

# Fire Sprinkler System Guidelines

For

## Plan Review, Acceptance Testing, and Final Fire Sprinkler Inspection

**MCALLEN FIRE DEPARTMENT**

**FIRE PREVENTION DIVISION**



If you have any questions or comments regarding the information contained within, or if you need assistance interpreting these requirements, please contact:

**McAllen Fire Marshal's Office**  
**McAllen, Texas 78501**  
**Tel: (956) 681-2500**  
**Website: [mcallen.net](http://mcallen.net)**  
**Email: [mcallenfpdocs@mcallen.net](mailto:mcallenfpdocs@mcallen.net)**

# Fire Sprinkler Systems

(NFPA-13 & 13R)

## General

This document's intent is to provide contractors with guidelines outlining the expectations and procedures for how the McAllen Fire Marshal's Office will conduct plan reviews, acceptance tests, and the final fire sprinkler system inspections. This document addresses the most common aspects of a fire sprinkler plan review, acceptance test, and the final fire sprinkler inspection. In cases where this document does not address a device or operation used with your system IFC, NFPA, and/or Manufacturer Specifications will be used to determine testing criteria.

## Plan Reviews

### Minimum Requirements:

FIRE SPRINKLER CONSTRUCTION DOCUMENTS SHALL BE SUBMITTED TO THE FIRE DEPARTMENT FOR REVIEW AND APPROVAL PRIOR TO SYSTEM INSTALLATION (2018 IFC SEC. 901 AND 903).

**NOTE:** Plans with more than one (1) riser, or a high hazard occupancy, shall require an ISO review.

**Designer Information:** Plan drawings shall be prepared and signed/dated by a designer who meets qualification criteria specified in this pamphlet and NFPA 13. In all cases, the designer of the system shall be clearly identified on the plans

**Fire Sprinkler Plan submittal:** Each submittal shall include a minimum two sets of complete plans and technical specification sheets. Digital Plans may be submitted and are preferred. The items listed in 2016 NFPA 13, Sec 23.1.3, will be required in all submitted plans, as they pertain to the design of the system.

**Re-Submittals:** Submittal's requiring additional information will be placed "On Hold" until required information has been submitted. Plan information revisions shall be submitted with changes clouded. Changes in other documents shall be clearly identified.

**Equipment Specification Sheets:** Equipment utilized in the design shall be clearly identifiable in the submitted specification sheets either by **highlight** or marking. **(Automatic failure if missing.)**

**Non-Required Systems:** All proposed non-required fire sprinkler systems shall meet the same requirements for required systems and must meet locally adopted codes (i.e. International Fire Code, NFPA 13, etc.). The "Non-Required" fire sprinkler system shall be submitted for review and acceptance to the Fire Department (2018 IFC 901.4.2).

IT IS THE RESPONSIBILITY OF THE DESIGNER/INSTALLER OF RECORD TO ASSURE ADHERENCE TO ALL APPLICABLE CODE REQUIREMENTS. FINAL ACCEPTANCE OF ANY FIRE SPRINKLER SYSTEM INSTALLATION IS SUBJECT TO FIELD INSPECTION BY THE FIRE DEPARTMENT (2018 IFC Sec 105.4.4).

The six (6) items listed below, as applicable, are those identified as items that shall be correct and included in each plan submittal. **The failure to meet any one of those items shall constitute an automatic failed plan submittal** and shall require a re-submittal, along with associated fees.

1. The contractor's company name, phone number and applicable license number.
2. The correct address of the project in question.
3. An electronic or original signature by the Managing Responsible Employee-G (RME-G), The Alarm Planning Superintendent (APS), or the designated Fire Extinguishing License (FEL-A).
4. The hydrant flow test information must be included on the drawings and match those outlined in the fire inspection form.
5. All pertinent hydraulic calculations (fire sprinklers) or specs sheets (fire alarms) shall be included.
6. Battery calculations and voltage drop (fire alarms).

The requirements listed in NFPA 72 (chapters 7 and 23) and NFPA 13 (chapter 23) are required in every submittal. However, the failure to include those items, with the exception of the six (6) items listed above, will not constitute an automatic failure, but an as built submittal will be required before the fire sprinkler final inspection is scheduled and/or conducted.

## **Underground/Flush**

1. **Approved Plans** - An Approved/Stamped set of plans shall be located at the job site.
2. **Responsibility** - Underground supply will be broken into two categories:
  - First will be everything before and up to the approved assembly which is the responsibility of the McAllen Public Utilities Department to witness and inspect.
  - Second is everything after the approved assembly to the fire sprinkler riser which is the responsibility of the McAllen Fire Department to witness and inspect.
3. **NFPA 24 Report** - The contractor shall complete, sign, and provide a copy of the contractor's material and test certificate to the AHJ. (NFPA 24 Figure 10.10.1.)

