



Montgomery County Government

Building and Codes Department

350 Pageant Lane, Suite 309

Clarksville, TN 37040

SPRINKLER DESIGN INTENT – NFPA 13 Systems

2007 NFPA 13, 2007 NFPA 24, and 2009 IBC

To Accompany Architectural Review

Project:

Listed items require revision/clarification by contractual documentation (i.e., revised drawings, specifications, addenda, etc.) before plans can be approved. Answers in letter form are not acceptable. The Design Intent must be submitted by a Tennessee registered fire protection sprinkler system designer.

Starting construction before plan approval may be considered as just cause to issue a stop work order.

Correction lists are not all inclusive.

Submittal Requirements

1. Provide two (2) full size paper copy of plans, one copy of specifications, one pdf copy on a CD accompanied with a letter of certification stating that the pdf copy is an identical copy of the paper copy. All documents to be sealed (with signature and date) by a Tennessee registrant in accordance with the Architects and Engineers Licensing Law Rules. [Rule 07800203.03, 07800203.03(b), A&E Rule 012002.08(3)]

Architectural

1. Provide a separate sprinkler system riser for each area of a building separated by a 2/3/4hour Fire resistance rated structurally independent fire wall. The areas are considered separate buildings. [IBC 706.1]

Underground/Site

1. Provide the following information on a site plan. [NFPA 13 Chapter 10 and NFPA 24 Chapter 10]
 - A. Identify the location and size of the city main at the sprinkler system tap. Show the location of the domestic water tap. All piping from the “*point of service*” including underground used for sprinkler or standpipe system must be installed by a Tennessee registered sprinkler contractor. [Rule 078027.08] Show location of “*point of service*” for the underground sprinkler piping on the site plan and provide a note stating that the installation must be performed by a Tennessee registered sprinkler contractor. “Point of service” means the point immediately after the tap of the service main where water is used exclusively for fire protection purposes. [Rule 07800207.01(g)]
 - B. Provide details of the underground piping from the city main to the building identifying: line size and type (6" minimum, unless the requirements of NFPA 13 23.1.3.2 are met), depth of bury (3 ft. minimum), sectional valve locations (PIVs), valve pit, trench detail, and thrust block size and location, etc. [NFPA 24 Chapter 4, 10, and NFPA 13 Chapter 10]
 - C. Identify whether a reduced pressure backflow preventer or meter are present. When used, specify that this equipment is listed for fire protection use. [NFPA 13 23.1.7, 23.1.8.3, and NFPA 24 5.3]
 - D. The fire department connection (FDC) must be on the street side of the building and be located and arranged so that a hose can be attached without interference from any objects, fences, posts, and buildings. FDC must be located away from the building a minimum distance of 1.5 times the height of the building. [NFPA 24 5.9.5.2 and NFPA 13 A.8.17.2.1 and local fire department requirement]
 - E. The pumper hydrant must be within 100 feet of the fire department connection. [Office Policy]
 - F. Show the fire pump and/or water tank location when required by design. See the additional code requirements listed below in this review based on the Fire Pump and/or Tank Design Intent correction list(s). [NFPA 13 23.2, NFPA 24 5.6, and 5.7]
2. A post indicator valve (PIV) is required for supply lines. [NFPA 24 6.3.1] The PIV must be electronically supervised by a fire alarm system and should be located not less than 40 feet from the building. [2009 IBC 903.4 and NFPA 13 8.16.1.1.2]
3. Provide fire alarm supervised tamper switches at all control valves installed in the private fire service main. [IBC 903.4 and NFPA 13 8.16.1.1.2]
4. Service mains must not run under buildings unless special precautions are taken. Provide details showing the method utilized (i.e., arched foundation walls, covered trenching, and isolation valves). [NFPA 24 10.6.2, and NFPA 13 10.6.2]
5. Provide a leadin detail where the underground piping passes through the foundation and attaches to the riser. Provide clearance to prevent breakage of the piping due to building settlement. [NFPA 13 23.1.6.1, and .2] Provide a method for drainage where the leadin terminates at a point lower than grade. [NFPA 13 8.16.2]

