



## Kerrville Fire Marshal

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## Section 4

### New Fire Sprinkler Aboveground System Plan Submittal Requirements

These guidelines are to be followed when a business, facility or organization proposes to install an automatic fire sprinkler system within the City of Kerrville. **These guidelines are not to be interpreted as containing all data required for proper design, installation or approval.**

All automatic sprinkler systems for the purpose of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the *International Fire Code*, as adopted and amended by the City of Kerrville and NFPA 13.

***This guide does not replace, nor supersede any adopted codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.***

#### Performance and Installation Requirements

1. Unless specifically allowed by the *International Fire Code* or the *International Building Code*, residential sprinkler systems installed in accordance with NFPA 13D or NFPA 13R shall not be recognized for the purposes of exceptions or reductions, commonly referred to as "trade-offs", permitted by other requirements of this code. In addition, residential sprinkler systems installed in accordance with NFPA 13R, must include attic sprinkler protection to be recognized for the purposes of such trade-offs permitted by other requirements of this code.
2. When determining the requirement for sprinkler protection, the total area under any roof overhangs, canopies, projections, or other permanent vertical structures, beyond that of the building footprint, is include the total area determination. EXAMPLE: A proposed building area is 5,800 sq. ft. Multiple canopies are indicated to cover the entrances. The total square footage of the canopies is 300 sq. ft. The total building area is calculated as: 5,800 sq. ft. + 300 sq. ft. = 6,100 sq. ft. Therefore this building would require an automatic sprinkler system.
3. Automatic sprinkler systems shall be designed with a minimum 10 PSI safety factor with a 20 psi residual on City water mains.
4. Automatic Sprinkler System Room Access. Sprinkler system risers providing protection for buildings with multiple tenant spaces must be located in a ground floor room directly accessible from the exterior. The door must be labeled as the fire riser room.
5. All valves controlling the water supply for automatic sprinkler systems and water-flow switches on all sprinkler systems and standpipe systems, with the exception of fire department hose connections, shall be electrically supervised. (IFC 903.4 & 905.9)
6. Approved, supervised, indicating control valves shall be provided at the point of connection to the riser on each floor in high-rise buildings.
7. An approved, audible/visual device shall be connected to every automatic sprinkler system. (IFC 903.4.2)
8. An approved, weatherproof, audio/visual device shall be provided on the exterior of the building in an approved location. This device shall be a minimum of 75 candelas. (IFC 903.4.2)
9. The time delay feature on the flow switch switches must be set to a delay of 90 seconds or less.
10. Sprinkler and standpipe system water-flow detectors shall be provided for each floor tap to the sprinkler system and shall cause an alarm upon detection of water flow for no more than 90 seconds.

11. The FDC must be at a remote location to the building adjacent to the fire lane, unless otherwise approved by the Fire Marshal's Office. (See *Fire Department Connections Section*)
12. The FDC shall be clear and unobstructed with a minimum of a 5 foot clear all weather path from fire lane access and no higher than 48 in. above grade.
13. Riser rooms shall be permanently heated, and such heating appliances shall be hard-wired to the building electrical distribution system. Heating devices shall not be provided with an on/off switch.
14. All inspectors' test, ball-drips, and main-drains shall be piped directly to the outside of the building.
15. Dry-system air compressors shall be hard wired.
16. Pre-action system solenoids shall be wired for alarm activation upon AC current loss.
17. **Do not stack the riser until the underground hydrostatic test, visual and flushing has been completed.**

### **Self-Service Storage Facility**

18. An automatic sprinkler system shall be installed throughout all self-service storage facilities that do not have exterior wall openings.
19. Permanent marking on the storage room walls shall be provided to designate the maximum stacking height of items stored within the compartment. The maximum stacking height shall be no closer than 18 inches below any fire sprinkler head.

### **Standpipes**

20. Standpipe systems shall be installed in accordance with this section and *NFPA 14*. Manual dry standpipe systems shall be supervised with a minimum of 10 PSI and a maximum of 40 PSI air pressure with a high/low alarm.
21. In addition to the requirements of *IFC* Section 905.4, Class I standpipes shall also be required on all occupancies in which the distance from accessible points for the Fire Department ingress to any point in the structure exceeds two hundred fifty feet (250') along the route that a fire hose laid as measured from the fire lane. When required by this Code, standpipe connections shall be placed adjacent to all required exits to the structure and at two hundred (200') intervals along major corridors thereafter.
22. A fire pump shall be installed to provide for the necessary standpipe water supply for any building in which standpipes are required by the Fire Code or Fire Marshal.
23. In addition to the required standpipe calculation, an additional FDC calculation shall be provided to indicate the standpipes can be fed solely by the FDC. An inlet flow and pressure of 1500 GPM and 150 PSI shall be used.
24. Hose valves shall be 2½-inch outlet with a KNOX locking cap installed.

