

**UNIVERSITY OF NORTH TEXAS**  
**SECTION 211313**  
**FIRE PROTECTION SPRINKLER SYSTEMS**

**PART 1 - GENERAL**

1.1 SUMMARY

- A. Section includes labor and materials for the installation of a hydraulically calculated automatic, sprinkler system(s), complete in all respects and ready for operation.
  - 1. Work includes the design of a hydraulically calculated, wet-pipe, automatic sprinkler system, designed for 100% coverage of the building.
    - 2. In areas where ambient temperature cannot be maintained at 40° or above, a dry pipe sprinkler system or a monitored heat tape system shall be provided.
    - 3. Design and installation of the sprinkler system shall be such that no parts interfere with general construction, doors, windows, heating, plumbing, air conditioning systems or electrical equipment.
- B. System components for each zone shall include, but not be limited to:
  - 1. Zone control valve and test/drain assembly.
  - 2. Drain valve.
  - 3. Waterflow switches.
  - 4. Valve supervisory switches.
  - 5. Piping.
  - 6. Sprinkler heads.

1.2 SYSTEM DESCRIPTION

- A. The sprinkler system shall be an automatic fire sprinkler system supplied by a pressurized water supply (Municipal water main) to fusible sprinkler heads for the control of fire.
- B. The sprinkler system shall be hydraulically designed to meet the more stringent of the requirements of the 2013 Edition of NFPA 13.
- C. Work shall be installed in accordance with NFPA 13 and Owner's direction. Devices and equipment shall be listed by Underwriters' Laboratories, Inc. or Factory Mutual-approved, individually and as a system, as applicable.
- D. Coordinate the location of sprinkler heads and piping such that it does not interfere with the installed ceiling configuration or other building construction and equipment.

1.3 HYDRAULIC CALCULATIONS

- A. Prepare hydraulic calculations in accordance with NFPA 13 and with the following exceptions:
  - 1. Provide a minimum safety factor of 10 psi on all hydraulically calculated sprinkler systems.
- B. Hydraulic calculations shall be performed by a State of Texas Licensed Responsible Managing Employee (RME) in the direct employ of the fire protection contractor, or by a Texas State Registered Professional Engineer (P.E.).
- C. A recent fire flow test shall be the basis for the fire sprinkler design.

1.4 SUBMITTALS

- A. Contractor's Qualification Data: Copies of fire sprinkler firm's TDI registration, RME License and Liability Insurance.
- B. Product Data: For each type of product indicated.
- C. Shop Drawings: Submit 3 (three) full-size sets of shop drawings for review. Plans must include the following:
  - 1. A "Wet" RME or Texas Professional Engineer's signature and stamp, is required on all plan drawings and calculations.
  - 2. Plans shall be clear and legible and all sheets shall be in a common and appropriate scale;
  - 3. The following information shall be provided on the plans:
    - a. Site plan showing location of the building, all fire hydrants, fire lanes, fire department connections and the fire service main location.
    - 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. Equipment List.
  - l. Hydraulic calculations for each design area.
  - m. A complete full-height cross section of the building.
  - n. Area of coverage of each sprinkler head.
  - o. Total area protected by each system.
  - p. Capacity of the dry system or antifreeze system.
  - q. Hydraulic node symbols and schedule.
  - r. Indicate all Riser Nipples (RN) or Drop Nipples (DN).
  - s. Elevations of sprinkler lines and node points.
  - t. Hanger details.
  - u. Hanger locations.
  - v. Sprinkler riser diagram.
  - w. Inspectors test connection detail.
  - x. Auxiliary drain details.
  - y. Size and location of standpipe hose stations, if applicable.
  - z. Description of the design area.
  - aa. Design density of each design area.
  - bb. Clearly indicate each remote area.
  - cc. Provide graphic representation of the waterflow analysis.
  - dd. Provide the water supply test information.
  - ee. Provide notes to indicate the following;
  - ff. Design code.
  - gg. Responsible party with regards to freeze protection. If to be provided by others, indicate and provide drawings to indicate the heaters with your submittal.
4. 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.
5. A legend shall be provided to include:
- a. Symbol, sprinkler description, manufacturer, model number, and quantity for each device.
  - b. Pipe and fittings type.
- D. Submit 3 (three) copies of equipment specification booklets containing all materials, equipment and products that are being provided for installation.
- 1. Materials, equipment and products being used shall be identified in the specification booklets by an arrow or highlighter.
- E. Field test reports and certifications for compliance with performance requirements shall be submitted to the owner. Include "Contractor's Material and Test Certificate for Aboveground Piping"
- F. All fire system submittals shall be provided to the UNT Fire Marshal for review and approval prior to any work.
- G. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction including hydraulic calculations
- H. Welding certificates.
- I. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13, Include "Contractor's Material and Test Certificate for

Aboveground Piping."

