SECTION 21 12 00 - FIRE SUPPRESSION STANDPIPES

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. Fire hose valves.
2. Valve cabinets.

B. Refer to 21 13 13 “Wet Pipe Sprinkler Systems” for:

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. Specialty pipe fittings.
8. Alarm Devices.
9. Automatic Air Vent.
10. Pressure Gauges.
11. Signs.

C. Refer to 21 13 16 “Dry Pipe and Preaction Sprinkler Systems” for:

1. Pipe and fittings for dry standpipe systems

D. 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 13 13 “Wet Pipe Sprinkler Systems”.
6. Section 21 13 16 “Dry Pipe and Preaction Sprinkler Systems”.
7. Section 10 44 13 “Fire Protection Cabinets”.
8. Section 09 90 00 “Painting”.

1.3 DESCRIPTION OF WORK

A. Provide all required labor, materials, equipment, testing and services necessary for a complete and operational wet standpipe system for the building as hereinafter described and as shown on the Engineering drawings.

B. Work shall begin at the 8 in. take-off on fire protection riser manifolds in each valve room supply and shall include the following:

1. Manual and Automatic Standpipe Systems – Wet and Dry (Renovated areas)
2. Automatic Standpipe Systems – Wet and Dry (New construction areas)
3. Coordination of work and schedules with other trades.

C. It is intended that the engineering drawings and specification shall describe and provide for a working installation complete in every detail and all items necessary for such complete installation shall be provided whether or not specifically mentioned herein or shown on the engineering drawings.

1.4 DEFINITIONS

A. Standard Pressure Standpipe Piping: Listed for 175 psi minimum. All components shall be rated for the maximum system working pressure to which they are exposed.

1.5 SYSTEM DESCRIPTION

A. Standpipe system design criteria shall be strictly per this specification.

B. Wet standpipe systems to provide fire protection for the entire building.

C. CLASS I Standpipe System Demand

1. Minimum Flow Rate: 500 gpm from hydraulically most remote standpipe through the two most remote 2-½ in. outlets, plus 250 gpm from each additional standpipe, with the total not to exceed 1,000 gpm.

D. 2 ½ in. Fire Department Valve Outlet Demand

1. Minimum Flow Rate: 250 gpm from hydraulically most remote valve outlet.
2. Minimum Design Pressure: 100 psi

E. Provide fire department connection as indicated on the engineering drawings.

F. Provide all necessary offsets, raises or drops in piping 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 and NFPA 14.

1.6 PERFORMANCE REQUIREMENTS

A. Standard Pressure Piping System Component: Listed for 175 psi (12.1 bar) minimum working pressure.

B. Water Supply for Manual Systems: 150 psi at inlet of fire department connection provided via pumper truck.

C. Water Supply – Available fire hydrant flow test records are provided on FZ drawing cover sheet.

D. 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 either 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 Literature: For all standpipe system equipment.

1. Literature 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.

D. 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 and NFPA 14. 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.

E. Field Test Reports and Certificates: Indicate test results for compliance with performance requirements and as described in NFPA 13 and 14. Include "Contractor's Material and Test Certificate for Aboveground Piping."

F. Field quality control reports.

G. The engineer will review this submittal for consistency with the engineer's Construction Documents.

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

I. 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.

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

K. 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 standpipe systems and providing professional engineering services needed to assume engineering responsibility.

    a. 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 Suppression Standpipe 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, Sprinkler Systems - 2013 Edition
4. NFPA 14, Standpipe Systems - 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 standpipe 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 Standpipe Service: Do not interrupt standpipe service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

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

B. Coordinate installation of system with all other disciplines.

1.11 REGULATORY REQUIREMENTS

A. All work shall meet the requirements of Section 1.8.

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

C. Standpipe 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 AHJ 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.

1.12 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 SPECIALTY VALVES

A. General Requirements:

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

B. Valve Hose Connections:

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. Croker.
    b. Elkhart Brass.
    c. Potter Roemer
2. Pressure Rating: 300 psi minimum.
3. Material: Brass or bronze.
4. Size: NPS 2½.
5. Inlet: Female pipe threads.
6. Outlet: Male hose threads with lugged cap, gasket, and chain. Include hose valve threads according to NFPA 1963 and matching local fire department threads. Include 1-1/2" reducer fitting.
7. Pattern: Angle.
8. Finish: Rough brass or bronze.

2.2 HOSE VALVE CABINETS

A. See Division 10 section 10 44 13 "Fire Protection Cabinets"

2.3 PIPE AND FITTINGS

A. See Division 21 section 21 13 13 "Wet Pipe Sprinkler Systems" for wet standpipe pipe and materials.

B. See Division 21 section 21 13 16 "Dry Pipe and Preaction Sprinkler Systems" for dry standpipe pipe and materials.

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 and NFPA 14 for installation of piping.

C. Install Test Connections in 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 automatic (ball drip) drain valve between fire department connection and check valve and between roof manifold and control valve at top of standpipe. Install drain piping to and spill over floor drain or to outside building.

F. Install automatic (ball drip) drain valve between roof manifold and control valve at top of standpipe.

G. Install alarm devices in piping systems.

H. Install hangers and supports for system piping according to NFPA 13 and NFPA 14.

I. Install pressure gages where required by NFPA 14. 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.

J. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Division 21 Section "Sleeves and Sleeve Seals for Fire Suppression Piping" and DFW Design Criteria Manual.

K. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Division 21 Section "Sleeves and Sleeve Seals for Fire Suppression Piping" and DFW Design Criteria Manual.

L. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Division 21 Section "Escutcheons for Fire Suppression Piping."

M. Firestop all penetrations of fire rated assemblies.

3.3 IDENTIFICATION

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

3.4 PAINTING

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

3.5 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 local fire department equipment.

C. Tests shall be witnessed by the authority having jurisdiction and Owner’s authorized agent.

D. Preliminary testing procedures shall be conducted as mentioned above to assure proper operation when the final testing is performed.

E. The Contractor’s Material and Test Certificates as shown in NFPA 13 and NFPA 14 must be completed and submitted to the Engineer before final acceptance may be given.

3.6 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.

3.7 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.

3.8 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain fire suppression standpipe system components.

END OF SECTION