SANTA ROSA FIRE DEPARTMENT
FIRE PREVENTION BUREAU
PLAN REVIEW

SPRINKLER SYSTEM PLAN REVIEW
PER NFPA 13 - 2002 EDITION

Address: Permit #: Inspector: Date: Status:
Inspector: Date: Status:

A-Approved; AC-Approved w/comments; I-Incomplete; D-Denied

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

This Checklist outlines general requirements. Information contained herein applies to typical instances and may not address all circumstances.

FILE REVIEW

- FEES – Permit fees entered in Permits Plus. 3rd or greater checks require an hourly fee for the review.

  Y ☐ N ☐ A minimum of three sets of drawings are provided.

  ☐ ☐ Equipment is listed for intended use and compatible with the system; specification data sheets are provided.

DRAWINGS SHALL DETAIL THE FOLLOWING (14.1.3.1-14.1.3.44):

GENERAL:

  ☐ ☐ Type of system is noted: ☐ hydraulic calc, ☐ pipe schedule, ☐ wet, ☐ dry, ☐ preaction, ☐ deluge, ☐ antifreeze. The plans declare the design standard is the 2002 edition year of NFPA 13.

  ☐ ☐ Scale: a common scale shall be used and plan information shall be legible.

  ☐ ☐ Plot plan illustrates fire protection water mains and pipe diameter(s) supplying the building.

  ☐ ☐ The location of smoke or fire partitions, fire walls, and building elevation views.

  ☐ ☐ Occupancy class and or use of each room or area. 5.1.1.

  ☐ ☐ Full height cross sectional drawing including ceiling construction.

  ☐ ☐ Total area protected by each system for each floor is provided.

  ☐ ☐ Dimensions for system piping, sprinkler spacing and branch line spacing and elevation changes.

  ☐ ☐ Equipment symbol legend and a north orientation arrow is provided.

  ☐ ☐ 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.
Y  N  Hydrant flow test determining water supply capacity at 20 PSI residual pressure is provided.

14.  N  When used as a basis for design, hydraulic calculations are provided with summary, detail worksheets, and graph sheet, 14.3.

15.  N  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.  N  All water supply valves and water flow switches shall be electrically supervised, IFC 903.4.

17.  N  Exterior flow alarm location is detailed. Note: if electric, it shall be listed for outdoor use, IFC 904.3.2.

18.  N  When installed backflow prevention device pressure loss data is provided in the hydraulic calculations.

**SPRINKLERS:**

19.  N  Total number of each type of sprinkler is noted, 8.3.2.1.

20.  N  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.  N  Light hazard occupancies shall have quick-response or residential sprinklers, 8.3.3.1, IFC 903.3.2.

22.  N  Sprinkler are located correctly for branch line spacing and area of protection limits, ceiling and roof cross sectional views are provided for clarification, 14.1.3.

23.  N  For each type of sprinkler the K factor, temperature rating, and orifice size are provided, 14.1.3.(12).

24.  N  Each sprinkler coverage area is installed in accordance with its area limitations or its listing, 8.6.2.2, Table 8.6.2.2.1 (a-c).

25.  N  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.

26.  N  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.

27.  N  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.

28.  N  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.

29.  N  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.  N  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 shall be provided beneath obstructions greater than 4 ft. wide, 8.5.5.3.1.

34. ☐ ☐ Baffles are provided for sprinklers less than 6 ft. apart in accordance with Section 8.6.3.4.

35. ☐ ☐ Locations or conditions requiring special consideration, 8.14.

36. ☐ ☐ A. concealed spaces, for the 15 omissions, see 8.14.1.2.


38. ☐ ☐ C. stairways, 8.14.3.


40. ☐ ☐ E. elevator hoistways and machine rooms, 8.14.5.

41. ☐ ☐ F. spaces under ground floors, exterior docks, and platforms, 8.14.6.

42. ☐ ☐ G. exterior roof and canopy, 8.14.7.


44. ☐ ☐ I. library stack room, 8.14.9.


47. ☐ ☐ L. stages, 8.14.15.

48. ☐ ☐ 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, 8.14.2.