- J. Field quality-control reports.
- K. Operation and maintenance data.
- L. Submit complete "As-Built" set of plans for each fire sprinkler and standpipe system.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Specialist Firm -- The installing contractor shall specialize in the design and installation of fire sprinkler systems and shall be registered as a fire sprinkler contractor by the Texas State Board of Insurance Underwriters (TDI) and shall have in its employ, a Responsible Managing Employee (RME), licensed by the Texas State Board of Insurance Underwriters (TDI). The contractor shall have a minimum of three years of verifiable installation experience with fire sprinkler systems.
  - 1. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing professional engineering services where needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test performed within past 90 days or less of design.
- B. Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. NFPA Standards: Sprinkler system equipment, specialties, accessories, installation, and testing shall comply with 2013 Edition of NFPA 13.

#### 1.6 PIPING AND FITTINGS

- A. Piping and fittings:
  - 1. All exposed, aboveground piping shall be minimum schedule 40 steel pipe\*, no exception, conforming to ASTM A53 or ASTM A795, Type E, Grade A. Comply with applicable governing regulations and industry standards.
  - 2. Piping and fittings for the fire main installed between the City's water utility connection and the required backflow prevention device for the fire riser shall be ASTM approved materials for potable water systems.
  - 3. The piping system for a dry pipe system shall be schedule 40 galvanized steel.
- B. \*Pipe and fittings shall be domestically manufactured by one of the manufacturers listed in the latest edition of the American Petroleum Institute (API) approved manufacturers listing.
- C. Threaded Fittings: Class 150 malleable iron, ANSI B16.3, for pipe sizes 2-inch and less.
- D. Malleable Iron Threaded Unions: ANSI B16.3, select for proper piping fabrication and service requirements including style, end connections, and metal-to-metal seats (iron, bronze, or brass), plain or galvanized as specified.
- E. Threaded Pipe Plugs: ANSI B16.14.
- F. Steel Flanges/Fittings: ANSI B16.5, including bolting, gasketing, and butt weld end connections. Fittings same thickness as pipe.
- G. Forged Steel Socket-welding and Threaded Fittings: ANSI B16.11, rated to match schedule of connected pipe.
- H. Wrought Steel Butt-welding Fittings: ANSI B16.9, except ANSI B16.28 for short radius elbows and returns; rated to match connected pipe.
- I. Flanged Fittings: Comply with ANSI B16.5 for bolt-hole dimensioning, materials, and flange thickness.
- J. Flange Bolts: Bolts shall be carbon steel ASTM A307 Grade A hexagon head bolts and hexagonal nuts. Where one or both flanges are cast iron, furnish Grade B bolts. Cap screws utilized with flanged butterfly valves shall be ASTM A307 Grade B with hexagon heads.
- K. Flange Bolt Thread Lubricant: Lubricant shall be an anti-seize compound designed for temperatures up to 1000°F and shall be Crane Anti-Seize Thread Compound or approved equal.
- L. Saddle tap fitting are not allowed.

#### 1.7 MISCELLANEOUS PIPING MATERIALS/PRODUCTS

- A. Welding Materials: Comply with ASME Boiler and Pressure Vessels Code, Section 11, Part C, for welding materials.
  - 1. Brazing Materials: American Welding Society, AWS A5.B, Classification B Cup-5.

