

21 13 13 – Wet-Pipe Sprinkler Systems

1. References

All sprinkler systems shall comply with the NC Building Code, plus the latest revisions of the following Standards as applicable:

- A. NFPA 1, Fire Prevention Code
- B. NFPA 13, Sprinkler Systems
- C. NFPA 14, Standpipe, Hose Systems and Private Hydrants
- D. NFPA 20, Centrifugal Fire Pumps
- E. NFPA 25, Inspection, Testing & Maintenance of Water-Based Fire Protection Systems

2. Plans and Specifications

- A. Fully developed plans and specifications are required for all sprinkler systems. Based on an official ruling by the North Carolina State Board of Registration for Professional Engineers and Land Surveyors, these must be sealed by a PE or a Licensed Fire Sprinkler Contractor registered in this State. The plans and specifications should be modeled after NFPA 13, Chapter 8, Plans and Calculations.

3. Contractor Qualifications

- A. The Contractor must be licensed to install sprinkler systems in North Carolina. For more information, contact the North Carolina State Board of Examiners of Plumbing, Heating and Fire Sprinkler Contractors.
- B. If requested by the Owner or System Designer, the Contractor is required to furnish evidence of satisfactory performance on previous sprinkler system installations of size and complexity at least equal to the project being bid.

4. Notice to Sprinkler Contractors

- A. The Contractor must furnish all parts, materials and labor required to build a complete and fully operational sprinkler system that complies with all applicable requirements, regardless of whether or not all required components are described in the design documents.
- B. The Contractor is also responsible for the inevitable minor adjustments in sprinkler locations, sprinkler quantity and piping required for full compliance with NFPA 13 and the project specification. No design can foresee all of the local conditions and conflicts that may arise during the course of construction.

- C. Approval of samples, cut sheets, shop drawings and other matter submitted by the Contractor shall not relieve the Contractor's responsibility for full compliance with project plans and specs, unless the attention of the system design Engineer is called to each non-complying feature, by letter, accompanying the submitted matter and specific deviation authorization is received from the designer in writing.
 - D. All equipment must be supported directly by structural members with adequate load-bearing capacity and material integrity, using appropriate anchoring/connection hardware. Under no circumstances may equipment be supported by connections to finish materials. For example, equipment hung from toggle bolts through plaster-on-lath, gypsum board or ACT ceilings is **not acceptable**.
5. Basic System Parameters – Ordinary Hazard (Group 1)
- A. Ordinary Hazard (Group 1) is the **minimum design acceptable** for the following occupancies classified Light Hazard by NFPA 13:
 - 1. Attics
 - 2. Dormitories
 - 3. Museum Display Areas
 - 4. Office Buildings
 - 5. Student Apartments
 - 6. All high-rise buildings**
 - B. Experience has shown that the fire load in "Light Hazard" occupancies may change substantially when tenants relocate, building usage changes or storage requirements increase. Offices, college dorm rooms, etc. vary greatly in fuel load.
6. Compliance with FM GLOBAL Criteria
- A. Design densities, area of operation, sprinkler types, area per sprinkler, hose stream allowances, fire pump installation and other details should meet current FM Global criteria. Contact GM Global for specific requirements.
7. Material and Components
- A. Listing/Approval: All sprinkler system materials and components must be UL Listed or FM approved and used in strict conformance to the conditions of their Listing or Approval. Consult the latest editions of:
 - 1. UL Fire Protection Equipment Directory
 - 2. Factory Mutual Approvals Guide

- B. Control Valves: All indoor control valves in the two (2) inch through eight (8) inch range are to be the butterfly type, with integral tamper switch and position indicator. There have been many field problems with frame-mounted tamper switches on OS&Y valves.
- Exception:** Valves at any fire pump are to be the OS&Y type. Butterfly discs could cause turbulence on the intake side or be damaged on the supply side of a fire pump.
- C. Waterflow Alarm Switches: For wet pipe systems, paddle-type waterflow switches or alarm check valve pressure switches are permitted. Dry pipe and pre-action systems must use pressure type waterflow switches.
- D. Alarm Retard: Paddle waterflow alarm switches must have a retard mechanism to prevent nuisance alarms from water supply pressure surges. Each retard is to be tested and adjusted for 20 to 40 seconds' delay, depending on system size, unless the Authority having Jurisdiction (AHJ) instructs otherwise.
- E. Check Valves: Provide a cutoff valve on both sides of the check valve(s) in the water supply connection for isolation (servicing).

8. Installation, Test and Certification

- A. Locating Valves, Drains and Inspector's Test Connections: All sprinkler valves and controls must be located for safe, convenient access. Inspector's Test Connections should be operable from floor level. Identify each valve and control with a prominent phenolic or metal placard. Any valves, drains or test connections located behind access doors or panels must also have an appropriate placard on the means of access.
- B. Auxiliary Drains: Provide an auxiliary drain for each location where piping pitch prevents complete drainage through the main drain valve. If the capacity of the trapped section exceeds 5 gallons, a valve must be provided and the outlet piped to a drain or convenient location acceptable to the AHJ.
- C. Underground Pipe Flushing and Testing: Underground pipe shall be thoroughly flushed before connecting to the sprinkler system. Perform hydrostatic pressure test in accordance with NFPA 24-1992.
- D. Contractor's Inspection of System: The Contractor must thoroughly inspect the completed system to assure compliance with Duke's Design Guidelines, project design documentation and all applicable Codes and Standards.

Important: The sprinkler system Contractor's final inspection must include a test of each waterflow alarm switch and all system supervisory devices in coordination with the fire alarm system Contractor.

- E. Contractor's Material and Test Certificates: Complete and submit four (4) copies to the project Architect or Engineer. Once reviewed, the Architect or Engineer shall distribute one copy to the following parties:

1. Owner
 2. FM Global
 3. OESO
- F. Final Inspection by OESO: The OESO will inspect each sprinkler system, **after** completion of the required Contractor's inspection and certification. This inspection will be scheduled through the Design Engineer, who will also normally attend.
- G. Dry Pipe Systems Test: All dry pipe systems will be tripped and timed for sustained flow at the Inspector's Test Connection. Pre-action systems will have their fire detection and control equipment tested, followed by automatic and manual tripping of the pre-action valve. Foam-water systems will be flow tested long enough to verify proper operation.
- H. System Warranty: The warranty period begins on the date of acceptance by the State. The Architect or Engineer will document this event.