Water Supply Availability and System Demand

1. Identify the sprinkler system occupancy hazard classification for the facility: Light and Ordinary (Groups 1 and 2), Extra (Groups 1 and 2), Special, or Mixed Commodity. [NFPA 13 5.1 thru .6] Commercial kitchens must be Ordinary Group 1. Storage spaces 50 sf or larger, janitor closets, and gas furnace rooms must be Ordinary Group 1. Large stack rooms in Libraries must be Ordinary Group 2. Stage area must be Ordinary Group 2. Laboratories using chemicals must be Ordinary Group 1 or 2. [2004 NFPA 45 4.2.1.1]
2. Provide the following information:
 - A. Identify the hydraulically most demanding area of the building. [NFPA 13 11.2.3.2 and 11.2.3.3]
 - B. Provide preliminary flow (gpm) and pressure (psi) demand calculations for the greatest demand area including required sprinkler head pressure, sprinkler system piping elevation loss, and friction loss (including device friction loss such as backflow preventers and isolation valves). [NFPA 13 11.2.3 and 14.4.4] Include outside hose demand (gpm). [NFPA 13 11.2.3.1.1]
 - C. Provide a graph plotting the water supply curve (static psi at zero gpm flow and residual psi at gpm flow) and system demand (preliminary calculated point of residual psi at gpm flow) to show that water supply (fire hydrant test) exceeds sprinkler system water demand for the building. [NFPA 13 22.3.4]

AboveGround

1. Identify the type of sprinkler system used:
 - A. Wet Pipe System [7.1]
 - B. Dry Pipe System [7.2] System [7.5]
 - C. Preaction or Deluge System [7.3]
 - D. NFPA 13 R System
 - E. Combined Sprinkler/Standpipe System
 - F. AntiFreeze [7.6]
 - G. Combined Dry Pipe, Preaction System [7.4]
 - H. NFPA 13 D System
2. Provide a sprinkler system riser schematic with control and check valves, backflow prevention devices, supply and system pressure gauges, water flow switches, tamper supervising switches, local water flow alarm location, and spare sprinkler head cabinet location. [NFPA 13 6.9.2, NFPA 13 22, Tennessee Board of Architects and Engineering Reference Manual Appendix F Standard of Care.
3. Provide flow test data (static psi, residual psi and gpm, who and when test was performed) for the existing sprinkler system riser when additions to existing systems are made. Provide this information on the plans (two inch main drain test). [NFPA 24]
4. Provide the total area protected of each floor for each system riser. The maximum area

limitation for the provided number of risers is: Light or ordinary hazard 52,000 sq. ft. per riser and extra hazard 40,000 sq. ft. per riser. [NFPA 13 8.2.1]

5. Identify type of aboveground pipe or tube materials used for the sprinkler system. [NFPA 13 6.3. and Table 6.3.1.1]
6. When CPVC piping is used, attach a copy of the Installation Manual on the design plans submittal. [NFPA 13 6.3.6.1 & Table 6.3.6.1]
 - A. CPVC pipe and fittings are not intended to be installed in combustibles concealed spaces where sprinklers are required by NFPA 13 or 13R. [[UL VIWT.GuideInfo](#)]
 - B. CPVC pipe and fittings are intended to be installed in applications where protection is provided. The minimum protection shall consist of either (1) one layer of 3/8 in. gypsum wallboard, (2) a suspended membrane ceiling with layin panels or tiles having a weight of not less than 0.35 psf when installed with metallic support grids, or (3) ½ in. plywood soffits. [[UL VIWT.GuideInfo](#)]
7. CPVC pipe and fittings may be installed without protection (exposed) when subject to the following additional limitations:
 - A. Exposed piping is to be installed below a smooth, flat, horizontal ceiling construction. [[UL VIWT.GuideInfo](#)]
 - B. Listed quickresponse, ordinary temperature rated pendent sprinklers having deflectors installed within 8 in. from the ceiling or listed residential ordinary temperature rated pendent sprinklers located in accordance with their listing and a maximum distance between sprinklers not to exceed 15 ft. [[UL VIWT.GuideInfo](#)]
 - C. Listed quick response ordinary temperature rated horizontal sidewall sprinklers having deflectors installed within 6 in. from the ceiling and within 6 in. from the sidewall or listed residential ordinary temperature rated horizontal sidewall sprinklers located in accordance with their listing and a maximum distance between sprinklers not to exceed 14 ft. [[UL VIWT.GuideInfo](#)]
8. Specify all areas to be sprinklered:
 - A. Elevator shafts must be sprinklered at the bottom of the shaft. [NFPA 13 8.15.5]
 - B. Provide sprinkler protection under an accessible first landing of a noncombustible stair and at the top of the stair shaft. [NFPA 13 8.15.3.2.1]
 - C. Provide sprinklers under all combustibles ground floors, exterior docks, and platforms. See reference for exceptions. [NFPA 13 8.15.6]
 - D. Provide sprinklers under combustibles exterior roofs or canopies exceeding 4 ft. in width. See reference for exceptions. [NFPA 13 8.15.7]
 - E. Provide sprinklers in every aisle and tier for library stack rooms. See reference for

exceptions. [NFPA 13 8.14.9]

