

**NFPA 13 Sprinkler System
Plan Review Checklist**
2014 OFC and 2013 NFPA 13 (Updated 07/11/2016)

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 checklist statements represent an NFPA code section unless otherwise specified.

Checklist Legend: ✓ or 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 (23.1.3 Items 1-46):

General

3. _____ Type of system is noted; ___ hydraulic calc, ___ pipe schedule, ___ wet, ___ dry, ___ preaction, ___ deluge, or ___ antifreeze.
4. _____ The plans declare the design uses the 2013 edition year of NFPA 13.
5. _____ Scale: a common scale shall be used and plan information shall be legible.
6. _____ Plot plan details illustrate the water supply pipe diameters, lengths, and fittings to the building.
7. _____ The location of partitions and fire rated walls, and building elevation views.
8. _____ Occupancy class and or use of each room or area. Classify a room if the hazard is different than adjacent areas or rooms, Chapter 5 NFPA 13.
9. _____ Full height cross sectionals and include ceiling construction if needed for clarification.
10. _____ Total area protected by each system for each floor is provided.
11. _____ Dimensions for system piping, sprinkler spacing, branch line spacing, and elevation changes.
12. _____ Equipment symbol legend and the compass point are provided.
13. _____ Area limitations for hazard classification; 52,000 sq. ft. for light and ordinary hazard, 25,000 sq. ft. for extra hazard pipe schedule and 40,000 sq. ft. for extra hazard-hydraulic calculations, and 40,000 for high-piled storage, 8.2.1.
14. _____ Hydrant flow test determining water supply capacity at 20 psi residual pressure is provided. 23.2.1.1
15. _____ Hydraulic calculations are provided with summary, detail worksheets, and graph sheet, except for permissible pipe schedule systems, 23.5.
16. _____ 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.
17. _____ All water supply valves and flow switches are supervised, OFC 903.4 refer to exceptions.
18. _____ Exterior flow alarm location is detailed. Note: if electric, it shall be listed for outdoor use, OFC 904.3.2.
19. _____ Backflow prevention device pressure loss data is provided in the hydraulic calculations.

Sprinklers

20. _____ Total number of each type of sprinkler is noted, ordinary temperature sprinklers are to be used, see exceptions, 8.3.2.1.
21. _____ Minimum temperature for ceiling sprinkler for general rack, tire, and rollpaper storage is 150 deg., 8.3.2.7.
22. _____ Light hazard occupancies shall have quick-response sprinklers, 8.3.3.1, OFC 903.3.2.
23. _____ Sprinkler locations are correct, ceiling and roof cross sectional views are provided for clarification, 23.1.3(45).
24. _____ For each type of sprinkler the K factor, temperature rating, and orifice size are provided, 23.1.3.(12).
25. _____ Each sprinkler coverage area is within its square footage limitations or its listing, 8.6.2.2, Table 8.6.2.2.1 (a-d).
26. _____ 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- 8.4.9.
27. _____ 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.
28. _____ 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.
29. _____ Sidewalls sprinkler spacing for front obstructions refer to Table 8.7.5.1.3, for a side obstruction refer to Table 8.7.5.1.4, and for floor mounted obstructions refer to Table 8.7.5.2.2.
30. _____ 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

