SECTION 21 13 13 - WET PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Pipe and fittings.
2. Hangers.
3. Backflow prevention.
4. Listed fire protection valves:
    a. Electronically supervised indicating butterfly valves.
    b. Check valves.
    c. OS&Y gate valves
5. Trim and drain valves.
    a. Angle valves.
    b. Ball valves.
    c. Globe valves.
6. Fire Department Connections.
7. Sprinkler specialty pipe fittings.
8. Sprinklers.
9. Alarm Devices.
10. Automatic Air Vent.
11. Pressure Gauges.
12. Signs.

B. Related Sections:

1. Section 21 05 17 “Sleeves and Sleeve Seals for Fire Suppression Piping.”
2. Section 21 05 18 “Escutcheons for Fire Suppression Piping.”
3. Section 21 05 33 “Heat Tracing for Fire Suppression Piping”.
4. Section 21 07 00 “Fire Suppression Systems Insulation”.
5. Section 21 12 00 “Fire Suppression Standpipes.”
6. Section 21 13 16 “Dry Pipe and Preaction Sprinkler Systems”.
7. Section 09 90 00 “Painting”.

1.3 DESCRIPTION OF WORK

A. Provide all required labor, materials, equipment, testing and services necessary to modify the existing fire protection systems for a complete and operational wet pipe fire protection system for the building as hereinafter described and as shown on the engineering drawings.

1.4 DEFINITIONS

A. Standard Pressure Sprinkler Piping: Listed for 175 psi minimum working pressure.

1.5 SYSTEM DESCRIPTION

A. Fire sprinkler design criteria shall be strictly per this specification.

B. Fire sprinkler systems to provide fire protection for the areas indicated on the engineering drawings.

C. Ordinary Hazard Group II wet pipe fire sprinkler systems:

1. Density - 0.20 GPM/sq ft
2. Operating Area - 1,500 sq ft
3. Areas:

a. All Baggage Handling Areas, TSA Bag Screening Areas and Conveyors

1) Temperature Classification: Ordinary
2) Response Type: QR

b. All public areas including Concourse, Ticketing, Baggage Claim, Restrooms, etc.

1) Temperature Classification: Ordinary
2) Response Type: QR

c. All non-public areas including Offices, Break Rooms, Training Rooms, Restrooms, Storage Rooms, Maintenance, etc.

1) Temperature Classification: Ordinary
2) Response Type: QR

d. Mechanical equipment spaces

1) Temperature Classification: Intermediate
2) Response Type: QR

D. Sprinkler spacing shall be per NFPA 13 requirements and as shown on the engineering drawings.

1. Acoustical Tile - Locate sprinklers in accordance with the architectural and engineering drawings. Not more than a 3 in. radius tolerance about the point identified by dimension will be accepted. Where rows of sprinklers are provided within the same ceiling plane, any part of the tolerance used for one sprinkler shall be the same for all others in that same row.
2. Hard Ceilings - Locate sprinklers in accordance with the architectural and engineering drawings. Sprinklers shall be in line with light fixtures and other sprinklers where indicated on the drawings. Coordinate closely with the electrical contractor.
3. Unfinished Areas - Locate sprinklers as shown on the engineering drawings.

E. Standpipes: See Section 211200.

F. Provide all necessary offsets, raises or drops in main or branch line piping and auxiliary drains required by building conditions whether or not shown on the engineering drawings.

G. Examine the job conditions and verify all measurements, distances, elevations, clearances, pipe sizes, etc.

H. The pipe sizes shown on the plans are intended for space coordination and estimating purposes only. Final selection of pipe diameters is to be determined by the installing contractor through hydraulic calculations in accordance with NFPA 13.

1.6 PERFORMANCE REQUIREMENTS

A. Standard Pressure Piping System Component: Listed for 175 psi minimum working pressure.

B. Water Supply – Available fire hydrant flow test records indicate the following conditions:

1. Terminal A:

   a. Date: 01/26/2023
   b. Performed by: GFS Texas
   c. Location of Static and Residual Hydrants: Near Gates A14 and A16
   d. Static Pressure: 79 psi
   e. Residual Pressure: 77 psi
   f. Residual Hydrant Flow Rate: 900 GPM

2. Terminal C:

   a. Date: 01/26/2023
   b. Performed by: GFS Texas
   c. Location of Static and Residual Hydrants: Near Gates C29 and C35
   d. Static Pressure: 80 psi
   e. Residual Pressure: 78 psi
   f. Residual Hydrant Flow Rate: 900 GPM

C. The contractor shall be responsible for obtaining a current water flow test.

1. The following items shall be addressed when performing a fire flow test:

   a. The pressure hydrant should be closer to a feed main than the flow hydrant.
   b. The number of flow hydrants should be determined.