## ***Hydrostatic Test:***

4. **Requesting Inspection** - The contractor shall request for the inspection using the on-line permitting portal, or in person. Inspection requests submitted on-line before 11:59 p.m. on Monday-Thursday will be tentatively scheduled within the next 24 hours, or the next business day if requested on a Friday. A Full 100% pre-testing of the fire sprinkler system is required prior to scheduling the final fire sprinkler inspection. Documentation must be submitted in written form and signed by the fire sprinkler contractor.
5. **2 Hour Test** - A member of the Fire Marshal's Office will contact the contractor to schedule a time for the inspection. The contractor is responsible for verifying that all piping and attached equipment to the system subjected to system working pressure has been under 200 psi of pressure or 50 psi in excess of the system working pressure, whichever is greater, and shall maintain the pressure at +/- 5 psi for 2 hours prior to the inspection. Example: Timestamped photograph of pressure gauge. (Loss shall be determined by a drop in the gauge pressure or visual leakage.)

6. **Backfill** - The trench shall be backfilled between joints before testing to prevent movement of pipe. Thrust blocks and or restrained joint systems shall also be left uncovered for inspection.
7. **Joints** - Joints shall be inspected for visual leakage
8. **Thrust Blocks** - Thrust blocks shall be installed as per approved set of plans and placed between undisturbed earth and the fitting to be restrained and shall be capable of resisting the calculated thrust forces. Wherever possible, thrust blocks shall be placed so that the joints are accessible for repair.
9. **Release Pressure** - After verifying that the system has maintained the required 200 psi for 2 hours, release pressure from the system to verify that the gauge is operating properly.

### ***Flushing:***

10. **Before Connection** - Underground piping, from the water supply to the system riser, and lead-in connections to the system riser shall be completely flushed before the connection is made to downstream fire protection system piping.
11. **Pre-Flushing** - Pre-flushing shall be conducted by the contractor to ensure all foreign materials have been flushed from the system prior to the fire inspector conducting the official flush test.
12. **Flushing Operations** - Flushing operations shall be set-up and conducted complying with the following:
  - The discharge used for the flush shall be located in close proximity of the lead-in connection to the system riser.
  - Water shall be discharged through an open ended 4-inch pipe or through a 4-inch pipe connected to a Y or siamese connection with two 2 ½ inch hoses.
  - Flow rate shall be at a minimum of 390 gpm.
  - See the examples set forth in NFPA 24, 2016 edition.

## Fire Department Connection (FDC):

14. **Location** - The accepted location of the FDC shall comply with McAllen city ordinance:

**Section 903.3.7 shall be amended to read as follows:**

Generally, Fire Department Connections shall be installed in accordance with section 912.4.2 of this code and will include the following:

- (i) Free standing away from the collapse area.
- (ii) FDC height shall be between 28 inches and 36 inches.
- (iii) Shall have a fire hydrant within 150 feet.

15. **Arrangement/Orientation** - The FDC shall be assessable and arranged/orientated so a hose line can be attached to the inlets without interference.

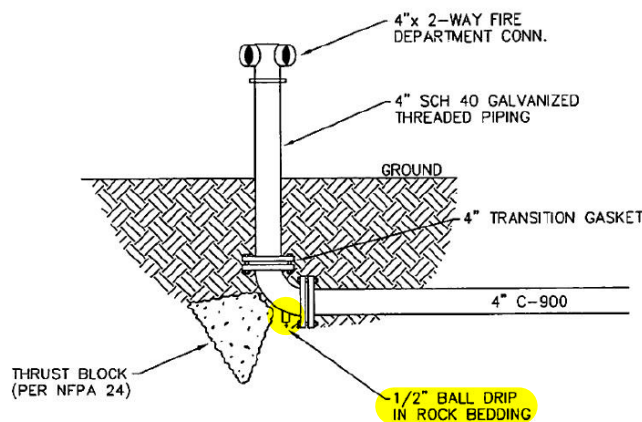
16. **Specifications** – The FDC shall be an approved type and comply with the following:

- Have two 2 ½ fire department inlet connections
- Brass (Not Painted)
- Have a Schedule 40 galvanized steel post painted red (If not wall mounted)
- Couplings shall have swivel fittings with NH internal threads
- FDC shall be located 24 to 60 inches above the final grade
- Protected from mechanical damage
- Supported with a minimum of an 18"x18"x8" concert base
- A clear working space not less than 36 inches in width, 36 inches in depth and 78 inches in height shall be provided

17. **Check Valve** - A listed check valve shall be installed in each fire department connection.