- B. Gaskets for Flanged Joints: 1/16 inch thick for pipe size 10 inches and smaller and 1/8 inch thick for all pipe size 12 inches and larger. Ringtype shall be used between raised face flanges and full face-type between flat face flanges with punched bolt holes and pipe opening. Gaskets shall be Garlock Style 3400 compressed non-asbestos or equal.
- C. Dielectric Unions: Provide dielectric unions at all pipe connections between ferrous and nonferrous piping. Unions shall be "Delvin" as made by Pipeline Seal and Insulator Company or "EPCO" as made by Epco Sales, Inc. and shall have nylon insulation.
- D. Mechanical couplings may only be used for pipe sizes over 2-inch, to engage and lock grooved or pipe ends and to allow for some angular deflection, contraction and expansion.
  - 1. Couplings shall be positive lock type and shall consist of ASTM A536 ductile iron housing, c-shaped composition sealing gasket and carbon steel bolts conforming to ASTM A183.
  - 2. Gasket Material for wet systems shall be EPDM.
  - 3. Gasket material for dry pipe systems shall be silicone.
  - 4. All couplings shall be UL listed and approved.
  - 5. Provide only full flow (no-fabricated) fittings. Snap joint couplings, outlet couplings, cut-in style couplings, reducing couplings, mechanical-T style couplings, pressfit couplings, and plain end type couplings are not allowed.
  - 6. When mechanical couplings are used, ONLY grooved type fittings and pipe shall be used, no plain end fittings or pipe. Grooved couplings and fittings shall be manufactured by Victaulic, "Firelock" or approved equivalent.
- E. Water Flow Switches: Viking or approved equal water flow switch with adjustable retard feature. Switch shall be double-pole double-throw type and shall be rated at least 7 amperes at 125/250 volts.
- F. Valve Supervisory Switches:
  - 1. Provide on each valve, controlling or shutting-off sprinkler system where shown on drawings or/and on all valves required by NFPA 13, or any portion thereof.
  - 2. Provide UL listed unit, with either one single pole double throw switch or two single pole double throw switches as required. Switch shall be compatible with installed valve for standard mounting. Manufactured by Potter Roemer No. 6220, or approved equal.
- G. Sight Flow Connection: Provide acrylic sight flow connection in all test lines, conforming to NFPA 13.
- H. Pressure Gauges: Potter-Roemer Fig. No. 6240 or approved equal 3-1/2 inch diameter polished brass case, 1/4 inch NPT male connection, glass enclosed, 0-300 psi dial pressure gauges with isolation valves.
- I. All hangers and supports shall comply with NFPA 13.
- J. Fire Valve Cabinet (FVC): Where required, Potter-Roemer Fig. No. 18210, recessed fire valve cabinet consisting of 20 gauge steel cabinet with continuous hinge, re-coatable white polyester finish.
- K. Fire Department Valve (FDV): Where required, provide Potter Roemer No. 4060-D, UL Listed and FM approved 2-1/2" cast-brass angle valve with iron hand-wheel, female inlet by 2-1/2" male NST hose thread outlet, 300 pound rating, with female NST hose thread cap with pin lugs and chain.
- L. Wall Mounted Fire Department Siamese Connection: Potter Roemer No. 5785-C or approved equal, free standing, cast bronze body, with 2-1/2", UL listed, rough chrome plated body with polished chrome plated trim, caps and chains with NST hose threads.
- M. Remote Located Fire Department Connection: Where required by Owner, install free standing Potter Roemer No. 5761-5764 Body, cast bronze body with Siamese NST 2-1/2" outlets with polished chrome plated finish, with caps and chains, with NST threads.
- N. Roof Manifold: Where required, provide free standing Potter Roemer No. 5882 Body with 4065 Valves or approved equal, cast bronze body with 2-1/2" outlets with cast brass angle hose valves rated for 300 psi with polished chrome plated finish, with caps and chains, with NST threads.
- O. Post Indicator Valve: Where required, provide adjustable, free standing indicating post and valve, consisting of UL/ FM approved non-rising stem gate valve and indicating post. Gate valve shall have iron body with non-rising stem, bronze mounted, indicator post flange, 175 psi non-shock rating, flanged ends. Indicator post shall be free standing and shall have a cast iron body, plexiglass window and an 18 inch adjustment span with handle and locked and chained in open position. Manufactured by Mueller Valve No. A-2052 and Indicating Post No. A-20801, or approved equal.