2. The following data need must be recorded during a fire flow test:

   a. Static Pressure: This refers to the pressure reading before water flows. It is taken from the pressure hydrant just prior to time of the fire flow test.
   b. Residual Pressure: This refers to the pressure reading while water is flowing. It is taken from the pressure hydrant while the flow hydrants are flowing full.
   c. This pressure is taken to determine the fire flow for sufficient fire coverage.
   d. Pitot Pressure: This reading is taken by a pitot gauge from the flow hydrants.
   e. The pitot gauge should be inserted into the center of the flowing outlet at
   f. approximately half of the diameter away from the nozzle.

1.7 SUBMITTALS

A. The engineering drawings have been prepared using computer aided drafting software. These documents will be made available to the successful fire sprinkler contractor in electronic format. Utilization of these documents for the development of shop drawings and submittals does not relieve the fire sprinkler contractor from any of his responsibilities required herein.

B. Submittals shall be in accordance with requirements of the General Conditions of the Contract.

C. Product Data: For all wet pipe sprinkler system equipment.

D. All product data shall clearly identify exactly what components are being provided and shall include: finish, size, type, etc. Literature which is not clearly identified will be rejected.

E. Shop Drawings:

1. Drawings must be comprehensive of entire project, demonstrating coordination with other disciplines, complete in all detail and the same scale as the engineering drawings.
2. Hydraulic calculations.
    a. Hydraulic calculations shall comply with NFPA 13. This includes a water supply graph and hydraulic cover sheet. The cover sheet shall include the name and location of the calculated area, ceiling height, occupancy, design criteria, sprinkler spacing, system type, sprinkler make, model, size, K factor and temperature rating, flow requirements, C factor used, water supply data and source of information. The Contractor shall prepare and submit, at a minimum, hydraulic calculations for the hydraulically most remote area for each occupancy hazard.
    b. The Contractor's calculations shall be prepared using a margin of safety of 10 psi with respect to available residual pressure.
    c. Hydraulic calculations shall extend to the point of the waterflow test.
    d. Use of outlet extensions or sprigs shall be reflected in hydraulic calculations. This may be accomplished through use of an equivalent K-factor in conjunction with the sprinkler (in which case supporting calculations are required), or through inclusion as piping.

F. As-Built Drawings

1. Maintain at the site an up-to-date marked hard copy set of as-built drawings that shall be corrected and delivered to the Owner upon completion of work.
2. Upon completion furnish the Owner with '.dwg' file of each reviewed shop drawing, revised to show "as-built" conditions, and final hydraulic calculations, manufacturer's data sheets and NFPA certificates.

G. Field Test Reports and Certificates: Indicate test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping."

H. Field quality control reports.

I. The engineer will review this submittal for consistency with the engineer’s Construction Documents.

J. After the satisfactory review by the engineer, provide submittals to the Authority Having Jurisdiction (AHJ) for approval.

K. The fire sprinkler contractor shall be responsible for responding, in writing, to any comments from the AHJ or the insurance underwriter within ten (10) working days after the receipt of their comments. Copies of the response shall be sent to the General Contractor and the engineer.

L. Provide record documents in accordance with requirements of the General Conditions of the Contract.

M. Provide operating and maintenance instructions to the Owner in accordance with requirements of the General Conditions of the Contract.

1.8 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer's responsibilities include preparing shop drawing submittal, fabricating, and installing sprinkler systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on water supply coordinates provided herein.
2. Installer shall be State and Locally Licensed.

B. 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.

C. References: Fire sprinkler system equipment, specialties, accessories, installation, and testing shall comply with all applicable codes and referenced design standards:

1. International Building Code - 2015 Edition with DFW Amendments
2. International Fire Code - 2015 Edition with DFW Amendments
3. NFPA 13, Standard for the Installation of Sprinkler Systems - 2013 Edition
4. NFPA 415, Standard on Airport Terminal Buildings, Fueling Ramp Drainage, and Loading Walkways – 2013 Edition
5. DFW International Airport Design Criteria Manual – Nov 2015 (Rev 2, Oct 2020)

D. Equipment and components shall be UL Listed for fire protection systems installation.

E. All fire sprinkler system components shall be installed free of any rust, corrosion or visible damage. All items not complying with this requirement shall be replaced without cost to the Owner.

