Sprinkler system Plan Review
2018 International Fire Code and NFPA 13R

Date of Review: __/__/______ BLD20: ________
Project Address: ____________________________ Project Name: ____________________________
Professional Engineer’s Name: ____________________________ Phone: ________
Sprinkler Contractor’s Business Name: ____________________________ Phone: ________
Sprinkler Contractors Name: ____________________________ Phone: ________
Sprinkler Contractor’s Email Address: ____________________________

Occupancy Classification: ____________________________

Reference numbers following checklist statements represent an NFPA code section unless otherwise specified.

1. _____ Two sets of drawings are provided.

2. _____ System components are listed for intended use and compatible with the system, and specification data product sheets are provided.

**Drawings shall detail the following and items listed in 8.1:**

**General**

3. _____ The type of system is noted: wet, dry, antifreeze not exceeding 40 gals., pre-action, dry and type of sprinklers are noted: pend, upright, sidewall.

4. _____ Scale: a common scale shall be used and plan information is legible.
5. Plot plan showing supply piping and pipe size from the water source to the building.

6. Building’s dimension, location of partitions, and fire walls.

7. Room dimensions, labeled rooms, occupancy class of each room. If the room label is not descriptive provide the room's type of use.

8. Full-height cross elevation views and include ceiling construction.

9. Type of protection for nonmetallic pipe.

10. Dimensions for system piping, type of pipe, and component spacing.

11. Equipment symbol legend and the compass point.

12. A water flow alarm test connection is provided.

13. All water supply valves and flow switches are supervised, IFC 903.4.

14. Exterior flow alarm location is shown and the type identified, if electric, it is listed for outdoor use, and it is connected to the building fire alarm, if provided.

Note: if an electric bell is utilized, it shall be connected to the Fire Alarm Control Panel and listed for outdoor use.

16. Backflow prevention device, when required by state or local regulations, is shown in the pipe schematic, listed specification sheet and pressure loss data are provided.

17. Antifreeze systems are detailed and designed in accordance with NFPA 13:

18. Water supply provides the system demand for at least 30 minutes.

19. If a fire pump is required it is designed and detailed per NFPA 20 and this book’s checklist.

20. Pressure gauges for the riser are provided and detailed for supply and system pressure.

21. Riser coverage does not exceed 52,000 sq. ft.

22. Aboveground water supply pipe is protected against freezing conditions.
Sprinklers
23. Total number of each type of sprinkler is noted and the number of sprinklers per floor are noted,

24. Sprinkler location is correct, ceiling and roof sectionals are provided for clarification.

25. Type of sprinklers: sprinkler K-factors, temperature rating, and orifice size.

26. Residential sprinklers are limited for use for wet pipe automatic sprinkler systems unless specifically listed for another use,

27. When listed quick-response sprinklers are used in dwelling units, the dwelling unit shall meet the definition of a compartment and a maximum of four sprinklers are used, sprinkler density complies with 6.2., providing at least 0.1 gpm/ft² in the dwelling unit.

28. Sprinklers are rated for ordinary temperature (135°F-175°F) when ceiling temperature does not exceed 100°F,

29. Sprinklers in areas with a ceiling temperature of 101°F-150°F are equipped with intermediate temperature sprinklers (175°F-225°F),

30. Distance of sprinklers from heat sources complies with Table 6.2.

31. Sprinklers outside the dwelling unit are quick-response,

32. Each sprinkler coverage area is within its listing limitations,

33. Sprinkler coverage not required for an architectural area, e.g., bay window, etc., up to 18 sq. ft., dimension up to 2 ft. in depth and up to 9 ft. in length and is within sprinkler’s spacing distance,

34. Sprinkler coverage is not required for shadowed areas in a compartment not exceeding 800 sq. ft., where the area does not exceed 3 sq. ft., the aggregate of the areas do not exceed 12 sq. ft. in a compartment and 30 sq. ft. in a dwelling unit,

35. Sloped ceiling spacing is in accordance with Section 6.4.

36. Sidewall sprinklers are 4 in. to 6 in. from the ceiling unless listing permits otherwise,

37. Closets and storage areas not exceeding 400 cu. ft. a single sprinkler provides coverage and is located at the highest ceiling level,
38. Pendent sprinklers are at least 3 ft. from obstructions, e.g., light fixtures, ceiling fans, etc., or in accordance with 6.4. Sprinkler locations for continuous obstructions are in compliance with 6.4.

