NFPA 13 Sprinkler System
General Design Plan Review Worksheet

Date of Review: _______________________________ Permit Number: _____________________________
Business/Building Name: ________________________ Address of Project: __________________________
Designer Name: _______________________________ Designer’s Phone: __________________________
Contractor: ___________________________________ Contractor’s Phone: __________________________
No. of Sprinklers: ______________________________ Occupancy Classification: _______________________

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

Worksheet Legend: OK = acceptable N = need to provide NA = not applicable
1. ____ A minimum of three sets of drawings are provided.
2. ____ Equipment is listed for intended use and compatible with the system; specification data sheets are provided.

Drawings shall detail the following:

General:
3. ____ Type of system is noted: __ hydraulic calc, __ pipe schedule, __ wet, __ dry, __ preaction, __ deluge, __ antifreeze. The plans declare the design standard is the 2007 edition year of NFPA 13.
4. ____ Scale: a common scale shall be used and plan information shall be legible.
5. ____ Plot plan details illustrate the fire protection water supply piping and pipe diameter supplying the building.
6. ____ The location of smoke or fire partitions, fire walls and building elevation views.
7. ____ Occupancy class and or use of each room or area, 5.1.1.
8. ____ Full height cross sectionals and include ceiling construction as needed for clarification.
9. ____ Total area protected by each system for each floor is provided.
10. ____ Dimensions for system piping, sprinkler spacing and branch line spacing, and elevation changes.
11. ____ Equipment symbol legend and the compass point are provided.
12. ____ Area limitations for hazard classification; 52,000 sq. ft. for light and ordinary hazard, 25,000 sq. ft. for extra hazard pipe schedule, 40,000 sq. ft. for extra hazard-hydraulic calculations, and 40,000 for high-piled storage, 8.2.1.
13. ____ Hydrant flow test determining water supply capacity at 20 PSI residual pressure is provided.
14. ____ Hydraulic calculations are provided with summary, detail worksheets, and graph sheet, except for permissible pipe schedule systems, 22.3.
15. ____ Dry pipe system capacity in gallons is provided _____ gal., not to be greater than 750 gal. unless the requirements of 7.2.3.2 or 7.2.3.3 are met, 7.2.3.
16. ____ All water supply valves and flow switches are supervised, IFC 903.4.
17. ____ Exterior flow alarm location is detailed and provided for systems exceeding 20 sprinklers, 8.17.1.1. Note: if electric, it shall be listed for outdoor use, IFC 904.3.2.
18. ____ If required, backflow prevention device pressure loss data is provided in the hydraulic calculations.

Sprinklers:
19. ____ Total number of each type of sprinkler is noted, ordinary temperature sprinklers are to be used, see other permitted temperature ratings from 8.3.2.2 to 8.3.2.5.
20. ____ If the hazard classification of the occupancy is changed, the temperature of rating of sprinklers shall be evaluated in accordance with Section 8.3.2.6.
21. ____ Light hazard occupancies shall have quick-response sprinklers unless residential sprinklers are required in accordance with, IFC 903.3.2 and NFPA 13: 8.3.3.1
22. ____ Sprinkler locations are correct, ceiling and roof cross sectional views are provided for clarification, 22.1.3(45).
23. ____ For each type of sprinkler the K factor, temperature rating, and orifice size are provided, 22.1.3(12).
24. ____ Each sprinkler coverage area is within its area of protection limitations or its listing, 8.6.2.2, Table
8.6.2.2.1 (a-c).

25._____ Specialty sprinklers, extra coverage, early suppression fast response, large drop, sidewall, etc. comply with the standard and listing limitations, 6.1.1 and 8.4.1-8.4.10.

26._____ Maximum perpendicular distance to the walls is not greater than 1/2 of allowable distance between sprinklers, 8.6.3.2 and Tables 8.6.2.2.1(a through d), for sidewall sprinklers, 8.7.3.2 and Table 8.7.2.2.1. For irregular shaped or angled areas the sprinkler placement is in accordance with 8.6.3.2.3.

27._____ Standard sprinkler spacing from vertical obstructions complies with Table 8.6.5.1.2 and for floor mounted obstructions, Table 8.6.5.2.2, 8.6.5.1.2 and 8.6.5.2.2.