To facilitate the plan review and inspection processes, please refer to the information listed below. At a minimum, the submittal shall conform to the requirements of *NFPA 13*, Chapter 14, Plans and Calculations.

### **Where Required**

25. Approved automatic sprinkler systems in new buildings and structures shall be provided in the locations described in this section. *Exception:* Spaces or areas in telecommunications buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries and standby engines, provided those spaces or areas are equipped throughout with an automatic fire alarm system and are separated from the remainder of the building by fire barriers consisting of not less than 1-hour fire-resistance-rated walls and 2-hour fire-resistance-rated floor/ ceiling assemblies.
26. Group A-1. An automatic sprinkler system shall be provided for Group A-1 occupancies where one of the following conditions exists:
  - a. The fire area exceeds 12,000 square feet (1115 m<sup>2</sup>);

- b. The fire area has an occupant load of 300 or more;
- c. The fire area is located on a floor other than the level of exit discharge; or
- d. The fire area contains a multi-theater complex.

27. Group A-2. An automatic sprinkler system shall be provided for Group A-2 occupancies where one of the following conditions exists:

- a. The fire area exceeds 5,000 square feet;
- b. The fire area has an occupancy load of 100 or more;
- c. The fire area is located on a floor other than the level of exit discharge.

28. Group A-3. An automatic sprinkler system shall be provided for Group A-3 occupancies where one of the following conditions exists:

- a. The fire area exceeds 12,000 square feet (1115 m<sup>2</sup>);
- b. The fire area has an occupant load of 300 or more; or
- c. The fire area is located on a floor other than the level of exit discharge.
- d. *Exception:* Areas used exclusively as participant sports areas where the main floor area is located at the same level as the level of exit discharge of the main entrance and exit.

29. Group A-4. An automatic sprinkler system shall be provided for Group A-4 occupancies where one of the following conditions exists:

- a. The fire area exceeds 12,000 square feet (1115 m<sup>2</sup>);
- b. The fire area has an occupant load of 300 or more; or
- c. The fire area is located on a floor other than the level of exit discharge.
- d. *Exception:* Areas used exclusively as participant sports areas where the main floor area is located at the same level as the level of exit discharge of the main entrance and exit.

30. Group A-5. An automatic sprinkler system shall be provided for Group A-5 occupancies in the following areas: concession stands, retail areas, press boxes, and other accessory use areas in excess of 1,000 square feet (93 m<sup>2</sup>).

31. Group E. An automatic sprinkler system shall be provided for Group E occupancies as follows:

- a. Throughout all Group E fire areas greater than 20,000 square feet (1858 m<sup>2</sup>) in area.
- b. Throughout every portion of educational buildings below the level of exit discharge.
- c. *Exception:* An automatic sprinkler system is not required in any fire area or area below the level of exit discharge where every classroom throughout the building has at least one exterior exit door at ground level.

32. Group F-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group F-1 occupancy where one of the following conditions exists:

- a. Where a Group F-1 fire area exceeds 12,000 square feet (1115 m<sup>2</sup>);
- b. Where a Group F-1 fire area is located more than three stories above grade plane; or
- c. Where the combined area of all Group F-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m<sup>2</sup>).
- d. An automatic sprinkler system shall be provided throughout all Group F-1 occupancy fire areas that contain woodworking operations in excess of 2,500 square feet in area (232 m<sup>2</sup>) which generate finely divided combustible waste or which use finely divided combustible materials.

33. Woodworking Operations. An automatic fire sprinkler system shall be provided throughout all Group F-1 occupancy areas that contain woodworking operations in excess of 2,500 square feet in area which generate finely divided combustible waste or which use finely divided combustible materials.

34. Group H. Automatic sprinkler systems shall be provided in high-hazard occupancies as required in IFC 2018 Sections 903.2.5 through 903.2.4.3. An automatic sprinkler system shall be installed in Group H occupancies.

