pressures and normal pressure if included in calculations
 - Notes to indicate starting points, reference to other sheets or classification of data
27. A ten percent (10%) safety margin must be included in all hydraulic calculations unless otherwise approved by Southern Pines Fire Department. System supply must be equal to or exceed 1.1 times that of the system demand. (Example: If demand is 50 psi, then the supply must be 55psi or greater. Calculations must clearly identify how the safety margin was achieved.