49. ☐ ☐ Vertical shaft has sprinklers at top opening, above bottom opening and alternate levels when it has combustible surfaces, 8.14.2.1, 8.14.2.2.

50. ☐ ☐ Sprinklers are provided beneath combustible stairs, 8.14.3.1.

51. ☐ ☐ Sprinklers are provided at the top of the stairway, under the first landing above the stairway shaft bottom when the shaft and stairs are noncombustible, 8.14.3.2.

52. ☐ ☐ 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, 8.14.4.1 and 8.14.4.2.

53. ☐ ☐ Elevator shaft has a sprinkler within 2 ft. of the shaft floor unless the shaft is noncombustible and there are no combustible hydraulic fluids, 8.14.5.
Ordinary or intermediate temperature sprinklers are in the elevator machine room or at the top of the elevator shaft, 8.14.5.1-8.14.5.1.5.

Sprinklers are provided under combustible ground floor, exterior dock, and platforms, 8.14.6.

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 8.14.7.1–8.14.7.4

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, 8.14.8.1.

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., 8.14.8.2.

Sprinklers are provided in every aisle and at every tier stack, distance is not more than 12 ft. in library stack rooms, 8.14.9.

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.

Open grid ceilings shall not be installed under sprinklers, unless the grid opening and sprinkler placement criteria of section 8.14.12 are met.

Drop-out ceilings are installed under sprinklers in accordance with their listing, and sprinklers are not located below the ceilings, 8.14.13.

Sprinklers for stages shall be provided in accordance with section 8.14.15.

Proscenium openings for stages shall be protected in accordance with section 8.14.15.2.

**PIPE SUPPORT AND HANGERS:**

Type and locations of hangers, sleeves, and braces are shown, 14.1.3. Non-listed hangers shall meet 5 performance criterion and the design shall be sealed by a registered professional engineer, 9.1.1.2

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, 9.1.1.6.

Pipe hanger spacing is in accordance with Table 9.2.2.1.

Branch lines show one hanger for each section of pipe, exceptions are listed, 9.2.3.2.

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.

Supports can be on the horizontal pipe section if within 24 in. of the vertical pipe centerline, 9.2.5.1.

Risers in multi-story buildings show supports at the lowest level, each alternate level, below offsets, and at the top, 9.2.5.3.
Y N The distance between supports for a riser does not exceed the limit specified in 9.2.5.4.

**PIPE AND VALVES:**

73. □ □ Main drain pipe diameter is detailed and complies with Table 8.15.2.4.2, 8.15.2.4.

74. □ □ Main drain routing is to the exterior or to an interior drain but ensure that the drain capacity is adequate, 8.15.2.4.4

75. □ □ Auxiliary drain location is detailed and its size is in accordance with section 8.15.2.5.

76. □ □ When required, the location of the listed backflow prevention device is detailed, 8.15.1.1.3.

77. □ □ A listed control valve is provided on each side of the check valve, 8.15.1.1.4.1. Only one control valve on the system side of the check valve is necessary when the water supply is provided from the city connection, 8.15.1.1.4.3.

79. □ □ If a pressure reducing valve is used, its location and installation criteria are detailed in accordance with section 8.15.1.2.

80. □ □ If used, outside post-indicator control valve (PIV) locations and installation criteria are detailed in accordance with section 8.15.1.3.

81. □ □ If PIVs are approved to be located in a pit, the pit construction, location, and marking are designed and detailed in accordance with section 8.15.1.4.2.

**SEISMIC BRACING:**

82. □ □ Flexible couplings may be used for pipe 2½ in. or larger in accordance with sections 9.3.2.2 and 9.3.2.3.

83. □ □ A seismic separation assembly for piping is provided at building seismic joints, 9.3.3.

84. □ □ 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 - .5.

85. □ □ Lateral sway bracing is required at a maximum spacing of 40 ft. for all feed and cross mains, and branch lines 2½ in. and larger, 9.3.5.3.1.

86. □ □ Lateral sway bracing can be spaced up to 50 ft. if the design is in compliance with 9.3.5.3.3.