## **PART 2 - PRODUCTS**

### **2.1 SPRINKLERS**

- A. Unless otherwise specified, sprinkler heads shall be a quick response type with standard (155°F) temperature rated fusible link, 1/2 inch orifice and a 5.6 K factor.
  - 1. Heads located within the air streams of heat emitting equipment and serving Elevator Machine Rooms, Elevator Shafts and Boiler Rooms shall have an intermediate (200°F) temperature rated fusible link.
  - 2. Install corrosion-resistant sprinkler heads where they are exposed to weather, moisture, or corrosive vapors.
  - 3. Heads installed where they might receive mechanical injury or are less than 7 feet above the floor level shall be protected with approved guards in accordance with NFPA 13.
  - 4. Sprinklers in areas with suspended ceilings shall have pipe and fittings located above the suspended ceiling.
- C. Sprinkler heads shall be UL Listed and approved.
- D. Provide metal cabinet containing a stock of spare sprinkler heads of all types and ratings installed per NFPA 13.
  - 1. Locate cabinet where temperature will not exceed 100°F.
  - 2. Location shall be approved by the Owner.
  - 3. Number of spare sprinklers shall conform to NFPA 13.
  - 4. Provide a sprinkler wrench in the cabinet, for each different type sprinkler head.
- E. Sprinklers shall be provided in electrical rooms unless otherwise noted on the drawings.
- F. The use of extended coverage type heads must have prior approval.
- G. The use of UL listed flexible type head assemblies are permitted.

### **2.2 VALVE SUPERVISORY SWITCHES**

- A. Contractor shall furnish and install supervisory switches. Coordinate wiring of switches with Electrical Contractor.

### **2.3 WATERFLOW SWITCHES**

- A. Provide Viking VSR-F or equivalent waterflow switches, with adjustable retard feature in the supply pipe to each zone for remote alarm. Switch shall be double-pole single-throw type and shall be rated at least 7 amperes at 125/250 volts.
- B. Waterflow switches shall be furnished and installed by this Contractor and wired by Fire Alarm or Electrical Contractor. Coordinate wiring of flow switches with appropriate contractor.

### **2.4 BUILDING FIRE ALARM SYSTEM INTERFACE**

- A. Each zone control assembly shall provide an alarm signal output to the Building Fire Alarm System whenever there is waterflow in the zone. Coordinate with Fire Alarm Contractor.
- B. Each valve which controls the flow of sprinkler system water shall be monitored by the Building Fire Alarm System. Coordinate with Fire Alarm Contractor.

### **2.5 SPRINKLER ALARM CHECK VALVE ASSEMBLY**

- A. Provide 175 psi rated automatic sprinkler valve with one or two pole (as required) flow detectors, pressure switch and associated trim for a complete working system.
- B. Provide products manufactured by Reliable, Viking or approved equivalent.

### **2.6 SPRINKLER INSPECTOR'S TEST ASSEMBLY**

- A. Provide NFPA 13 compliant UL Listed and approved sprinkler system inspector's test assembly, consisting of sight glass, tamper resistant test orifice, test and drain ball valve, rated for 300 psi, manufactured by AGF Model 1000, or approved equal.

### **2.7 FREEZE PROTECTION FOR SPRINKLER PIPE SYSTEM**

- A. Fire protection piping within unheated crawl spaces and attics shall be protected from freezing by one of the following methods:

1. Raychem XL-Trace®, or equivalent, listed and supervised thermostatically controlled heat-trace tape, capable of maintaining pipe temperature above 40° F., shall be installed along the pipe system and sprinkler heads per manufacturer's installation instructions; pipe shall also be insulated with minimum 1 inch thick Pittsburg Corning Foamglas®, John Manville Mico-Lok® Fiber Glass Pipe Insulation, or approved equivalent, type insulation. Where insulation is subject to damage, a metal outer jacket shall be installed over the insulation.
2. Provide a dry pipe sprinkler system with all necessary components to protect the sprinkler system pipe and heads located in the unheated space.
  - a. Dry sprinkler pipe to be schedule 40 galvanized steel pipe conforming to ASTM A53 or ASTM A795, Type E, Grade A.
  - b. Components shall be rated for a minimum 175 psi working pressure.
  - c. Dry Pipe Valve. Provide UL listed and FM approved externally resettable dry pipe valve (Viking, or approved equal) and appurtenances. Equip and connect as required by NFPA 13.
  - d. Provide water and air pressure gauges, priming water level indicator, alarm test bypass and accelerator. Include all necessary pipe fittings and accessories to provide a complete dry pipe Sprinkler System.
  - e. Provide air maintenance devices consisting of air relief valve, bypass valve, shut-off valves; low and high air pressure supervisory switches and water flow supervisory switch with 120 volt single phase power requirement and adjustable pressure rating of 14 to 60 psi, manufactured by Reliable or approved equal.
  - f. Provide a quick opening device equipped with an anti-flooding device (Viking or approved equal) for each system riser.
  - g. Provide an oil-free air compressor for dry pipe sprinkler system applications, permanently lubricated, direct drive, air filter, safety relief valve set at 50 psi, UL listed, sized to fill dry system within 30 seconds. Air compressor shall be either pipe mounted or floor mounted. Manufactured by Reliable or approved equal.