- **Automatic Drip** - An automatic drip shall be installed between the check valve and the outside hose coupling in a location that permits inspection and testing and reduces the likelihood of freezing.

**Remote FDC Detail:**



### ***Post Indicator Valve (PIV):***

19. **No Shutoff Valve** - No shutoff valve shall be permitted in the piping from the fire department connection piping to the point that the fire department connection piping connects to the system
20. **Assessable & Visible** - Both Remote Post Indicator Valves and Wall Post Indicator Valves shall be piping. easily accessible, and the Open/Closed indicator shall be visible at all times.
21. **Remote PIV** - Remote Post Indicator Valves shall be set so that the top of the post is 32 to 40 inches above the final grade.
22. **Wall PIV** - Wall Post Indicator Valves are permitted on R3 occupancy; or as approved by AHJ.
23. **Protection** - Post Indicator Valves shall be protected against mechanical damage.

### ***Operating Test:***

24. **Hydrant Test** - Each hydrant shall be fully opened and closed under system water pressure.
25. **Dry Hydrant Drainage** - Dry barrel hydrants shall be checked for proper drainage.
26. **Control Valves** - All control valves shall be fully closed and opened under system water pressure to ensure proper operation.
27. **Fire Pump** - Where fire pumps are available, the operating tests shall be completed with the pump running.

## **Rough-In/Cover**

1. **Concealment** - No drywall or other coverings shall be permitted to conceal any components of the fire sprinkler system until after the Rough-In/Cover Inspection has been completed and approved by the fire code official.

*A) 107.3 Concealed work. It shall be the duty of the permit applicant to cause the work to remain visible and able to be accessed for inspection purposes. Where any installation subject to inspection prior to use is covered or concealed without having first been inspected, the fire code official shall have the authority to require that such work be made visible and able to be accessed for inspection. Neither the fire code official nor the jurisdiction shall be liable for expense entailed in the removal or replacement of any material required to allow inspection. -IFC 2018*

2. **Scheduling** - Only the sprinkler contractor shall request an inspection. All fees must be paid prior to site inspection. Upon completion of payment, an inspector will contact you within 24 hrs. to schedule a date and time for the site inspection.
3. **Approved Plans** - Consult accepted as proposed set of plans.
4. **Size & Type of Piping** - Verify proper type and size of piping.
5. **Changes** - Confirm the installation of the piping does not have excessive change of directions that are not indicated on approved plans.
6. **Penetrations** - All piping penetrations through fire rated assemblies have been properly sealed by an approved method. Fire-stopping materials intended for use on nonmetallic piping penetrations shall be investigated for compatibility with the nonmetallic pipe materials.
7. **Hanger/Bracing/Supports** - Piping hangers, sway bracing, and supports shall be installed as per plans and NFPA.

8. **Compatibility** - When work with CPVC special consideration is necessary when in contact with other materials or chemicals. (See manufacturer's guidance on installation and compatible materials.)
9. **Non-System Components** - Sprinkler piping or hangers shall not be used to support non-system components such as ducting, electrical wiring, cabling and ducting.
10. **Sprinkler Verification** - Verify locations, type, and temperature of sprinkler heads.
11. **Sprinkler Obstructions** - Proper clearance of sprinkler heads from obstructions.
12. **Sprinklers Spacing** - The distance from sprinklers to walls shall not exceed one-half of the allowable distance between sprinklers.
13. **Sprinkler Spacing** - Check for correct distances between sprinkler heads, maximum coverage per sprinkler heads, suspended ceilings and distance below roof deck.
14. **Inspector Test** - Check for installation of orifice in inspector's test. (Orifice shall be the same size as the smallest orifice installed in the system.)
15. **Painted Sprinklers** - Check to ensure fire sprinklers are not painted. Painted fire sprinklers shall be replaced, they shall not be cleaned.
16. **Valve Locations** - All control, auxiliary, and inspector's test valves shall not be located more than seven feet above finish floor or grade.
17. **Protection Against Freezing** - A wet pipe system shall be used where piping is installed in areas that can be maintained reliably above 40°F (4°C). Piping in areas that cannot be maintained reliably above 40°F (4°C) shall be protected by use of one of the following methods:
  - Antifreeze system using a listed antifreeze solution in accordance with NFPA 13
  - Dry pipe system
  - Pre-action system
  - Listed dry pendent, dry upright, or dry sidewall sprinklers extended from pipe in heated areas
  - Heat tracing
18. **Insulation** - Piping covered by insulation is considered part of the area below the ceiling and not part of the unheated attic area.