1.9 PROJECT CONDITIONS

A. Interruption of Existing Sprinkler Service: Do not interrupt sprinkler service to facilities occupied unless permitted under the following conditions and then only after arranging to provide temporary sprinkler service according to requirements indicated:

1. Notify Construction Manager, Owner, Insurance Underwriter and AHJs in advance of proposed interruption of sprinkler service.
2. Do not proceed with interruption of sprinkler service without Construction Manager's and Owner's written permission.
3. Provide temporary piping, fittings and valves as required to maintain sprinkler service.

B. Damage

1. Protect all unfinished work to prevent damage and furnish protection of all surrounding areas where necessary.

C. Leak Damage

1. The Contractor shall be responsible during the installation and testing periods of the sprinkler system for any damage to the work of others, to the building or its contents caused by leaks in any equipment, by unplugged or disconnected pipes or fittings, or by overflow. The Contractor shall pay for the necessary replacements or repairs to work of others damaged by such leakage.
2. Water shall not be introduced into the system during conditions where there is danger of freezing or when the building is not closed and heated.

D. No field welding of sprinkler piping is permitted. All welds shall be shop welded.

1.10 COORDINATION

A. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.

B. Coordinate installation of system with all other disciplines.

1.11 EXTRA MATERIALS

A. Provide at the riser manifold spare sprinkler cabinets in accordance with the requirements of NFPA 13 that are stocked with sprinklers and escutcheon assemblies proportionate to those provided in the building and all necessary sprinkler wrenches as required by NFPA 13.

1.12 REGULATORY REQUIREMENTS

A. All work shall meet the requirements of Section 1.12.

B. The fire sprinkler contractor shall not pursue any approvals or interpretations of the engineer's Construction Documents except through the engineer.

C. Sprinkler piping shall not be concealed where it is inaccessible unless it is first inspected and accepted by a representative of the authority having jurisdiction.

D. Any work performed prior to the satisfactory review by the engineer and approval by the authority having jurisdiction and the insurance underwriter, will be solely at the fire sprinkler contractor's risk.

E. The system will not be acceptable until final testing and receipt of the Contractor's Material and Test Certificate has been obtained.

1.13 WARRANTY

A. Repair all defective workmanship or replace all defective materials for a period of **[one]** year from the date of acceptance by the Owner. Workmanship or equipment found to be defective during that period shall be replaced without cost to the Owner.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

A. Per local requirements and NFPA 13. All pipe shall have a Corrosion Resistance Ratio (CRR) equal to or greater than 1.00. Refer to the current UL Fire Protection Equipment Directory - Steel Sprinkler Pipe for acceptable manufacturers, sizes, and joining methods.

B. Fittings shall be screwed, flanged, grooved, or welded connections.

C. Pressure Rating: 175 psi minimum. All components shall be rated for the maximum system working pressure to which they are exposed.

D. All interior pipe and fittings prior to the backflow prevention device shall be acceptable for use in potable water systems per local requirements

E. Schedule 40, Steel Pipe: ASTM A 53/A 53M, Type E, Grade B.

F. Black-Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M, standard-weight, seamless steel pipe with threaded ends.

G. Uncoated-Steel Couplings: ASTM A 865/A 865M, threaded.

H. Uncoated, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.

I. Malleable- or Ductile-Iron Unions: UL 860.

J. Cast-Iron Flanges: ASME 16.1, Class 125.

K. Steel Flanges and Flanged Fittings: ASME B16.5, Class 150.

1. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free or EPDM rubber gasket.

   a. Class 125 and Class 250, Cast-Iron, Flat-Face Flanges: Full-face gaskets.
   b. Class 150 and Class 300, Ductile-Iron or -Steel, Raised-Face Flanges: Ring-type gaskets.

2. Metal, Pipe-Flange Bolts and Nuts: Carbon steel unless otherwise indicated.

L. Steel Welding Fittings: ASTM A 234/A 234M and ASME B16.9.

1. Welding Filler Metals: Comply with AWS D10.12M/D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

M. Grooved-Joint, Steel-Pipe Appurtenances:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Anvil International.
   b. Gruvlock.
   c. Shurjoint Piping Products.
   d. Tyco.
   e. Victaulic.
   f. Viking.