## **PART 3 - EXECUTION**

### **3.1 PIPING INSTALLATION**

- A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.
  1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction.
- B. Piping Standard: Comply with requirements for installation of sprinkler piping in NFPA 13.
- C. Piping and joints shall be full bore reamed, for all joint types.
  - D. Slag shall be removed and cleaned at all welded joints.
  - E. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.
  - F. Install unions adjacent to each valve in pipes NPS 2" and smaller.
  - G. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.
  - H. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, and sized and located according to NFPA 13.
  - I. Install sprinkler piping with drains for complete system drainage.
  - J. Install sprinkler control valves, test assemblies, and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes.
  - K. Install automatic (ball drip) drain valve at each check valve for fire-department connection, to drain piping between fire-department connection and check valve. Install drain piping to and spill over floor drain or to outside building.
  - L. Install hangers and supports for sprinkler system piping according to NFPA13. Comply with requirements for hanger materials in NFPA 13.
- M. Install pressure gages on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Include pressure gages with connection not less than NPS 1/4 and with soft metal seated globe valve, arranged

for draining pipe between gage and valve. Install gages to permit removal, and install where they will not be subject to freezing.

N. Fill sprinkler system piping completely with water.

### 3.2 PIPING INSTALLATION

- A. Piping shall be concealed, except by prior approval of Owner. Install all piping parallel to or at right angles to the column lines of the building wherever possible.
- B. Sprinklers in suspended ceilings shall be provided with arm over supply line.
- C. Individual sprinkler head piping shall not connect to cross-main from the bottom or side of cross-main.
- D. In electrical rooms, only sprinkler piping which serves the sprinkler heads in that room are allowed.
- E. Wet sprinklers shall not be located in IT closets or rooms without prior approval of Owner. Wet sprinkler piping shall not be located in IT closets or rooms. Provide a plugged, 1 inch "T" fitting outside of and in close proximity to each IT closet location for future branch line installation.
- F. Grade piping to eliminate traps and pockets and for drainage per NFPA 13. Where air pockets or water traps cannot be avoided, provide gate valves with hose connections for drainage.
- G. It shall be the responsibility of the Fire Protection Contractor to coordinate electrical equipment locations with the Electrical Contractor and design the fire protection piping system such that no piping is routed over electrical equipment, unless it serves that room.
- H. Changes in direction, branches, offsets etc., shall be made with standard pipe fittings. Holes in the main for branches shall be made with a hole-cutting machine and a standard "Weld-O-Let" or "Thread-O-Let" fitting used. Burning holes in the fire protection System Piping will cause that section of the piping to be cut out and replaced at the Contractor's expense.
- I. Pipe shall be reamed to full pipe diameter before joining:
  - 1. Screwed joints shall be made with standard pipe thread and an approved compound applied to the male thread only.
  - 2. Welded joints shall be made in accordance with the procedure outlined in the ANSI piping code.
  - 3. Valves and specialties shall be screwed or flanged joints.
  - 4. Grooved joints shall be made in accordance with manufacturers recommendations with UL listed and approved couplings or weld-o-let connections to pipe mains shall be full bore.
  - 5. Slag, etc. shall be removed.
- J. Install unions or flanges at equipment connections and as indicated on the Drawings.
- K. Cold-springing piping will not be permitted. Install piping with adequate support to prevent strain on the equipment and to allow for piping system expansion and contraction.
- L. Welded joints on pipe runs shall be made with continuous welds and with pipe ends beveled before fabrication. Piping shall be carefully aligned prior to welding and no metal shall project within the pipe.
- M. Piping shall be sized as required by applicable codes and as indicated on the Drawings.
- N. Provide all test and drain lines as required by Section 8.17.4.1, of NFPA 13:
  - 1. Pressure gauges, signs, and other such standard appurtenances shall be furnished as required for a complete installation in accordance with NFPA 13.
  - 2. Provide nameplate data sign at the zone controlling valve to identify the system as a hydraulically designed system indicating the location and basis for design in accordance with NFPA 13.
  - 3. Install sprinkler piping so that it can be thoroughly drained, and where practicable shall be arranged to drain at the zone drain valve. The zone drain valve shall be capable of a full discharge test without allowing water to flow onto the floor. All drips and drains shall conform to NFPA 13.
  - 4. Field changes in the piping layout or pipe sizes shall not be made without the prior approval of the Owner.