39. Sidewall sprinklers are at least 5 ft. from obstructions, e.g., light fixtures, ceiling fans, etc. Sprinkler locations for continuous obstructions are in compliance with 6.4.

40. Soffits and cabinets are provided sprinkler coverage in accordance with 6.4.

41. Ceiling pockets are sprinkled unless the pocket volume is 100 sq. ft. or less, its depth is 1 ft. or less, the fall below is protected, it is separated from other pockets by at least 10 ft., and the finish material is noncombustible or limited combustible.

42. Sprinklers are not required in dwelling unit bathrooms less than 55 sq. ft.

43. Sprinklers are not required in dwelling unit clothes closets, pantries, or linen closets less than 24 sq. ft. with the least dimension being 3 ft. or less, and walls and ceilings have noncombustible or limited-combustible surface materials.

44. Sprinklers are provided in closets containing heating or air-conditioning equipment.

45. Sprinklers on balconies and decks on buildings of Type V construction shall comply with Section 903.

46. Sprinklers are not required in attics, penthouse equipment rooms, elevator machine rooms, concealed spaces used exclusively for dwelling unit ventilation equipment, crawl spaces, floor/ceiling spaces, elevator shafts, and other non-used concealed areas.

47. Areas outside dwelling unit: Residential sprinklers can protect these spaces with flat smooth ceilings: (1) lobbies not in hotels or motels, (2) foyers, (3) corridors, (4) halls, (5) lounges, (6) other areas with fire loads similar to residential.

48. Garage separated from the residential building by fire-resistive construction, which qualifies the garage as a separate building is sprinkled in accordance with NFPA 13, NFPA 13R.

49. Garage accessible by people from more than 1 dwelling unit and not constructed like 7.3 is part of the building and is protected in accordance with 7.2.
50. Garages only accessible from one dwelling unit is protected in accordance with 7.3.

**Drains and Test Connection**

51. At least a 1 in. nominal diameter drain with a valve is detailed on the system side of the control valve.

52. A ½ in. drain is provided for each trapped portion of a dry system subject to freezing.

53. At least a 1 in. test connection with a valve is detailed.

**Pipe and Valves**

54. One control valve is provided for both the domestic water and sprinkler, unless a separate control valve is provided for the sprinkler system and it is **electronically supervised or locked open**.

**Pipe Support and Hangers Are in Accordance with NFPA 13, 13R 6.13.**

55. Type and locations of hangers, sleeves, braces, and methods of securing pipe are shown and the manufacturer's installation manual for plastic pipe is provided.

56. Steel pipe hanger spacing is not greater than 12 ft. for 1 in. to 1¾ in. not greater than 15 ft. for 1½ in. to 8 in.

57. Light wall steel pipe hanger spacing is not greater than 12 ft. for 1 in. to 3 in. pipe.

58. Branch lines are provided with one hanger per section of pipe.

59. Mains are provided with one hanger between each branch line unless Sections 9.2 are met.

60. Cross mains are provided with one hanger between each two branch lines or in compliance 9.2.

61. Risers in multistory buildings are provided with supports at the lowest level, each alternate level, below offsets, and at the top.

62. The maximum span distance between riser supports not to exceed 25 ft.
Seismic Protection in Accordance with NFPA 13 below, (13R 6.13)

63. Flexible couplings may be used for pipe 2½ in. or larger at structural separations or within 2 ft. of expansion joints, within 2 ft. of the top and bottom of all risers, within 1 ft. above and below a floor penetration in multistory buildings, and on both sides of and within 1 ft. of concrete or masonry wall penetrations unless pipe clearance is provided.