2. Pressure Rating: 175-psig minimum. All components shall be rated for the maximum system working pressure to which they are exposed.
3. Painted Grooved-End Fittings for Steel Piping: ASTM A 47/A 47M, malleable-iron casting or ASTM A 536, ductile-iron casting, with dimensions matching steel pipe.
4. AWWA C606 and UL 213 cover couplings in "Grooved-End-Pipe Couplings for Steel Piping"
5. Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213 rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and bolts and nuts.

2.2 HANGERS

A. All hangers to be of approved materials and spaced in accordance with NFPA 13 and the piping manufacturer's specifications.

B. The section modulus required by NFPA 13 shall be provided for all trapeze members supporting piping.

2.3 BACKFLOW PREVENTION

A. Double Check Detector Assembly Backflow Preventer:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    a. Ames.
    b. Febco.
    c. Watts.
    d. Wilkins.
2. Pressure Rating: 175 psi minimum.
3. Size: 8 and 10 in. as shown on drawings
4. Accessories: Supervised OS&Y gate or butterfly valves with flanged ends on inlet and outlet.

2.4 LISTED FIRE PROTECTION VALVES

A. General Requirements:

1. Pressure Rating: 175 psi minimum. All components shall be rated for the maximum system working pressure to which they are exposed.

B. Indicating Butterfly Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    a. Gruvlock.
    b. Nibco.
    c. Tyco.
    d. Victaulic.
    e. Viking.
2. Body Material: Cast or ductile iron with nylon, EPDM, epoxy, or polyamide coating.
3. Seat Material: EPDM.
4. Stem: Stainless steel.
5. Disc: Ductile iron, nickel plated and EPDM or SBR coated.
6. Actuator: Worm gear or traveling nut.
7. Retain "Supervisory Switch" Subparagraph below only if switch is not specified elsewhere.
8. Supervisory Switch: Internal or external.
9. Body Design: Lug or wafer Grooved-end connections.
10. Standard: UL 1091 and FM Global standard for indicating valves, (butterfly or ball type), Class Number 1112.

C. Check Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Milwaukee Valve.
   b. Mueller Co.
   c. Nibco.
   d. Stockham.
   e. Tyco.
   f. United Brass Works.
   g. Victaulic.

2. Type: Swing check.
3. Body Material: Ductile Iron.
4. Clapper: Bronze, ductile iron, or stainless steel with elastomeric seal.
5. Clapper Seat: Brass, bronze, or stainless steel.
6. Hinge Shaft: Bronze or stainless steel.
7. Hinge Spring: Stainless steel.
8. End Connections: Flanged, grooved, or threaded.
9. Standard: UL 312 and FM Global standard for swing check valves, Class Number 1210.

D. OS&Y Gate Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Milwaukee Valve.
   b. Mueller Co.
   c. Nibco.
   d. Stockham.
   e. Viking.

2. Body and Bonnet Material: Cast or Ductile Iron.
3. Wedge: Cast or ductile iron, or bronze with elastomeric coating.
4. Wedge Seat: Cast or ductile iron, or bronze with elastomeric coating.
5. Stem: Brass or bronze.
6. Packing: Non-asbestos PTFE.
7. Retain "Supervisory Switch" Subparagraph below only if switch is not specified elsewhere.
8. Supervisory Switch: External.
9. End Connections: Flanged.
10. Standard: UL 262 and FM Global standard for fire-service water control valves

2.5 TRIM AND DRAIN VALVES

A. General Requirements:

1. Pressure Rating: 175 psi minimum. All components shall be rated for the maximum system working pressure to which they are exposed.

B. Angle Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Milwaukee Valve.
    b. Nibco.
    c. United Brass Works.

2. Body Material: Brass or bronze.
3. Ends: Threaded.
4. Stem: Bronze.
5. Disc: Bronze.
6. Packing: Asbestos free.
7. Handwheel: Malleable iron, bronze, or aluminum.

C. Ball Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Milwaukee Valve.
    b. Nibco.
    c. United Brass Works.
    d. Victaulic.

2. Body Design: Two piece.
3. Body Material: Forged brass or bronze.
4. Port size: Full or standard.
5. Seats: PTFE.
6. Stem: Bronze or stainless steel.
7. Ball: Chrome-plated brass.
8. Actuator: Handlever.