### 3.2 CUTTING AND PATCHING

- A. General: Cut and patch walls, floors, etc., resulting from work or by failure to provide proper openings or recesses in new construction.
- B. Methods of Cutting:
  - 1. Openings cut through concrete and masonry shall be made with masonry saws and/or core drills and at such locations acceptable to the Owner.
  - 2. Impact-type equipment shall not be used except where specifically acceptable to the Owner.

3. Openings in precast concrete slabs for pipes, conduits, outlet boxes, etc., shall be core drilled to exact size.
- C. Restoration:
  1. All openings shall be restored to "as-new" condition for the materials involved, and shall match remaining surrounding materials and/or finishes.
- D. Masonry:
  1. Where openings are cut through masonry walls, provide and install lintels or other structural supports to protect the remaining masonry.
  2. Adequate supports shall be provided during the cutting operation to prevent any damage to the masonry occasioned by the operation.
  3. All structural members, supports, etc., shall be of the proper size and shape, and shall be installed in a manner acceptable to the Owner.
4. Special Note: No cutting, boring, or excavating which will weaken the structure shall be undertaken. A Texas Registered Professional Engineer shall be consulted in these cases. Necessary structural repairs shall be designed by a Texas Registered Professional Engineer.

### 3.3 TESTS AND INSPECTIONS

- A. Inspections, examinations and tests required by the authorities or agencies specified shall be arranged and paid for by the Fire Protection Subcontractor, as necessary, to obtain complete and final acceptance of the system as installed. The certificates of inspection shall be in quadruplicate, and shall be delivered to the Owner.
- B. Fire protection piping systems shall be hydrostatically tested by the Contractor upon completion of the installation as required by NFPA 13 in the presence of the Owners Representative.
  1. The fire protection piping systems shall be hydrostatically tested per the requirements listed in NFPA 13.
  2. When hydrostatic and alarm tests have been completed and all necessary corrections made, a material and test certification shall be provided in accordance with NFPA 13.
  3. Final inspection shall include full flow testing through the inspectors test connection.
  4. Actuation of the flow switch shall occur within one minute of opening of the inspector's test valve.
  5. Final tests shall be witnessed by the Owner's Representative.
- C. Sprinkler system zone control assemblies shall be tested to demonstrate proper operation of the flow switch and valve supervisory switch.
- D. Arrange and pay for all tests and inspections required by authorities having jurisdiction.
- E. Sprinkler piping system will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.

### 3.3 JOINT CONSTRUCTION

- A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.
- B. Install unions adjacent to each valve in pipes NPS 2" and smaller.
- C. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2" and larger end connections.
- D. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- E. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- F. Flanged Joints: Select appropriate gasket material in size, type, and thickness suitable for water service. Join flanges with gasket and bolts according to ASME B31.9.
- G. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
  1. Apply appropriate tape or thread compound to external pipe threads.
  2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.



- H. Welded Joints: Construct joints according to AWS D10.12M/D10.12, using qualified processes and welding operators according to "Quality Assurance" Article.
  - 1. Shop weld pipe joints where welded piping is indicated. Do not use welded joints for galvanized-steel pipe.
    - I. Steel-Piping, Cut-Grooved Joints: Cut square-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe joints.
    - J. Steel-Piping, Roll-Grooved Joints: Roll rounded-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.
- K. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

### 3.4 PERIODIC INSPECTION SERVICE

- A. After completion of the fire protection system installation and at the beginning of the guarantee period, the Automatic Sprinkler Subcontractor shall execute the National Automatic Sprinkler and Fire Control Association, Inc., Standard Form of "Inspection Agreement", without change in the Contract amount, calling for four inspections of the fire protection system during the warranty period.
- B. During the warranty period, inspections shall be in accordance with the Inspection Agreement, plus the following maintenance to be performed during the course of the fourth inspection:
  - 1. Operation of all control valves.
  - 2. Lubrication of operating stems of all interior valves.
  - 3. Operation of all alarms, supervisory switches, air compressors, alarm trip switches, flow switches, and similar items.
  - 4. Cleaning of alarm valves.
  - 5. Lubrication of Fire Department valve hose connections.
- 6. The standard form of the National Automatic Sprinkler and Fire Control Association, Inc., "Report of Inspection", shall be filled out in triplicate after each inspection and the copies sent to the Owner.