31. _____ 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.
32. _____ 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.
33. _____ 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.
34. _____ Sprinkler coverage is provided under obstructions greater than 4 ft. wide, 8.5.5.3.1.
35. _____ Baffles are designed and provided for sprinklers less than 6 ft. apart in accordance with section 8.6.3.4.2.
36. _____ Locations or conditions requiring special consideration, 8.14.
37. _____ A. concealed spaces, 8.15.1.
38. _____ B. vertical shafts, 8.15.2.
39. _____ C. stairways, 8.15.3.
40. _____ D. vertical openings, 8.14.4.
41. _____ E. elevator hoistways and machine rooms, 8.15.5.
42. _____ F. spaces underground floors, exterior docks, and platforms, 8.15.6.
43. _____ G. exterior projections (including roof and canopy), 8.15.7.
44. _____ H. dwelling unit, 8.15.8.
45. _____ I. hospital clothes closet, 8.15.9
46. _____ J. library stack room, 8.15.10.
47. _____ K. electrical equipment, 8.15.11.
48. _____ L. industrial ovens and furnaces, 8.15.12
49. _____ M. duct protection, 8.15.13
50. _____ N. ceilings: open-grid, 8.15.14 and drop-out, 8.15.15.
51. _____ O. old style sprinklers, 8.15.16
52. _____ P. stages, 8.15.17.
53. _____ Sprinkler is provided at top of shaft, refer to exceptions, shafts with combustible surfaces require coverage at alternate levels, accessible noncombustible shaft has sprinkler at bottom, 8.15.2.
54. _____ Vertical shaft has sprinklers at top opening, above bottom opening and alternate levels when it has combustible surfaces, 8.15.2.1, 8.15.2.2.
55. _____ Sprinklers are provided beneath combustible stairs, 8.15.3.1.
56. _____ Sprinklers are provided at the top of the shaft, under the first landing above the shaft bottom when the shaft and stairs are noncombustible, 8.15.3.2. Refer to 8.15.3.2.3 for storage beneath stairs.
57. _____ 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 -.3.
58. _____ Elevator shaft has a sprinkler within 2 ft. of the bottom unless the shaft is noncombustible and there are no hydraulic fluids, 8.15.5.
59. _____ Ordinary or intermediate temperature sprinklers are in the elevator machine room or at the top of the elevator shaft, 8.15.5.4.
60. _____ Sprinklers are provided under combustible ground floor, exterior dock, and platforms, 8.15.6.
61. _____ Sprinklers are provided under roofs and canopies unless noncombustible, less than 4 ft. wide, and no storage, refer to exceptions 8.15.7.1 - .5
62. _____ 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 (I-1 and I-2) and in bathrooms that have direct access into corridors and exitways used by the public, 8.15.8.1.1.
63. _____ Sprinklers are not required in hotel or motel dwelling unit clothes closet, pantries, or linen closets less than 24 sq. ft. and the least dimension is not greater than 3 ft., 8.15.8.2.
64. _____ Sprinklers are provided in every aisle and at every tier stack, distance is not more than 12 ft. in library stack rooms, 8.15.10.
65. _____ 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 allowed, 8.15.11.
66. _____ Open grid ceilings shall not be installed under sprinklers, unless the grid opening and sprinkler placement criteria of section 8.15.14 are met.
67. _____ Drop-out ceilings are installed under sprinklers in accordance with their listing, and sprinklers are not location below the ceilings, 8.15.15.
68. _____ Sprinklers are provided below the stage ceiling, under stages of combustible construction or if combustibles are stored under the stage, and if required for proscenium opening protection a deluge system is provided, 8.15.16.
69. _____ 2½ in. hose connection is allowed with wet system of light or ordinary hazard and each sprinkler floor system has its own control valve, minimum riser size is at least 4 in., each combination sprinkler and standpipe riser has its own control valve that isolates it from other risers, 8.17.5.2.

Pipe Support and Hangers

70. _____ Type and locations of hangers, sleeves, and braces are shown, 23.1.3(22). Non-listed hangers shall meet 5 performance criteria and be engineer certified, 9.1.1.2
71. _____ If trapeze hangers are used, the locations are shown, a legend provided to specify span, size of pipe supported, angle and pipe used, and section modulus are provided and comply with section, 9.1.1.7.
72. _____ Pipe hanger spacing by 9.2.2, Table 9.2.2.1(a), and the pipe listing information.
73. _____ Branch lines show one hanger for each section of pipe, 9.2.3.2.
74. _____ Cross mains show one hanger between each branch lines or in compliance with Table 9.2.2.1, and for additional spacing variations refer to section 9.2.4.
75. _____ Supports can be on the horizontal pipe section if within 24 in. of the vertical pipe centerline, 9.2.5.1.
76. _____ Risers in multi-story buildings show supports at the lowest level, each alternate level, below offsets, and at the top, 9.2.5.4.
77. _____ Risers have a distance between supports of not greater than 25 ft., 9.2.5.5.