- F. Provide sprinklers for electrical equipment rooms. See reference for exceptions. [NFPA13 8.15.10]
 - G. Provide sprinkler protection for elevator equipment rooms. [NFPA 13 8.15.5.3] The electrical equipment room exception does not apply elevator equipment rooms.
 - H. Provide sprinklers at stages, under the stage (if combustibile construction or used for storage), and at all adjacent stage areas. [NFPA 13 8.15.16.1] Where proscenium opening protection is required provide a deluge system with open heads no more than 3 feet from the stage side of the opening, and at a maximum of 6 feet on center. [NFPA 138.15.16.2]
 - I. Combustible concealed spaces must be sprinklered per NFPA 13 8.15.1. This includes floor ceilings made with composite wood joists, except where the ceiling is installed directly to the joist or with channels (maximum 1"), the joist channels are firestopped into 160 ft³ with materials equivalent to the joist construction, and where channels are used, at least 3 ½" of batt insulation is installed at the joist channel. [NFPA 13 8.15.1.2.6]
 - J. For dwelling units, sprinkler bathrooms, closets, and pantries per NFPA 13 8.15.8.
9. Provide a heated space for the dry sprinkler system riser. The dry pipe valve room must be lighted and heated. The source of heat must be a permanently installed type. [NFPA 13 8.16.4.1.3]
10. Show that the sprinkler system is supervised per NFPA 13 8.16.1.1.2 and IBC 903.4:
- A. Provide tamper switches at all control valves.
 - B. Provide a flow switch or alarm check valve and specify connection to the general building alarm that sounds within 90 seconds of flow. [NFPA 72 5.11.2 and NFPA 13 6.9.1] For systems protecting storage in accordance with NFPA 13 12.3, provide alarm service per NFPA 13 8.17.1.7.
 - C. For highrise buildings, the requirements of NFPA 13 8.17.1.6 must be met.
11. Specify seismic restraints for sprinkler piping in seismic areas required by IBC 1613. Specify flexible couplings at flexure joints per NFPA 13 9.3.2.1 and, where required, clearance around piping passing through concrete floors and concrete/CMU walls and foundations. [NFPA 13 9.3.4] Provide sufficient information on design drawings showing typical seismic bracing details, location of 4way bracing, longitudinal and latitudinal bracing, end of the line restraint bracing, and state the clearance required around sprinkler pipe based on pipe size.
12. For protection of special storage and commodities see NFPA 13 Chapter 12.

13. Specify that all system gauges and valves must be accessible for inspection and maintenance. [NFPA 13 8.1.2]
14. Where the potential exists for water pressures exceeding 175 psi, provide a pressure reducing valve meeting the requirements of NFPA 13 8.16.1.2.
15. The proposed sprinkler system solenoid valve used for elevator hoistways and machine rooms would have to be tested and listed for this particular application and be supervised by the fire alarm system to satisfy the code. [NFPA 13 6.1.1 and 8.15.1.1.2] The use of a stand alone solenoid valve serving a dry system branch line for elevator hoistways and machine rooms is not an acceptable alternative to a preaction sprinkler system.
16. Where a water curtain is used to protect glass walls and inoperable windows, specify that “specific application window sprinklers” are used. Unless otherwise listed:
 - (1) the system must be a wet system for interior use or a deluge system for exterior use;
 - (2) the glazing must be nonoperable, heat strengthened, tempered, single or double paned, minimum ¼ in. thick;
 - (3) without any horizontal framing members for the glazing frame;
 - (4) the frame must be noncombustible with a standard EPDM rubber gasket seal;
 - (5) the maximum height of the window assembly is 13 ft;
 - (6) heads spacing is a maximum of 6 ft on center or within each glazing segment; and
 - (7) some method must be used to keep combustibles a minimum of 2 in. from the glass. [Office Policy] The sprinkler heads must be arranged so that the entire surface of the glass is wet upon operation of the sprinklers.