### 3.4 VALVE AND SPECIALTIES INSTALLATION

- A. Install listed fire-protection valves, trim and drain valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.
- B. Install listed fire-protection shutoff valves supervised open, located to control sources of water supply except from fire-department connections. Install permanent identification signs indicating portion of system controlled by each valve.
- C. Install check valve in each water-supply connection. Install double check, fire service rated backflow preventer in connection to potable-water-supply sources.
- D. Specialty Valves:
  - 1. General Requirements: Install in vertical position for proper direction of flow, in main supply to system.

### 3.5 IDENTIFICATION

- A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.

### 3.5 SPRINKLER AND COVER PLATE (RECESSED SPRINKLER HEADS) INSTALLATION

- A. Sprinkler heads and recessed sprinkler cover plates shall be protected from damage, dirt and other deleterious materials during construction. Remove and replace any damaged sprinkler or sprinkler cover plate, or sprinklers or cover plates having any foreign material other than factory finish. Sprinkler heads and cover plates shall not be cleaned unless by a method approved by the manufacturer AND accepted by the Owner.

### 3.6 ESCUTCHEON INSTALLATION

- A. Install escutcheons for penetrations of walls, ceilings, and floors.

### 3.7 SLEEVE INSTALLATION

- A. General Requirements: Install sleeves for pipes and tubes passing through penetrations in floors, partitions, roofs, and walls.
- B. Sleeves are not required for core-drilled holes.
- C. Permanent sleeves are not required for holes formed by removable PE sleeves
- D. Cut sleeves to length for mounting flush with both surfaces unless otherwise indicated.
- E. Install sleeves in new partitions, slabs, and walls as they are built.
- F. For interior wall penetrations, seal annular space between sleeve and pipe or pipe insulation using joint sealants appropriate for size, depth, and location of joint.
- G. For exterior wall penetrations above grade, seal annular space between sleeve and pipe using joint sealants appropriate for size, depth, and location of joint.
- H. For exterior wall penetrations below grade, seal annular space between sleeve and pipe using sleeve seals.
- I. Seal space outside of sleeves in concrete slabs and walls with grout.
- J. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials.

### 3.8 SLEEVE SEAL INSTALLATION

- A. Install sleeve seals in sleeves in exterior concrete walls at water-service piping entries into building.
- B. Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble sleeve seal components and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

### 3.9 IDENTIFICATION

- A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.

### 3.10 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
  - 1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
  - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
  - 3. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
  - 4. Energize circuits to electrical equipment and devices.
  - 5. Start and run excess-pressure pumps.
  - 6. Coordinate with fire-alarm tests. Operate as required.
  - 7. Verify that equipment hose threads are NST.
  - 8. Sprinkler system zone control assemblies shall be tested to demonstrate proper operation of the flow switch and valve supervisory switch.
  - 9. Arrange & pay for all tests and inspections required by authorities having jurisdiction.
- C. Sprinkler piping system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

### 3.11 PERIODIC INSPECTION SERVICE

- A. Provide periodic inspections service after completion and Owner acceptance.
- B. This agreement shall be executed at no cost to the Owner and shall include four inspections of the entire sprinkler system during the warranty period, each with a NASFCA "Report of Inspection to the Owner". The final inspection shall include operation and lubrication of all valves, cleaning of all alarm valves and operational testing of all system Electrical and alarm components.

### 3.12 TRAINING

- A. The installation contractor shall provide a minimum of 4 hours of training for the Owner in operation and maintenance of the wet-pipe and/or dry pipe sprinkler system.

## END OF SECTION

EFFECTIVE DATE  
01 June 2020

Project Name, Project Location  
Architect Name, Project No.

211313  
FACILITY PROTECTION SPRINKLER SYSTEM  
UNIVERSITY OF NORTH TEXAS