D. Globe Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Crane.
    b. Milwaukee Valve.
    c. Nibco.

2. Body Material: Bronze with integral seat and screw-in bonnet.
3. Ends: Threaded.
4. Stem: Bronze.
5. Disc Holder and Nut: Bronze.
6. Disc Seat: Nitrile.
7. Packing: Asbestos free.
8. Handwheel: Malleable iron, bronze, or aluminum.

2.6 FIRE DEPARTMENT CONNECTIONS

A. Exposed Standard 5 in. Storz Type Fire Department Connection with 30-degree down angle:

1. Pressure Rating: 175 psi minimum.
2. Body Material: Corrosion resistant metal.

3. Inlets: Brass with threads according to NFPA 1963 and matching local fire department sizes and threads. Include extension pipe nipples, brass lugged swivel connections, and check devices or clappers.
4. Caps: Brass, lugged type, with gasket and chain.
5. Connection: 5” Storz inlet with NPS 6 in. outlet.
6. Finish: Polished chrome plated.
7. FDC location(s) shall be at least 1½ the building height away from the building served OR minimum 50’ away from the building served when specifically approved. They should be off a corner of the building when practical, and out of collapse zone. Refer to Civil Plans for location of FDC.
8. FDC distance to the fire hydrant should be minimum 10’ and maximum 100’, along an approved path measure along hose lay
9. FDC shall be located relative to fire hydrant such that hose lay will not cross roadway or fire lane.
10. FDC shall be minimum 18-inches to bottom, maximum 48inches to top, above the adjoining ground, sidewalk, or grade surface.
11. FDCs shall be provided with locking Knox StorzGuard Caps
12. FDC signs:
    a. Approved address/building number(s) sign shall be attached to ALL FDCs – Buildings served by each FDC shall have approved address/building number(s) sign(s) plainly visible from the FDC.
    b. A Reflective Metal sign with raised letters at least 1 inch in size shall be mounted on all fire department connections serving automatic sprinklers, standpipes or fire pump connections. Such signs shall read: AUTOMATIC SPRINKLERS or STANDPIPES or TEST CONNECTION or a combination thereof as applicable.
    c. Where the system demand pressure exceeds 150 psi, the sign shall indicate the required design pressure.
13. Provide check valve with ball drip. Ball drip shall be approved. Check valve and drain shall be in a readily accessible location for servicing.
14. The pipe located above the ground serving the fire department connections shall be externally and internally galvanized.

2.7 SPRINKLER SPECIALTY PIPE FITTINGS

A. General Requirements:

1. Pressure Rating: 175 psi minimum. All components shall be rated for the maximum system working pressure to which they are exposed.

B. Flow Detection and Test Drain Assemblies:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    a. AGF Manufacturing Inc. – Model 1011 with relief
2. Size: 2 in.
3. Inlet and Outlet: Threaded.

C. Sprinkler Test Fittings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. AGF Manufacturing Inc.
b. Tyco.
c. Victaulic.
d. Viking.

2. Body Material: Bronze, Cast or Ductile Iron housing with sight glass.
3. Size: Same as connected piping.
4. Inlet and Outlet: Threaded.

D. Automatic (Ball Drip) Drain Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Nibco.
b. Reliable.
c. Tyco.

2. Type: Automatic draining, ball check.
3. Size: NPS 3/4 (DN20).

E. Adjustable Drop Nipples:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Anvil International, Inc.
b. CECA, LLC.
c. Corcoran Piping System Co.

2. Body Material: Steel pipe with EPDM-rubber O-ring seals.
3. Size: Same as connected piping.
4. Length: Adjustable.
5. Inlet and Outlet: Threaded.

F. Flexible, Sprinkler Hose Fittings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Fivalco Inc.
b. FlexHead Industries, Inc.
c. Gateway Tubing, Inc.

2. Type: Flexible hose for connection to sprinkler, and with bracket for connection to ceiling grid.
3. Size: Same as connected piping, for sprinkler.

2.8 SPRINKLERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Reliable.
2. Tyco.
3. Victaulic.

4. Viking.

B. General Requirements:

1. Pressure Rating: 175 psi minimum. All components shall be rated for the maximum system working pressure to which they are exposed.
2. Only sprinklers manufactured utilizing Belleville spring seals will be acceptable for use.
3. If dry pendent or recessed sprinklers are protecting a walk-in cooler, freezer or similar area and the piping supplying these sprinklers is in a conditioned space a Dry Sprinkler Boot compatible with the dry sprinkler shall be used.