Pipe and Valves

78. _____ Main drainage pipe is $\frac{3}{4}$ in. or greater for riser up to 2 in., $1\frac{1}{4}$ in. or greater for riser $2\frac{1}{2}$ in. to $3\frac{1}{2}$ in., 2 in. only for riser 4 in. or greater, size is shown or determined by specified valve type, 8.16.2.4.2.
79. _____ 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.
80. _____ Auxiliary drain location is detailed and its size is in accordance with section 8.16.2.5.
81. _____ When required the location of the listed backflow prevention device (can serve as a check valve) is detailed, 8.16.1.1.3.
82. _____ 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.
83. _____ The control valve locations are easily accessible, 8.16.1.1.7.
84. _____ If a pressure reducing valve is used, its location and installation criteria are detailed in accordance with section 8.16.1.2.
85. _____ If used, outside post-indicator control valve (PIV) locations and installation criteria are detailed in accordance with section 8.16.1.3.
86. _____ 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 Protection

87. _____ Flexible couplings may be used for pipe $2\frac{1}{2}$ 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, 9.3.2.
88. _____ A seismic separation assembly, for any pipe, is provided at building seismic joints, 9.3.3.
89. _____ Proper pipe clearance is noted on the plans for pipe penetrations, 9.3.4.
90. _____ Lateral sway bracing is required at a maximum spacing of 40 ft. for all mains, cross mains, and branch lines $2\frac{1}{2}$ in. and larger, 9.3.5.5.2.2.
91. _____ Lateral sway bracing is designed not to exceed the maximum zone of influence loading in Tables 9.3.5.5.2(a-e) for its spacing, 9.3.5.5.2.3.
92. _____ Lateral sway bracing is provided for the last length of pipe but within 20 ft. of the end of a feed or cross main, 9.3.5.5.7.
92. _____ Lateral sway bracing is required unless all pipe is supported by rods less than 6 in. or by 30° wrap-around U-hooks for any size pipe, 9.3.5.5.10 and .11.
94. _____ Longitudinal sway bracing is a maximum of 80 ft. for mains and cross mains and within 40 ft. of the end of the line, 9.3.5.6.1 and .3.
95. _____ 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, 9.3.5.8.1 and .4.
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(b) and the design should be in compliance with OSSC Chapter 16 and ASCE 7, 9.3.5.6 to .10.
97. _____ Longitudinal and lateral bracing is provided for each run of pipe between the change of direction unless the run is less than 12 ft. and supported by adjacent pipe run bracing, 9.3.5.11.
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. _____ Restraints are detailed for springs 4 ft. long or greater against lateral movement, 9.3.6.6.

Fire Department Connection (FDC)

102. _____ The local water flow alarm location is above the FDC, OFC 912.2. Local water flow alarm is provided when the sprinkler system exceeds 20 sprinklers and its location is detailed, 8.16.1.1
103. _____ The FDC location is detailed on the street side or response side of building or as approved by the fire official, and when connected to the water supply it will not obstruct emergency vehicle access to the building, OFC 912.
104. _____ FDC is installed per OFC 912 and 8.17.2.