87. □ □ Lateral sway bracing is within 20 ft. of the end of the pipe, 9.3.5.3.2.

88. □ □ A lateral sway brace is provided on the last pipe of a feed or cross main, 9.3.5.3.4.

89. □ □ Lateral sway 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, 9.3.5.3.7 and .8.

Special CA amendment “**where pipe is used for sway bracing, it shall have a wall thickness of not less than Schedule 40.**

90. □ □ Longitudinal sway bracing is a maximum of 80 ft. for mains and cross mains and within 40 ft. of the end of the pipe, 9.3.5.4.
91. ☐ ☐ 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.

92. ☐ ☐ Seismic bracing calculations are provided for each brace to be used as shown in Figure A.9.3.5(d).

**Special CA amendment “Lag screws or powder-driven fasteners shall not be used to attach braces to the building structure.”**

93. ☐ ☐ 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.

94. ☐ ☐ Branch line method of restraint is detailed and in accordance with section 9.3.6.1-.3.

95. ☐ ☐ Restraints of branch lines shall be in accordance with section 9.3.6.1.

**FIRE DEPARTMENT CONNECTION (FDC):**

96. ☐ ☐ 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, IFC 912.2.

97. ☐ ☐ Local water flow alarm is provided when the sprinkler system exceeds 20 sprinklers and its location is detailed, 8.16.1.1.

98. ☐ ☐ FDCs for fire engine or fire boat are sized and arranged in accordance with, 8.16.2.3, and .4.

99. ☐ ☐ The arrangement of the FDC piping supplying wet pipe, dry pipe, pre-action or deluge sprinklers shall be in accordance with section 8.16.2.4.2.

**HYDRAULIC CALCULATIONS, 11.2 AND 14.1.3:**

100. ☐ ☐ Indicate the calculation method used: density area method or room design method, 11.2.3.2. and .3.

101. ☐ ☐ Reference points in the calculation worksheet match with points on the plans, the occupancy hazard classifications are correct for the occupancy or use, 14.1.3.

102. ☐ ☐ If design area adjustments are made, the selected shall be indicated, 11.2.3.2.7.

103. ☐ ☐ Designs using QR sprinklers shall be in accordance with section 11.2.3.2.3.

104. ☐ ☐ Pipe size and length references in the calculation worksheet match the plans, 14.1.3(19).

105. ☐ ☐ Sloped ceiling may require a 30 percent increase of design area, 11.2.3.2.4.

106. ☐ ☐ Sprinkler data sheet information matches information on the plans.

107. ☐ ☐ Water flow information is provided with static PSI, residual PSI, and available GPM at 20 PSI residual with graphed results.

108. ☐ ☐ Density and design areas information are provided and comply with 12 conditions listed in section 11.2.3.1.8, Figure 11.2.3.1.5.
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**RESIDENTIAL SPRINKLERS IN A 13 SYSTEM:**

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**SPECIAL DESIGN:**

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**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 less than 5,000 sq. ft. shall have 50 PSI residual pressure and meet the requirements of Table 11.2.2.1.

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126. □ N  B. Sprinklers greater than 12 ft. separation are in accordance with Table 14.5.3.5.

127. □ N  C. Sprinklers above and below the ceiling are in accordance with Table 14.5.3.7.

128. □ N  Extra Hazard: the pipe schedule method is not allowed, 14.5.4.

WET SYSTEM:

129. □ N  Relief valve not less than ¼ in. is detailed for gridded system, 7.1.2.1.

130. □ N  An alarm test connection location for the waterflow alarm is provided and in compliance with 8.16.4.2.1–8.16.4.2.3.

DRY SYSTEM, 7.2:

131. □ N  Only upright, listed dry sprinklers are used, see exceptions for return bends and sidewall sprinklers, 7.2.2.

132. □ N  System capacity is provided, 14.1.3(17).

133. □ N  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.

134. □ N  Water delivery calculations complying with 11.2.3.9 are provided for systems exceeding 750 gallons in order to confirm a water delivery time to be within 60 seconds, 7.2.3.3.

135. □ N  A trip test connection sized according to 8.16.4.3.1 is equipped with a shutoff valve and the test connection is located in the upper story at the most remote sprinkler pipe, 8.16.4.3.