C. Sprinkler Types:

1. Chrome Recessed - Glass Bulb Quick Response Recessed Sprinkler with polished chrome recessed escutcheon.
2. Black Semi-Recessed - Glass Bulb Quick Response Recessed Sprinkler with factory applied black painted deflector, frame and escutcheon.
3. White Semi-Recessed - Glass Bulb Quick Response Recessed Sprinkler with factory applied white painted deflector, frame and escutcheon.
4. Brass Upright - Glass Bulb Quick Response Upright Sprinkler.
5. Brass Pendent - Glass Bulb Quick Response Pendent Sprinkler.
6. Brass Horizontal Sidewall - Glass Bulb Quick Response Horizontal Sidewall Sprinkler.
7. Chrome Horizontal Sidewall - Glass Bulb Quick Response Horizontal Sidewall Sprinkler with polished chrome flat escutcheon.
8. Chrome Pendent - Glass Bulb Quick Response Pendent Sprinkler with polished chrome flat escutcheon.
9. Dry Horizontal Sidewall - Quick Response Dry Horizontal Sidewall Sprinkler.
10. Concealed – Glass Bulb Quick Response Concealed Sprinkler with factory painted cover plate. Custom colors shall be coordinated with the architect as required.

D. Sprinkler Escutcheons: Materials, types, and finishes shall match sprinklers.

1. Escutcheons shall be listed for use with the corresponding sprinkler with which it is installed.

E. Sprinkler Guards:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Reliable.
b. Tyco.
c. Victaulic.
d. Viking.

2. Type: Wire cage with fastening device for attaching to sprinkler.
3. Guard Finish: Clear Chromate over Zinc Plating.

2.9 ALARM DEVICES

A. Alarm device types shall match piping and equipment connections.

B. Waterflow Switches - Vane Type:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Guardian.
   b. Potter Electric.
   c. System Sensor.

2. Components: Two single-pole, double-throw circuit switches for isolated alarm and auxiliary contacts, 24-volt D.C. or 110-volt A.C.; complete with factory set, field adjustable retard element to prevent false signals and tamperproof cover; corrosion resistant components in waterway; dust tight construction.
3. Type: Paddle operated.
4. Pressure Rating: 175 psi
5. Design Installation: Horizontal or vertical.
6. Signals waterflow that equals or exceeds 10 GPM.
7. 0 to 120 seconds adjustable range.
8. Detector shall be furnished and installed by the fire sprinkler contractor and wired complete by the electrical contractor.

C. Valve Supervisory Switches:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Guardian.
   b. Potter Electric.
   c. System Sensor.

2. Type: Electrically supervised.
3. Components: Single-pole, double-throw switch with normally closed contacts; tamper proof cover; dust tight construction.
4. Design: Signals that controlled valve is in other than fully open position.
5. The supervisory switch shall be furnished and installed by the fire sprinkler contractor and wired complete by the electrical contractor.

2.10 AUTOMATIC AIR VENT

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Engineered Corrosion Solutions – Automatic Air Vent (EAAV-2)
2. Potter Electric Signal – Automatic Air Vent (PAAR)
3. Owner Approved Equivalent:

B. Furnish and install the Automatic Air Vent per manufacturer's instructions. Provide at least one Automatic Air Vent per sprinkler zone connected at or near the high point of the fire protection system piping.

C. The fire sprinkler contractor shall leave the provided isolation valve in the open position after the installation of the Automatic Air Vent and the final testing of the system has been completed.

D. The contractor shall install the Automatic Air Vent in a location that the water detection indicator installed in the bottom of the assembly, if provided, can be clearly viewed from directly below.

E. Pressure Rating: 175 psi minimum. All components shall be rated for the maximum system working pressure to which they are exposed.

2.11 PRESSURE GAGES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AMETEK; U.S. Gauge Division.
2. Brecco Corporation.
3. WIKA Instrument Corporation.

B. Dial Size: 3½ to 4½-inch diameter.

C. Pressure Gage Range: 0 to 250 psi minimum.

D. Water System Piping Gage: Include "WATER" or "AIR/WATER" label on dial face.

2.12 SIGNS

A. Approved enameled metal signs shall be securely attached at all main drains, auxiliary drains, test connections and control valves. (Signs shall indicate which zone they serve.)