Hydraulic Calculations, 11.2 and 14.1.3

105. _____ Specify the calculation method used, density area or room design, 23.1.
106. _____ Reference points in the calculation worksheet match with points on the plans, the occupancy hazard classifications are correct for the occupancy or use, 23.3 and 11.2.1.2.
107. _____ If design area adjustments are made, the adjustment methodology is provided, 23.3.2, 23.3.5.2.
108. _____ The use of QR sprinklers in a design area meets design specifics, 11.2.3.2.3.
109. _____ Pipe size and length references in the calculation worksheet match the plans, 23.1.
110. _____ Sloped ceiling may require a 30 percent increase of design area, 11.2.3.2.4.
111. _____ Sprinkler head information matches information on the plans, 23.1.
112. _____ Water flow information is provided with static psi, residual psi, and available gpm at 20 psi residual with graphed results, 23.2.1.
113. _____ 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.
114. _____ Calculations are correct: static psi, pipe length, gpm, K for drops or branch lines, elevation data, hose allowance, friction loss, and equivalent pipe and fitting lengths, 23.3.
115. _____ For the room design method the design area includes the most demanding room and if any, adjacent communication compartments, 11.2.3.3, 23.4.4.1.2.
116. _____ A minimum of 2 summary calculations are provided for a grid system, refer to the one exception, 23.4.4.2.
117. _____ Multiple calculations may be required by the AHJ if the building design and room uses do not make the most demanding area obvious.
118. _____ Legend for calculation abbreviations is provided.
119. _____ Calculations are provided for extra hazard extra hazard occupancies, deluge, exposure, in-rack systems, 23.5.4, 23.6, 23.7, 23.8.
120. _____ 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 occupancy may reduce design area by 25 percent but not less than 2,000 sq. ft., 11.2.3.2.6.

Residential Sprinklers in a 13 System

121. _____ Calculations for a single and for a multiple sprinkler discharge are provided, 11.3.1.1.
122. _____ The calculation design is based on the 4 most demanding sprinklers at the minimum listed flow rate or 0.10 gpm/ft., 11.3.1.2.
123. _____ Hose streams and water duration requirements are for LH in accordance with Table 11.2.3.1.1, 11.2.3.5.5.

Special Design

124. _____ Special design considerations for exposure protection, water curtain, and dry system are in accordance with 11.2.3.1.2.

Pipe Schedule

Note: For systems less than 5000 sq. ft. the minimum water flow is proven to be available in accordance with Table 11.2.2.1. Systems more than 5,000 sq. ft. shall have 50 psi residual pressure and meet the requirements of Table 11.2.2.1, 11.2.2.1, 11.2.2.3, and 23.5.

125. _____ Only 5.6 K-factor sprinklers, other size heads are for hydraulically calculated systems, 23.5.1.2.
126. _____ Light Hazard: 8 heads maximum for each branch line, 23.5.2.1.1, 9 and 10 are permitted, see 23.5.2.1.2.
127. _____ A. pipe size and number of sprinklers are in accordance with Table 23.5.2.2.1.
128. _____ B. sprinklers above and below the ceiling are in accordance with Table 23.5.2.4.
129. _____ Ordinary Hazard: 8 sprinklers maximum for each branch line, 23.5.3.2.1.
130. _____ A. pipe size and number of sprinklers are in accordance with Table 23.5.3.4.
131. _____ B. heads greater than 12 ft. separation are in accordance with Table 23.5.3.5.
132. _____ C. sprinklers above and below the ceiling are in accordance with Table 23.5.3.7.
133. _____ Extra Hazard: not allowed, 23.5.4.

Wet System

134. _____ Relief valve not less than ¼ in. is detailed for gridded system, 7.1.2.1.
135. _____ An alarm connection not less than 1 in., discharging to the exterior, is provided to test the waterflow alarm, 8.17.4.2.

Dry System, Grid System not Permitted, 7.2

136. _____ Only upright, listed dry sprinklers are used, see exceptions for return bends and sidewall sprinklers, 7.2.2.
137. _____ System capacity is provided, 23.1.3(17).