35. Group H-5 occupancies. An automatic sprinkler system shall be installed throughout buildings containing Group H-5 occupancies. The design of the sprinkler system shall not be less than that required under the *International Building Code* for the occupancy hazard classifications in accordance with IFC 2018 Table 903.2.5.2.

36. Pyroxylin plastics. An automatic sprinkler system shall be provided in buildings, or portions thereof, where cellulose nitrate film or pyroxylin plastics are manufactured, stored or handled in quantities exceeding 100 pounds (45 kg).

37. Group I. An automatic sprinkler system shall be provided throughout buildings with a Group I fire area. *Exception:* An automatic sprinkler system installed in accordance with IFC, Section 903.2.6 **903.3.1.2 or 903.3.1.3** shall be allowed in Group I-1 facilities.

38. Group M. An automatic sprinkler system shall be provided throughout buildings containing a Group M occupancy where one of the following conditions exists:

- Where a Group M fire area exceeds 12,000 square feet (1115 m<sup>2</sup>);
- Where a Group M fire area is located more than three stories above grade plane; or
- Where the combined area of all Group M fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m<sup>2</sup>).

39. High-piled storage. An automatic sprinkler system shall be provided as required in IFC 2018 Chapter 32 in all buildings of Group M where storage of merchandise is in high-piled or rack storage arrays.

40. Group R. An automatic fire sprinkler system shall be provided throughout all buildings containing Group R fire occupancy.  
*Exception:* Detached one-and-two family dwellings and multiple single-family dwellings (townhouses) no more than three stories in height with a separate means of egress (*2018 International Fire Code Commentary*).

41. Group S-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group S-1 occupancy where one of the following conditions exists:

- A Group S-1 fire area exceeds 12,000 square feet (1115 m<sup>2</sup>);
- A Group S-1 fire area is located more than three stories above grade plane; or
- The combined area of all Group S-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m<sup>2</sup>).

42. Repair garages. An automatic sprinkler system shall be provided throughout all buildings used as repair garages in accordance with the *International Fire Code*, as follows:

- Buildings two or more stories in height, including basements, with a fire area containing a repair garage exceeding 10,000 square feet (929 m<sup>2</sup>).
- One-story buildings with a fire area containing a repair garage exceeding 12,000 square feet (1115 m<sup>2</sup>).
- Buildings with a repair garage servicing vehicles parked in the basement.

43. Bulk storage of tires. Buildings and structures where the area for the storage of tires exceeds 20,000 cubic feet (566 m<sup>3</sup>) shall be equipped throughout with an automatic sprinkler system in accordance with IFC 2018 Section 903.3.1.1.

44. Group S-2. An automatic sprinkler system shall be provided throughout buildings classified as enclosed parking garages in accordance with IFC 2018 Section 406.6 of the International Building Code or where located beneath other groups. *Exception:* Enclosed parking garages located beneath Group R-3 occupancies.

45. Commercial parking garages. An automatic sprinkler system shall be provided throughout buildings used for storage of commercial trucks or buses where the fire area exceeds 5,000 square feet (464 m<sup>2</sup>).

46. Windowless stories in all occupancies. An automatic sprinkler system shall be installed in the locations set forth in IFC, Sections 903.2.11.1 through 903.2.11.6. *Exception:* Group R-3 and Group U.

47. Stories and basements without openings. An automatic sprinkler system shall be installed in every story or basement of all buildings where the floor area exceeds 1,500 square feet (139.4 m<sup>2</sup>) and where there is not provided at least one of the following types of exterior wall openings:

- Openings below grade that lead directly to ground level by an exterior stairway complying with Section 1011 or an outside ramp complying with IFC, Section 1011. Openings shall be located in each 50 linear feet (15 240 mm), or fraction thereof, of exterior wall in the story on at least one side.
- Openings entirely above the adjoining ground level totaling at least 20 square feet (1.86 m<sup>2</sup>) in each 50 linear feet (15 240 mm), or fraction thereof, of exterior wall in the story on at least one side.
- Opening dimensions and access. Openings shall have a minimum dimension of not less than 30 inches (762 mm). Such openings shall be accessible to the fire department from

- the exterior and shall not be obstructed in a manner that fire fighting or rescue cannot be accomplished from the exterior.
- b. Openings on one side only. Where openings in a story are provided on only one side and the opposite wall of such story is more than 75 feet (22 860 mm) from such openings, the story shall be equipped throughout with an approved automatic sprinkler system or openings as specified above shall be provided on at least two sides of the story.
- c. Basements. Where any portion of a basement is located more than 75 feet (22 860 mm) from openings required by *IFC*, Section 903.2.11.1, the basement shall be equipped throughout with an approved automatic sprinkler system.