# Final Inspection and Acceptance Testing

**Pre-Test:** A full 100% functional pre-testing of the fire sprinkler system(s) is **REQUIRED** prior to scheduling the final fire sprinkler inspection.

**Pre-Test Letter:** Documentation must be submitted in written form and signed by the fire sprinkler contractor (i.e. the system has been installed in accordance with "accepted as proposed" plans and tested in accordance with the manufacturers published instructions and NFPA requirements). 2018 IFC 901.2.1; NFPA 13 25.1. **Failure to submit shall result in automatic failure and a new request and fee shall be required.**

**Fire Sprinkler Acceptance Test Form:** Must be completed and submitted prior to scheduling final. **REQUIRED**

## Hydrostatic Test

1. **Scheduling** - Only the sprinkler contractor shall request an inspection. All fees must be paid prior to site inspection. Upon completion of payment, an inspector will contact you within 24 hrs. to schedule a date and time for the site inspection.
2. **2 Hour Test** - A member of the Fire Marshal's Office will contact the contractor to schedule a time for the inspection. The contractor is responsible for verifying that all piping and attached equipment to the system subjected to system working pressure has been under 200 psi of pressure for a minimum of 2 hours prior to the inspection (pretest). (Loss shall be determined by a drop in the gauge pressure or visual leakage.)
3. **Hydrostatic Test:** All piping and joints, including the FDC piping, standpipe and/or sprinkler systems require a 200 psi hydrostatic test for 2 hours per NFPA 13 and NFPA 24. Where system working pressure exceeds 150 psi, the hydrostatic test shall be performed at 50 psi in excess of the system working pressure per NFPA 13. The test shall be witnessed and accepted by the AHJ (2016 NFPA 13 SEC. 25.2.1.2). System modifications involving 20 or fewer sprinkler heads shall not require testing in excess of system working pressure.
4. **FDC Piping** - Piping between the exterior FDC and the check valve in the fire department inlet pipe shall be hydrostatically tested in the same manner as the balance of the system.
5. **Release Pressure** - After verifying that the system has maintained the required 200 psi for 2 hours, release pressure and confirm the test gauge returns to zero. (A gauge that does not return to zero could be an indication that the gauge was pegged.)
6. **Dry Pipe Systems** - In addition to the standard hydrostatic test, an air pressure leakage test at 40 psi 4 hours. Any leakage that results in a loss of pressure in excess of 1 ½ psi for the 24 hours shall be corrected. This test will have to be scheduled for a different day to allow for the 24 hour test.
7. Additions or Modifications affecting **20 or fewer sprinklers** shall not require testing in excess of system working pressure.
8. **More Than 20 Heads** - Additions or Modifications affecting more than 20 sprinklers, the new portions shall be isolated and tested at not less than 200 psi for 2 hours. (Additions or Modifications that cannot be isolated, such as relocated drops, shall not require testing in excess or system working pressure.
9. **Work Affecting FDC** - Repairs or replacements or work affecting the FDC, piping between the exterior and the check valve in the fire department inlet pipe shall be isolated and hydrostatically tested at 150 psi.



## Step 4: Sprinkler Final

1. **Scheduling** - Only the sprinkler contractor shall request an inspection. All fees must be paid prior to site inspection. Upon completion of payment, an inspector will contact you within 24 hrs. to schedule a date and time for the site inspection.
2. **Fire Alarm** - Acceptance testing for the above ground portions of the sprinkler system may be conducted prior to the fire alarm system being fully operational. All sprinkler devices shall be tested with the sprinkler contractor(s) present.
3. **Approved Plans** - Approved/Stamped set of plans.
4. **Waterflow Test** - Test waterflow alarm by flowing water from the Inspectors Test Valve. The alarm should sound no earlier than 45 seconds and no later than 90 seconds. (Wet and dry systems)
5. **Access Panels** - A minimum 12" x 36" access panels shall be provided for all valves located inside a wall or concealed space. Signage shall be provided on the outside of access panel indicating type of valve that is concealed within.
6. **Exterior Horn/Strobe** - Verify that a listed horn/strobe device is located on the exterior of the building in an approved location in close proximity to the buildings address. Such device shall be activated by water flow actuation of the automatic sprinkler system.
7. **Dry-Type Sprinkler Systems** – Have constrictor demonstrate that both high and low air pressure are supervised as required. The off-normal signal shall be initiated when the pressure increases or decreases by 10 psi.
8. **Supervised Valves** - Close all electrically supervised sprinkler control valves to verify supervisory alarm at the FACP within 2 turns of control wheel or, for post indicator valve within 1/5 of valve control mechanism's travel distance. Then reopen to verify "restore" signal.
9. **Calc Plates** - Hydraulic Design Information Sign (Calc Plates) shall be proved by the installing contractor. The sign shall be weatherproof metal or rigid plastic secured with corrosion-resistant wire, chain, or other approved means. Such signs shall be placed at the alarm valve, dry pipe valve, pre-action valve, or deluge valve supplying the corresponding hydraulically designed area.

