SPRINKLER DESIGN INTENT – NFPA 13R SYSTEMS
2002 NFPA 13R, 2002 NFPA 13, 2002 NFPA 24 and 2006 IBC
To Accompany Architectural Review

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 by the State to issue a stop work order.** [Rule 0780-02-07-.09]

Submittal Requirements

1. Provide plans & specifications through the electronic plans submittal portal **or** provide one (1) 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 0780-02-03-.03, 0780-02-03-.03(b), A&E Rule 0120-02-.08(3)]

Architectural

1. A NFPA 13R sprinkler system applies to only residential occupancies up to and including 4-stories in height. [NFPA 13R 1.1]

Underground/Site

1. Provide the following information on a site plan: [NFPA 13R 6.5.3]

   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 0780-2-7-.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 0780-02-07-.01(g)]

   B. Provide details of the underground piping from the city main to the building identifying: line size and type, depth of bury, valve locations, etc. [NFPA 13R 5.2.1]

   C. At least one 1½ in. fire department connection must be provided for buildings greater than 2000 ft² or more than one story. [NFPA 13R 6.6.4.1 and .2]

   D. The pumper fire hydrant must be within 100 feet of the fire department connection. [Office Policy]

   E. 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 15.2, 2002 NFPA 24 5.6, and 5.7]

F. Identify the location of the test fire hydrant and provide flow test information including: static psi, residual psi and gpm, tester, company, date and time, and the hydrant elevation. [IBC 106.1.1.1]

Water Supply Availability and System Demand

1. Identify the highest demand area for areas inside the dwelling unit. [NFPA 13R 6.7.1.1, 6.7.1.2, and 6.7.1.4]

   A. For flat, smooth, horizontal ceilings, identify the compartment with the greatest hydraulic demand (a maximum of 4 heads must be calculated). For sloped, beamed, and pitched ceiling areas, all heads in the compartment must be calculated (no maximum).

   B. Provide two sets of preliminary calculations with: (1) a single head operating at 18 gpm, 7 psi; and (2) multiple heads operating at 13 gpm, 7 psi; or, where specific discharge criteria heads are used, provide cut sheets and calculations for single and multiple discharge criteria. [NFPA 13R 6.7.1.1 and 6.7.1.4]

   C. For systems with a common domestic and fire supply main, the domestic demand must be added to the system flow. Use Table A.6.5.5(a) and (b) to determine the flow. Domestic demand does not have to be added where an automatic domestic cutoff valve activates upon sprinkler line flow. [NFPA 13R 6.5.5]

   D. Provide a water supply/sprinkler system demand graph.

2. For areas outside the dwelling unit see NFPA 13R 6.7.2.

3. For garages see NFPA 13R 6.7.3.

Above-Ground

1. Identify the type of sprinkler system used. A wet system must be used where temperatures can reliably be maintained above 40°F. Where subject to freezing, an antifreeze, dry, preaction, or listed dry heads must be used. [NFPA 13R 5.3]

2. Provide a system riser schematic with control and check valves, supply and system pressure gauges, fire department connection location, waterflow alarm switches, local waterflow alarm type and location, tamper switches, and spare sprinkler heads. [NFPA 13R 6.6 and A6.5.3]

3. Listed residential sprinklers must be used in dwelling units (See Exceptions). [NFPA 13R 6.6.7.1]

4. Residential sprinklers that have not been listed with specific coverage criteria must meet the following. [NFPA 13R 6.7.1.3.1]

   A. Sprinklers must be spaced so that the maximum area protected by a single sprinkler does not exceed 144 ft^2. [NFPA 13R 6.71.3.1.1]

   B. The maximum distance between sprinklers must not exceed 12 ft. [NFPA 13R 6.71.3.1.2]

C. The maximum distance from the sprinkler to a wall or partition must not exceed 6 ft. [NFPA 13R 6.71.3.1.3]

D. The minimum distance between sprinklers within a compartment must be 8 ft. [NFPA 13R 6.71.3.1.4]

5. Identify type of pipe or tube materials used for the sprinkler system. [NFPA 13R 5.2.1 and Table 5.2.1]

6. When CPVC piping is used, attach a copy of the Installation Manual on the design plans submittal. [NFPA 13R 5.2.2.2 and Table 5.2.2.2]

   A. CPVC pipe and fittings are not intended to be installed in combustible 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 lay-in 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 quick-response, 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. Sprinkler protection is required for exterior balconies, decks, and ground floor patios of dwelling units where the building is Type V construction (combustible). [IBC 903.3.1.2.1]

9. Sprinklers must be installed in all areas except: [NFPA 13R 6.8.1]

   A. Sprinklers are not required in bathrooms where both of the following conditions are met: (1) The bathroom area does not exceed 55 ft2; (2) The walls and ceilings, including walls and ceilings behind fixtures, are of noncombustible or limited-combustible materials providing a 15-minute thermal barrier. [NFPA 13R 6.8.2]

   B. Sprinklers are not required in clothes closets, linen closets, and pantries within the dwelling units that meet all of the following conditions: (1) The area of the space does not exceed 24 ft2; (2) The least dimension does not exceed 3 ft; (3) The walls and ceilings are surfaced with noncombustible or limited-combustible. [NFPA 13R 6.8.3]

C. Sprinklers are not required in any corridor and stair that are open and attached. [NFPA 13R 6.8.4]

D. Sprinklers are not required in attics, penthouse equipment rooms, elevator machine rooms, concealed spaces dedicated exclusively to and containing only dwelling unit ventilation equipment, crawl spaces, floor/ceiling spaces, elevator shafts, and other concealed spaces that are not used or intended for living purposes or storage and do not contain fuel-fired equipment. [NFPA 13R 6.8.5]

E. Sprinklers are not required in closets on exterior balconies, regardless of size, as long as there are no doors or nonprotected penetrations from the closet directly into the dwelling unit. [NFPA 13R 6.8.6]

10. A single control valve arranged to shut off both the domestic system and the sprinkler system must be installed for systems with common sprinkler/domestic mains. [NFPA 13R 6.6.1.1] A separate shut off valve must be installed for the domestic line. [NFPA 13R 6.6.1.3]

11. A sprinkler system shut off valve is permitted only when it is electronically supervised by a fire alarm system. [NFPA 13R 6.6.1.2, IBC 903.4, and 903.4.1]

12. Provide a waterflow alarm switch and specify connection to the general building alarm. [NFPA 13R 6.6.8, IBC 903.4, and 903.4.1]

13. Provide a 1 in. drain with a separate valve on the system side of the control valve. [NFPA 13R 6.6.2.1, .2, and .3] A ½ in. drain is required at each trapped portion of a dry system that is subject to freezing. [NFPA 13R 6.6.2.4]

14. Provide a 1 in. test connection with a separate valve on the system side of the waterflow alarm switch. [NFPA 13R 6.6.3.1, .2, .3, and .4]

15. Specify seismic restraints for sprinkler piping in seismic areas required by 2006 IBC 1613.1. Specify flexible couplings at flexure joints per NFPA 13 9.3.2.1. Provide details or descriptions for minimum clearances around sprinkler piping passing through concrete floors, concrete/CMU walls, and foundations. [NFPA 13 9.3.4] Provide sufficient information on design drawings showing typical seismic bracing details, location of 4-way bracing, longitudinal and latitudinal bracing, and end of the line restraint bracing. [NFPA 13R 6.6.6]