48. Rubbish and linen chutes. An automatic sprinkler system shall be installed at the top of rubbish and linen chutes and in their terminal rooms. Chutes extending through three or more floors shall have additional sprinkler heads installed within such chutes at alternate floors. Chute sprinklers shall be accessible for servicing.

49. Buildings 55 feet or more in height. An automatic sprinkler system shall be installed throughout buildings with a floor level having an occupant load of 30 or more that is located 55 feet (16 764 mm) or more above the lowest level of fire department vehicle access. Exceptions:

1. Airport control towers.
2. Open parking structures.
3. Occupancies in Group F-2.

50. Other hazards. Automatic sprinkler protection shall be provided for the hazards indicated in *IFC*, Sections 903.2.11.4.

51. Ducts conveying hazardous exhausts. Where required by the *International Mechanical Code*, automatic sprinklers shall be provided in ducts conveying hazardous exhaust, flammable or combustible materials. *Exception:* Ducts where the largest cross-sectional diameter of the duct is less than 10 inches (254 mm).

52. Commercial cooking operations. An automatic sprinkler system shall be installed in a commercial kitchen exhaust hood and duct system where an automatic sprinkler system is used to comply with IFC 2018 Section 904.

53. Other required suppression systems. In addition to the requirements of *IFC*, Section 903.2, the provisions indicated in *IFC*, Table 903.2.11.6 also require the installation of a suppression system for certain buildings and areas.

## Submittal Requirements

- 54. Faxed plans submittals will not be accepted.
- 55. A "Wet" RME signature and stamp, is required on all plan drawings and calculations.
- 56. Copy of Contractors Texas Department of Insurance License and Liability Insurance with the city of Kerrville as the certificate holder.
- 57. Plans shall be clear and legible and all sheets shall be in a common and appropriate scale.
- 58. Plans and specifications/cut sheets shall be submitted in PDF Format into the online platform. A second set of plans shall be submitted on paper at the request of AHJ if needed. Plans shall contain sufficient detail to enable the plan reviewer to accomplish a complete review. The following information shall be provided on the plans:
  - a. Authority Having Jurisdiction (City of Kerrville)
  - b. Scale.
  - c. Floor plan.
  - d. Square footage.
  - e. Location of doors.
  - f. Intended use of each room is identified.
  - g. North arrow provided.
  - h. Location of the Fire Department Connection (FDC).
  - i. Occupancy classification.
  - j. Scope of Work.
  - k. Site plan to include the all fire hydrants, fire lanes, fire department connections and the fire service lead-in.
  - l. Equipment List.
  - m. Hydraulic calculations for each design area.

- n. A minimum of one (1) set of data specifications sheets for all equipment shall be provided.
- o. Specific materials in the specification booklet are to be identified by an arrow or highlighter.
- p. A complete full-height cross section of the building.
- q. Area of coverage of each sprinkler head.
- r. Total area protected by each system.
- s. Capacity of the dry system or antifreeze system.
- t. Hydraulic node symbols and schedule.
- u. Indicate all Riser Nipples (RN) or Drop Nipples (DN).
- v. Elevations of sprinkler lines and node points.
- w. Hanger details.
- x. Hanger locations.
- y. Sprinkler riser diagram.
- z. Inspectors test connection detail.
- aa. Auxiliary drain details.
- bb. Size and location of standpipe hose stations, if applicable.
- cc. Description of the design area.
- dd. Design density of each design area.
- ee. Clearly indicate each remote area.
- ff. Provide graphic representation of the waterflow analysis.
- gg. Provide the water supply test information.
- hh. Provide notes to indicate the following;
  - ii. Design code.
  - jj. Responsible party with regards to freeze protection. If to be provided by others, indicate and provide drawings to indicate the heaters with your submittal.

59. The title block shall contain the following;

- a. Location of the installation.
- b. Name and complete address of the business.
- c. Name and complete address of the installing company.
- d. Licensing information.
- e. Date.
- f. Drawn by.