**The sign shall be engraved, to include the following information:**

- Location of the design area or areas
- Discharge densities over the design area or areas
- Required flow and residual pressure demand at the base of the riser
- Occupancy classification or commodity classification and maximum permitted storage height and configuration
- Hose stream allowance included in addition to the sprinkler demand
- The name of the installing contractor

11. **Door Signs** - Doors leading into rooms that contain controls for fire sprinklers shall be identified with an approved sign. Approved signs shall identify fire protection equipment and be durable materials, red and white in color, permanently installed, and readily visible.
12. **Valve Signs** - All control, drain, and test connection valves shall be provided with a weatherproof metal or rigid plastic identification signs, secured with corrosion-resistant wire, chain, or other approved means. The sign shall identify the portion of the building served and systems with more than one control valve that must be closed to work on a system or space shall have a sign referring to existence and location of other valves. **Painted Heads** - Where sprinklers or cover plates on concealed sprinklers have been painted by other than the sprinkler manufacturer, they shall be replaced.
13. **Listings** - Escutcheons used with recessed, flush-type, or concealed sprinklers shall be part of a listed sprinkler assembly and be metallic or shall be listed for use around a sprinkler. No caulking or glue shall be used to seal penetrations or to affix the components of a recessed escutcheon or concealed cover plate.
14. **Spare Sprinkler Cabinet** - Spare Sprinkler cabinet, sprinkler wrench, and spare sprinklers shall be provided. The stock of spare sprinklers shall include all types and ratings installed and shall be as follows:
  - a. Facilities having under 300 sprinklers – no fewer than 6 sprinklers
  - b. Facilities having 300 to 1000 sprinklers – no fewer than 12 sprinklers
  - c. Facilities having over 1000 sprinklers – no fewer than 24 sprinklers  
-NFPA 13, 6.2.9.5
15. **Sprinkler List** - A list of the sprinklers installed in the property shall be posted in the spare sprinkler cabinet. The list shall include the following:
  - Sprinkler Identification Number (SIN) if equipped; or the manufacturer, model, orifice, deflector type, thermal sensitivity, and pressure rating
  - General description
  - Quantity of each type to be contained in the cabinet
  - Issue or revision date of the list  
-NFPA 13, 6.2.9.7.1
16. **Sprinkler Guards** - Sprinklers subject to mechanical injury shall be protected with listed guards.

### ***Fire Department Connection (FDC):***

17. **Assessable/Orientated** - The FDC shall be assessable and arranged/orientated so that a hose line can be attached to the inlets without interference.
18. **Clear Space** - A clear working space not less than 36 inches in width, 36 inches in depth and 78 inches in height shall be provided. *-IFC 2018, 912.4.2*
19. **Knox Caps** - Fire department connections shall be equipped with approved Knox plugs/caps.
20. **Signs** - Verify that a sign complying with the following has been provided:  
Metal sign with raised letters not less than 1 inch in sized. Signs shall read AUTOMATIC SPRINKLERS or STANDPIPES or TEST CONNECTION or combination thereof as applicable. Where the FDC does not serve the entire building, a sign shall be provided indicating the portions of the building served. (Address, Location, Zone...) *-IFC 912.5*

### ***Post Indicator Valve (PIV):***

21. **Accessible** - Both Remote Post Indicator Valves and Wall Post Indicator Valves shall be easily accessible, and the Open/Closed indicator shall be visible at all times.
22. **Cutable Lock** - The PIV shall be provided with a cuttable padlock.
23. **Clear Space** - A clear working space not less than 36 inches in width, 36 inches in depth and 78 inches in height shall be provided.

### ***System in Full Operation:***

24. **Systems Normal** - Ensure all systems are normal
25. **Alarm Off Test** - Ensure the Fire Alarm is off of test with the monitoring company.
26. **NFPA 13 Report** - The installer shall complete and sign the NFPA 13 Contractor's Material and Test Certificate for Aboveground Piping prior to requesting/scheduling the inspection. (If the building is also equipped with a standpipe system the installer shall also complete and sign the NFPA 14 Contractor's Material and Test Certificate for Aboveground Piping prior to final approval of the system.)