28._____ Sidewalls sprinkler spacing for a front obstruction refer to Table 8.7.5.1.3, for a side obstruction refer to Table 8.7.5.1.4, and for a floor mounted obstruction refer to Table 8.7.5.2.2.

29._____ Extended coverage uprights and pendant spacing for ceiling or wall obstructions refer to Table 8.8.5.1.2 and for floor mounted obstructions refer to Table 8.8.5.2.2.

30._____ Extended coverage sidewall spacing for front obstructions refer to Table 8.9.5.1.3 and for floor mounted obstructions, Table 8.9.5.2.2.

31._____ Residential upright and pendant sprinkler spacing from vertical obstructions complies with Table 8.10.6.1.2 and for floor mounted obstructions, Table 8.10.6.2.2.

32._____ Residential sidewall sprinkler spacing from ceiling or hanging obstructions complies with Table 8.10.7.1.3 and for floor mounted obstructions, Table 8.10.7.2.2.

33._____ Sprinkler coverage is provided under obstructions greater than 4 ft. wide, 8.5.5.3.1.

34._____ Baffles are designed and provided for sprinklers less than 6 ft. apart in accordance with Section 8.6.3.4.2.

35._____ Pilot line detector system design is in accordance with Section 8.14.

36._____ Locations or conditions requiring special consideration, 8.15.

37._____ A. concealed spaces, for the 15 omissions see 8.15.1.2.

38._____ B. vertical shafts, 8.15.2.

39._____ C. stairways, 8.15.3.

40._____ D. vertical openings, 8.15.4.

41._____ E. elevator hoistways and machine rooms, 8.15.5.

42._____ F. spaces under ground floors, exterior docks, and platforms, 8.15.6.

43._____ G. exterior roof and canopy, 8.15.7.

44._____ H. dwelling unit, 8.15.8.

45._____ I. library stack or medical record storage room, 8.15.9.

46._____ J. electrical equipment, 8.15.10.

47._____ K. duct protection, 8.15.12

48._____ L. ceilings: open-grid, drop-out, 8.15.13 and 8.15.14.

49._____ M. stages, 8.15.16.

50._____ Sprinkler placement for the protection of a vertical shaft is in accordance with 8.15.2.1.

51._____ Vertical shaft with combustible surfaces is protected in accordance with 8.15.2.2.

52._____ Sprinklers are provided beneath combustible stairs, 8.15.3.1.

53._____ Sprinklers are provided for stairways in accordance with 8.15.3. Refer to 8.15.3.2 for when there is storage use under the stair landing and 8.15.3.2.4 when a noncombustible construction exterior stair tower is 50 percent open.

54._____ Closely spaced sprinklers with draft stops are provided around unenclosed floor openings except large openings like found in malls or atriums, and openings between floors of a common dwelling unit, 8.15.4.1 and 8.15.4.2.

55._____ Elevator shaft has a sprinkler within 2 ft. of the shaft floor unless the shaft is noncombustible and there are no hydraulic fluids, 8.15.5.

56._____ Ordinary or intermediate temperature sprinklers are in the elevator machine room or at the top of the elevator shaft, refer to exceptions, 8.15.5.1–8.15.5.5.

57._____ Sprinklers are provided under combustible ground floor, exterior dock, and platforms, 8.15.6.

58._____ Sprinklers are provided under roofs and canopies unless constructed of noncombustible or limited combustible materials, less than 4 ft. wide, and no storage, refer to exceptions 8.15.7.1–8.15.7.4.
59. _____ Sprinklers are not required in noncombustible dwelling unit bathrooms, less than 55 sq. ft. or limited combustible with a 15 minute thermal barrier, except in nursing homes, 8.15.8.1.
60. _____ Sprinklers are not required in hotel or motel dwelling unit bathrooms, less than 55 sq. ft. or limited combustible with a 15 minute thermal barrier, except in nursing homes, 8.15.8.1.

the closet area and its least dimension complies with 8.15.8.2.
61. _____ Sprinklers are provided in every aisle and at every tier stack, distance is not more than 12 ft. in library stack rooms, 8.15.9.