60. A legend shall be provided to include:

- a. Symbol, sprinkler description, manufacturer, model number, and quantity for each device.
- b. Pipe and fittings type.

## General Requirements

- 61. Each submittal shall have a completed Fire Protection Plan Review / Permit Application
- 62. **Plans approved by the Fire Marshal's Office give authorization for construction and/or operation. Final approvals are subject to field verification. Any approval issued by the Fire Marshal's Office does not release the contractor or property owner from the responsibility of full compliance with all applicable codes and ordinances relating to the construction project.**
- 63. **Installation, fabrication or otherwise construction of the system is prohibited without approved plans and permit.**
- 64. **All installations and/or operations must concur with the approved plans. Any deviation from the approved plans requires a re-submittal to the Fire Marshal's Office.**
- 65. **All fire department inspection forms and permits shall be kept in a permit packet on the job site until final inspection.**

## **High-Piled Rack Storage**

66. For any building with a clear height exceeding 12 feet (4572 mm), see *IFC*, Chapter 32 to determine if those provisions apply.
67. For any building with a clear height in excess of 12 feet, the sprinkler system shall be designed to the maximum allowable storage height for Class IV commodities.
68. A rack storage plan is required prior to fire sprinkler plan approval for any building in which high-piled storage will take place.

## **Backflow Prevention**

69. All fire sprinkler systems must be provided with an approved method of backflow prevention.
  - a. A double check assembly backflow preventor is the minimum required device on wet systems.
  - b. A reduced pressure zone (RPZ) backflow prevention device is required on antifreeze systems.
  - c. Assemblies shall be listed for fire protection use.
  - d. Assemblies must be capable of being electronically monitored.
  - e. All installations shall be inspected and tested. Testing documentation shall be provided to the City Water/Wastewater Division Manager prior to final acceptance.

## **Inspection Requirements**

70. **Do not stack the riser until the underground hydrostatic test, visual and flushing has been completed.**
71. Visual: **All aboveground piping and joints must be uncovered and exposed, with labeling of the pipe legible from the floor.** All hangers will be visually inspected and must be uncovered and exposed to the floor. Failure to comply with this requirement can result in a failure of the system and covering material will have to be removed prior to an additional examination.
72. Aboveground Hydrostatic Test: Aboveground piping will be visually inspected with all joints exposed and labeling of the pipe turned downward. The test will be at a minimum of 200 psi for two (2) hours. No more than a Plus (+) or Minus (-) of 5 psi allowed on a wet system to pass.
73. 24 Hour Air Test: The test will be conducted at 40 psi of air for twenty four (24) hours with less than 1.5 psi loss.
74. Trip Test: Operational test of the dry pipe valve is performed and the quick opening device must trip within sixty (60) seconds.
75. Compressor Test: Dry system compressor fills the system within 30 seconds.
76. Riser Main Flush: Upon completion of the aboveground hydrostatic test, aboveground piping will be drained and witnessed by the Fire Marshal's Office.
77. Riser Room: Verify riser room requirements, including floor drain for fire pumps, heat, light, markings, spare sprinkler heads and wrench, etc.
78. Standpipe and Fire Department Connection (FDC): Hydrostatic testing if not already done, the test will be at 200 psi for a minimum of two (2) hours. +/- 5 psi allowed.
79. Fire Pump: Hydrostatic testing, if not already done, will be at 200 psi for a minimum of two (2) hours. No pressure drop or gain allowed, all piping flushed, pump room requirements verified and operational test conducted by manufacturer and witnessed by the Fire Marshal's Office.
80. Antifreeze systems shall be filled using only a factory pre-mixed solution. Propylene Glycol solution shall not exceed concentration of 40% and glycerin shall not exceed concentration of 50% solution. Written confirmation of the solution type used and concentration is required from the fire sprinkler contractor.
81. Fire Sprinkler Final: Final Fire Marshal Inspection at completion of all inspections and the receipt of all State required documents. The inspection shall be conducted when all sheet rock and millwork is completed. The objective of this inspection is to verify that coverage is adequate after the initial hydrostatic test. This will give the Fire Marshal's Office and the contractor(s) the opportunity to make any changes before there is a request for a CO Inspection. Sprinkler heads must be clean and free from paint, construction debris or other conditions that would affect the proper operation of the sprinkler heads.