64. A 6 ell seismic separation assembly or listed flexible piping with four-way bracing within 6 ft., for any pipe, is provided and detailed at building seismic joints.

65. Proper pipe clearance is noted on the plans for pipe penetrations, 9.3.4. Minimum clearance around pipes: 2 in. for 1 in. to 3½ in., 4 in. for 4 in. and larger, refer to the 3 spacing variations.

66. Lateral sway bracing is required at a maximum spacing of 40 ft. for all mains, cross mains, and branch lines 2½ in. and larger.

67. Lateral sway bracing is designed not to exceed the maximum zone of influence loading provided for its spacing.

68. Bracing is provided for the last length of pipe of the end of a feed or cross main.

69. Bracing is required unless all the pipe is supported by rods less than 6 in. or by 30’ wrap-around U-hooks for any size pipe.

70. Longitudinal sway bracing is a maximum of 80 ft. for mains and cross mains and within 40 ft. of the end of the line.

71. A four-way sway brace is provided at least every 25 ft. and at the top of the riser if the top of the riser exceeds 3 ft. in length.

72. Seismic bracing calculations and the zones of influence are detailed and provided for each brace to be used as shown in NFPA Figure A.9.3.5 (b) and the design should be in compliance with IBC 16 and ASCE 7, 9.3.5.6 through 9.3.5.8. Supplementing the calculations will be justification for the specific selection of the seismic coefficient.

73. Longitudinal and lateral bracing is provided for each run of pipe between the changes of direction unless the run is less than 12 ft. and supported by adjacent pipe run bracing.

74. Branch lines are restrained at the end sprinkler of each line and restrained against vertical and lateral movement.
75. Branch line method of restraint is in accordance with Section 9.3.

76. Restraints for branch lines shall be at intervals not greater than specified in Table 9.3. and justification for selection of the seismic coefficient is provided.

77. Detailed are restraints for sprigs 4 ft. long or greater against lateral movement.

**Fire Department Connection**

78. Detail local water flow alarm location is shown above the FDC.

79. An FDC is provided for a building exceeding 2,000 sq. ft. or more than 1 story.

80. The FDC location with a check valve is detailed on the street side or response side of building.

81. FDC is 2½ in. connection and 18 in. to 48 in. above grade.

**Design Criteria and Hydraulic Calculations**

82. Reference points match with plans.

83. Pipe size references match the plans.

84. Sprinkler information matches the plans.

85. Water flow information is provided; static psi, residual psi, gpm at 20 psi residual with graphed results.

86. Calculations are correct: static psi, pipe length, gpm, K for drops or branch, elevation data, hose allowance, friction loss, and equivalent pipe length. Minimum sprinkler pressure is that specified by the listing or 7 psi, whichever is greater.

87. Domestic demand calculation are provided and added to the sprinkler system demand where both systems share a common water supply main.

88. The system provides at least the flow required for multiple and single sprinkler operation as specified by the listing, and at the flow must produce a minimum density of .05 gpm/ft² to the design sprinklers.

89. Sprinkler design for flat, smooth ceilings consists of up to 4 sprinklers within the same compartment with the largest flow and pressure demand.
90. Areas outside dwelling unit are designed in accordance with NFPA 13 or as a compartmented area with a demand of no greater than 4 sprinklers when all the following are met: (1) Is compartmented into areas 500 sq. ft. or less by 30 minute fire construction, (2) Area is protected by quick-response or residential sprinklers not exceeding 130 sq. ft. for ordinary hazard occupancies, 225 sq. ft. for light hazard occupancies or in accordance with the sprinkler listing, (3) Openings have a lintel of at least 8 in. in depth, (4) Total area of openings does not exceed 50 sq. ft. per compartment, (5) Design densities are per 7.2.

91. Garages that are only accessible from 1 dwelling unit are part of that dwelling and are sprinkled with residential sprinklers in accordance with 7.3 or quick-response sprinklers with a density of .05 gpm/ft$^2$ over the area of the garage up to 4 sprinklers.

92. A legend for calculation abbreviations is provided.

Review/Inspection Date ____/____/20____ Reviewer: ________________