62. _____ Sprinklers are provided in electrical equipment rooms, exception: the room is dedicated use, has dry type equipment, 2 hour equipment enclosures, and no combustible storage, 8.14.10. Also consult the exceptions pertaining to spaces containing telecommunication equipment and associated power supplies as specified in IFC Section 903.2., 8.15.10.

63. _____ When required, ducts are protected in accordance with 8.15.12.1. Method of access for each sprinkler is detailed.
64. _____ Open grid ceilings shall not be installed under sprinklers, unless the grid opening and sprinkler placement criteria of Section 8.15.13 are met.

65. _____ Drop-out ceilings are installed under sprinklers in accordance with their listing, and sprinklers are not located below the ceilings, 8.15.14.

66. _____ Sprinklers for stages shall be provided in accordance with Section 8.15.16.
67. _____ Proscenium openings for stages shall be protected in accordance with Section 8.17.5.2.

Pipe Support and Hangers:
68. _____ Type and locations of hangers, sleeves, and braces are shown, 12.1.3(22). Non-listed hangers shall meet 5 performance criterion and the design shall be sealed by a registered professional engineer, 9.1.1.2.

69. _____ If trapeze hangers are used, the locations are shown, a legend provides the span, size of pipe supported, angle and pipe used, and section modulus in accordance with Section 9.1.1.6.
70. _____ Pipe hanger spacing is in accordance with Table 9.2.2.1(a).
71. _____ Ligh-wall steel pipe hanger spacing is in accordance with Table 9.2.2.1(a).
72. _____ Branch lines show one hanger for each section of pipe, exceptions are listed, 9.2.3.2.
73. _____ Cross mains show one hanger between each branch lines or in compliance with Table 9.2.2.1(a), and for additional spacing variations refer to Section 9.2.4.

74. _____ Supports can be on the horizontal pipe section if within 24 in. of the vertical pipe centerline, 9.2.5.1.
75. _____ Risers in multi-story buildings show supports at the lowest level, each alternate level, below offsets, and at the top, 9.2.5.4.

76. _____ The distance between supports for a riser does not exceed the limit specified., 9.2.5.5.

Pipe and Valves:
77. _____ Main drain location and pipe diameter are detailed and complies with Section 8.16.2.4.
78. _____ Main drain routing is to the exterior or to an interior drain but ensure that the drain capacity is adequate, 8.16.2.4.4.
79. _____ Auxiliary drain location is detailed and its size is in accordance with Section 8.16.2.5.
80. _____ When required, the location of the listed backflow prevention device (can serve as a check valve) is detailed, 8.16.1.1.3.2.

81. _____ A listed control valve is provided on each side of the check valve, 8.16.1.1.4.1. Only one control valve on the system side of the check valve is necessary when the water supply is provided from the city connection, 8.16.1.1.4.3.
82. _____ The control valve locations are accessible, 8.16.1.1.7.