- 138. ____ Only one dry pipe valve is permitted for each system that does not exceed 750 gallons unless the design complies with 7.32.3.2 or 7.2.3.3, 7.2.3.1.
- 139. ____ System is designed to meet the water delivery times for the hazard classification in accordance with Table 7.2.3.6.1 and calculations are provided, 702.3.6.
- 140. ____ A trip test connection with a shut-off valve and at least a 1 in. plug is at the furthest sprinkler pipe, 8.17.4.3.
- 141. ____ Compressor capacity specification sheet is provided, restores system within 30 minutes, 7.2.6.3.2.
- 142. ____ Compressor piping system, air fill line not less than ½ in., and check-relief-shutoff valves are shown or noted, 7.2.6.3.
- 143. ____ Shown is the location for the quick opening device (QOD) for systems greater than 500 gallons, see exception in 7.2.3.3.
- 144. ____ Shown is the location of the check valve for QOD and the antiflooding device between the riser and the QOD, 7.2.4.5, 7.2.4.8.

Preaction or Deluge

- 145. ____ Pressure gauge locations are above and below the preaction valve and on the air supply, 7.3.1.3.
- 146. ____ Location and spacing of the detection devices are detailed, 7.3.1.7.
- 147. ____ The preaction system is limited to 1,000 sprinklers, 7.3.2.2.
- 148. ____ Only upright, listed dry sprinklers are used, see exceptions for return bends and sidewall sprinklers, 7.3.2.5.
- 149. ____ Double interlock systems are not gridded, 7.3.2.6, and valve room is protected against freezing, 7.3.1.8.

Combined Dry Pipe and Preaction

- 150. ____ Dry pipe riser location is shown.
- 151. ____ Two 6 in. dry pipe valves are provided for systems greater than 600 sprinklers or greater than 275 sprinklers in a fire area, 7.4.3.1.
- 152. ____ Multi-dry pipe valves are interconnected with 1 in. pipe with shut-off valve for simultaneous tripping, 7.4.3.4.
- 153. ____ QOD is provided at the dry pipe valves, 7.4.3.8.
- 154. ____ A minimum 2 in. exhaust valve is shown at the end of the common feed main, 7.4.4.1.
- 155. ____ Fire areas requiring greater than 275 sprinklers shall divide the system into sections of 275 sprinklers or less by the use of check valves, and a building with multi-fire areas shall limit 600 sprinklers per check valve, 7.4.4.1 and 7.4.4.2.
- 156. ____ The manual method of activating the detection system is within 200 ft. of travel, 7.4.2.3.
- 157. ____ Water reaching the farthest point in not more than 1 minute for each 400 ft. of feed main, a maximum of 3 minutes for the system, 7.4.5.2.
- 158. ____ Only upright listed dry sprinklers are used, see exceptions for return bends and sidewall sprinklers, 7.4.5.1.

Valves

- 159. ____ All water supply control valves and water flow switches are electrically supervised in accordance with, OFC 903.4.
- 160. ____ Check valve is at/near connection to water supply, single riser's alarm valve is considered a check valve, 8.16.1, 8.16.1.1.3.5.
- 161. ____ Control valves are provided in accordance with 8.16.1.1.4.
- 162. ____ Water supply exceeding 175 psi requires pressure reducing valves (PRVs), locations are detailed, 8.16.1.2.
- 163. ____ Gauges are on inlet and outlet sides of PRVs and an indicating valve on the inlet side, 8.16.1.2.2.

Miscellaneous

- 164. ____ Flushing instructions and criteria are on the plans, 8.16.3 and 10.10.2.1.

Antifreeze System:	Refer to 7.6	Protection against Exposure Fire:	Refer to 7.8
Refrigerated Areas:	Refer to 7.9	Commercial Cooking Equipment:	Refer to 7.10
Storage:	Refer to Chapters 12 to 20		
Private Fire Service Water Mains: Refer to NFPA13, NFPA 24, and OFC Appendix B.			

Comments
