



Mobile Fire-Rescue Department Bureau of Fire Prevention
 2851 Old Shell Road Mobile, Al 36607 (251)208-7484 Fax: (251)208-7162



**NFPA 13 Sprinkler System
 General Design Plan Review Worksheet**

February 2010

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



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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 pendent 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 pendent 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.



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59. ____ Sprinklers are not required in noncombustible dwelling unit bathrooms, less than 55 sq. ft. or limited combustibles 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 clothes closet, pantries, or linen closets provided 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 combustibles 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. ____ Light-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.



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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, 9.3.3.2 and 9.3.3.3.
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, 9.3.5.3.1.
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 are restraints for sprigs 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 work sheets 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.



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- 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.

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