B. Provide a permanently attached placard indicating hydraulic design criteria placed on each system riser.

C. Provide in each sprinkler riser room a plan no less than 11” x 17” indicating the areas served by each system. The plan shall also include the location of each low point or auxiliary drain valve. The plan shall clearly identify the system associated with each low point or auxiliary drain valve. This plan shall be framed with a Plexiglas cover and shall be permanently attached to a wall. Plan shall be large enough to clearly define the areas protected by each system.

PART 3 - EXECUTION

3.1 COORDINATION WITH OTHER TRADES

A. Coordinate closely with all other trades to expedite construction and avoid interference.

3.2 SYSTEM INSTALLATION

A. Deviations from engineering documents require prior written approval from the Engineer of Record.

B. Piping Standard: Comply with requirements in NFPA 13 for installation of sprinkler piping.

C. Install Test Connections in sprinkler system piping as required.

D. Auxiliary drains consisting of plugs, or globe valves and plugs where capacity of trapped pipe section exceeds 5 gallons, shall be provided to drain all points in the system that cannot be drained back to main riser.

E. Install alarm devices in piping systems.

F. Install hangers and supports for sprinkler system piping according to NFPA 13.

G. Install pressure gages where required by NFPA 13. Include pressure gages with connection not less than NPS ¼ 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.

H. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in SECTION 210517 - SLEEVES AND SLEEVE SEALS FOR FIRE SUPPRESSION PIPING

I. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in SECTION 210518 - ESCUTCHEONS FOR FIRE SUPPRESSION PIPING.

J. Firestop all penetrations of fire rated assemblies.

K. Provide a bypass around the check valve in the fire department connection line with a control valve supervised in the normally closed position. The bypass is required for the performance of a full flow test of the system demand through the backflow preventer.

3.3 GENERAL REQUIREMENTS FOR VALVE INSTALLATION

A. 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.

B. Install backflow preventers in potable-water-supply sources.

C. Install valves having threaded connections with unions at each piece of equipment arranged to allow easy access, service, maintenance, and equipment removal without system shutdown. Provide separate support where necessary.

D. Install valves in horizontal piping with stem at or above the pipe center.

E. Install valves in position to allow full stem movement.

F. Install valve tags. Comply with DFW requirements for valve tags and schedules and signs on surfaces concealing valves; and the NFPA standard applying to the piping system in which valves are installed. Install permanent identification signs indicating the portion of system controlled by each valve.

3.4 JOINING OF PIPE AND FITTINGS

A. All pipe shall be joined in accordance with NFPA 13 and manufacturers recommendations.

B. Where grooved fittings and couplings are used together, they shall be of the same manufacturer.

C. Bushings shall not be used. (Exception: Hexagonal bushings shall be permitted for temporary sprinklers on exposed systems in unfinished lease spaces only. Refer to NFPA 13 for guidelines.)

3.5 IDENTIFICATION

A. Install labeling and pipe markers on equipment and piping as according to ANSI/ASME A13.1.

3.6 PAINTING

A. Piping shall be degreased, prepped, and ready for paint in exposed ceiling areas where indicated on the drawings.

3.7 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Leak Test: After installation, hydrostatically test all systems and test for leaks by charging system to 200 psi, or 50 psi above maximum working pressure if over 150 psi, in accordance with NFPA 13. 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. Coordinate with fire alarm tests. Operate as required.
5. Verify that equipment hose threads are same as those used by the local fire department equipment.
6. Tests shall be witnessed by the authority having jurisdiction and Owner’s authorized agent.
7. Preliminary testing procedures shall be conducted as mentioned above to assure proper operation when the final testing is performed.
8. The Contractor’s Material and Test Certificates as required by the Texas State Fire Marshal must be completed and submitted to the Engineer before final acceptance may be given.

3.8 CLEANING

A. Dust or blow away dirt and debris from sprinklers. Sprinklers with foreign materials that cannot be readily dusted or blown away must be replaced.

B. Remove and replace sprinklers with paint, other than factory finish, including overspray.

C. Maintain the premises free from accumulation of waste materials and rubbish caused by this work.

D. At the completion of the work, remove all surplus materials, tools, etc., and leave the premises clean.

3.9 SAFETY

A. All work shall be performed in compliance with the Occupational Safety and Health Act of 1970 and the Construction Safety Act Standards.

B. Contractor shall attend all job site safety meetings.

3.10 DEMONSTRATION

A. Refer to Division 01 Specification “Demonstration and Training” for instruction and demonstration of operation of fire protection systems to Owner’s Authorized Representatives.

END OF SECTION