83. _____ If a pressure reducing valve is used, its location and installation criteria are detailed in accordance with Section 8.16.1.2.
84. _____ If used, outside post-indicator control valve (PIV) locations and installation criteria are detailed in accordance with Section 8.16.1.3.
85. _____ If PIVs are approved to be located in a pit, the pit construction, location, and marking are designed and detailed in accordance with Section 8.16.1.4.2.
Seismic Bracing:
86. Flexible couplings may be used for pipe 2½ in. or larger in accordance with Sections 9.3.2.2 and 9.3.2.3.
87. Flexible couplings are specified for drops to hose lines, rack sprinklers, and mezzanines, 9.3.2.4.
88. A seismic separation assembly is provided and detailed at building seismic joints, 9.3.2.1 and 9.3.2.3.
89. Proper pipe clearance is noted on the plans for pipe penetrations in walls, floors, platforms or foundations, 9.3.4. Minimum clearance is in accordance with Section 9.3.4.2 – 9.3.4.7.
90. Lateral sway bracing is required at a maximum spacing of 40 ft. for all feed mains, cross mains, and branch lines 2½ in. and larger, 9.3.5.1.
91. Lateral sway bracing is designed not to exceed the maximum zone of influence loading provided in Tables 9.3.5.3.2(a) and (b) for its spacing, 9.3.5.3.2.
92. Bracing is provided for the last length of pipe of the end of a feed or cross main, 9.3.5.3.5.
93. 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, 9.3.5.3.8.
94. Longitudinal sway bracing has a maximum span of 80 ft. for mains and cross mains and within 40 ft. of the end of the line, 9.3.5.4.1 and .3.
95. A four-way sway brace spacing on a riser does not exceed 25 ft. and a four-way sway brace is located at the top of the riser if the top of the riser exceeds 3 ft. in length, 9.3.5.5.
96. Seismic bracing calculations and the zones of influence are detailed and provided for each brace to be used as shown in NFPA Figure A.9.3.5.6(e), 9.3.5.6 through 9.3.5.8. The calculations shall include the basis for the selection of the seismic coefficient from Table 9.3.5.6.2.
97. 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, 9.3.5.11.2.
98. Branch lines are restrained at the end sprinkler of each line and restrained against vertical and lateral movement, 9.3.6.3.
99. Branch line method of restraint is in accordance with Section 9.3.6.1.
100. Restraints for branch lines shall be at intervals not greater than specified in Table 9.3.6.4 and justification for selection of the seismic coefficient is provided, 9.3.6.4.
101. Detailed restraints for sprinkler 4 ft. long or greater against lateral movement, 9.3.6.6.

Fire Department Connection (FDC):
102. The FDC location is detailed on the street side or response side of building or as approved by the Bureau of Fire Prevention, and when connected to the water supply it will not obstruct emergency vehicle access to the building, IFC 912.
103. Local water flow alarm is provided when the sprinkler system exceeds 20 sprinklers and its location is detailed, 8.17.1.1.
104. FDCs for fire engine or fire boat are sized and arranged in accordance with A.8.17.2, 8.17.2.3, and 8.17.2.4.
105. The arrangement of the FDC piping supplying wet pipe, dry pipe, preaction or deluge sprinklers shall be in accordance with Section 8.16.2.4.2.

Hydraulic Calculations, 22.3:
106. Specify the calculation method used, density/area or room design, 22.3.
107. The summary sheet, water supply graph sheet, supply analysis, node analysis, and worksheets are provided for computer generated calculations, 22.3.5. The summary sheet, water supply graph sheet, and worksheets are provided for hand calculations.
108. Reference points in the calculation worksheet match with points on the plans, and the occupancy hazard classifications are correct for the occupancy or use, 22.3, 11.2.1.2.3.
109. If design area adjustments are made, the adjustment methodology is provided, 22.32, 22.3.5.2.
110. The use of quick response sprinklers in a design area shall meet the specific requirements in Section 11.2.3.2.3.
111. Pipe size and length references in the calculation worksheet match the plans.
112. Sloped ceiling may require a 30 percent increase of design area, 11.2.3.2.4.
113. ____ Sprinkler data sheet matches information on the plans.
114. ____ Water flow information is provided with static PSI, residual PSI, and available GPM at 20 PSI residual with graphed results.
115. ____ Density and design areas information are provided and comply with the restrictions listed in Section 11.2.3.1.4, Fig 11.2.3.1.1.
116. ____ Calculations are correct: static PSI, pipe length, GPM, K factors for drops or branch lines, elevation data, hose allowance, friction loss, and equivalent pipe and fitting lengths, 22.3.
117. ____ For the room design method the design area includes the most demanding room and if any, adjacent communication compartments, 11.2.3.3, 22.4.4.1.2.
118. ____ A minimum of 2 summary calculations are provided for a grid system, refer to the one exception, 22.4.4.4.2.
119. ____ Additional calculations may be required by the fire code official if the building design and room uses do not make the most demanding area obvious.
120. ____ Legend for calculation abbreviations is provided.
121. ____ Calculations are also provided for extra hazard occupancies, deluge, and exposure systems.
122. ____ Dry pipe and double interlock preaction design areas are increased 30 percent but the density remains the same (11.2.3.2.5), use of high-temp sprinklers in extra hazard occupancies may reduce design area by 25 percent but not less than the area specified in 11.2.3.2.6.