136. □ N  Compressor capacity specification sheet is provided, restores system within 30 minutes, 7.2.6.

137. □ N  Compressor piping system, air fill line not less than ½ in., and check-relief-shutoff valves are shown or noted, 7.2.6.3.

138. □ N  Shown is the location for the quick opening device (QOD) for systems greater than 500 gallons, see exception in 7.2.4.

139. □ N  Shown is the location of the check valve for QOD and the antiflooding device between the riser and the QOD, 7.2.4.6.

PREACTION OR DELUGE:

140. □ N  System capacity is provided, 14.1.3(17).

141. □ N  Pressure gauge locations are above and below the preaction valve and on the air supply, 7.3.1.3.

142. □ N  Location and spacing of the detection devices are detailed, 7.3.1.6.

143. □ N  The preaction system is limited to 1,000 sprinklers, refer to the exception, 7.3.2.1., 750 gal. limit per valve.

144. □ N  Only upright, listed dry sprinklers are used, see exceptions for return bends and sidewall sprinklers, 7.3.2.4.

145. □ N  Double interlock systems are not gridded, 7.3.2.5, and valve room is heated, 7.3.1.8.
COMBINED DRY PIPE AND PREACTION:

Y N  System capacity is provided, 14.1.3(17).
146.    

Dry pipe riser location is shown.
147.    

Two 6 in. dry pipe valves are provided for systems greater than 600 sprinklers or greater than 275 sprinklers in a fire area, 7.4.2.1.
148.    

Multi-dry pipe valves are interconnected with 1 in. pipe with shut-off valve for simultaneous tripping, 7.4.2.4.
149.    

QOD is provided at the dry pipe valves, 7.4.2.8.
150.    

A minimum 2 in. exhaust valve is shown at the end of the common feed main, 7.4.3.1.
151.    

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, 7.4.4.2.
152.    

The manual method of activating the detection system is within 200 ft. of travel, 7.4.1.3.
153.    

VALVES:

All water supply control valves, pressure switches and water flow switches are electrically supervised in accordance with IFC 903.4.
154.    

Check valve is at/near connection to water supply, 8.15.1.
155.    

Control valves are provided in accordance with 8.15.1.1.4.
156.    

Water supply exceeding 175 PSI requires pressure reducing valves (PRVs), locations are detailed, 8.15.1.2.
157.    

Gauges are provided on the inlet and outlet of the PRVs and an indicating valve is provided on the inlet side, 8.15.1.2.
158.    

MISCELLANEOUS STORAGE:

Class I-IV commodities, Group A plastics, and tires stored up to 12 ft. are protected as miscellaneous storage in accordance with Section 12.1.10.
159.    

Rolled paper stored up to 10 ft. and idle pallets stored up to 4 ft. are protected as miscellaneous storage in accordance with Section 12.1.10.
160.    

Hose stream demand has been added to the hydraulic calculation in accordance with 12.1.10.2.
161.    

In-rack sprinkler location, operating pressure, and the design water flow demand is in compliance with 12.1.12
162.    

Rack storage of Class I-IV commodities do not require hose connections, 12.3.1.3.
163.    

The matching of the density design to the appropriate sprinkler K-factor is in compliance with 12.1.13
164.    
Flushing:

165. Y N  Flushing instructions and criteria are on the plans. Flushing requirements shall be 880 GPM for 6 in. pipe, 1,560 GPM for 8 in., 2,440 GPM for 10 in., 3,520 GPM for 12 in., and the flush should be piloted and calculated to ensure the flow and the velocity is at least 10 ft/sec.

Antifreeze System: Refer to 7.5  Protection against Exposure Fire: Refer to 7.7
Refrigerated Areas: Refer to 7.8  Commercial Cooking Equipment: Refer to 7.9
Storage: Refer to Chapter 12  Special Occupancy Requirements: Refer to Chapter 13
Private Fire Service Water Mains: Refer to Chapter 10, NFPA 24.

Additional Comments:

Review Date: Approved □ or Disapproved □  FD Reviewer:
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