

SECTION 13915 - FIRE-SUPPRESSION PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following fire-suppression piping, sprinklers and equipment inside the building:
 - 1. Provide and place into service an NFPA 13 wet-pipe sprinkler system in the new Iris Park Apartments to protect the entire building, with a footprint of approximately 33,000 sq. ft.
 - 2. The water supply shall be provided by the existing underground mains of the Portland Water District which shall extend to the new building. The current water supply data from Portland Water District is as follows:
 - a. Test HYD #143
 - b. Flow HYD #332
 - c. Static Pressure: 94 psig
 - d. Residual Pressure: 94 psig
 - e. Pitot Reading: 62
 - f. Flow 1321 GPM
 - 3. A fire sprinkler system shall be installed in all areas in accordance with NFPA 13.
 - 4. Provide fire department connection, location as shown on attached sketch SKP-3 per Portland fire department requirements.
 - 5. Provide all sprinkler piping located inside the building.
- B. Related Sections include the following:
 - 1. Division 2 for piping outside the building.
 - 2. Division 15 Section "Basic Mechanical Materials and Methods".
 - 3. Division 15 Section "Mechanical Identification".
 - 4. Division 16 Section "Fire Alarm" for alarm devices not specified in this Section.

1.3 PERFORMANCE REQUIREMENTS

- A. NFPA-13 (not NFPA 13R) sprinkler system, as required by Portland Fire Department.
 - 1. Wet-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing water and that is connected to water supply. Water discharges immediately from sprinklers when they are opened. Sprinklers open when heat melts fusible link or destroys frangible device. Hose connections are included if indicated.
- B. Standard Piping System Component Working Pressure: Listed for at least 175 psig.

- C. Fire-suppression sprinkler system design shall be approved by authorities having jurisdiction.
 - 1. Margin of Safety for Available Water Flow and Pressure: 5 psig minimum
 - 2. Minimum Density for Automatic-Sprinkler Piping Design shall be as specified in NFPA 13.
 - 3. Maximum Protection Area per Sprinkler: Per UL listing and NFPA requirements.
 - 4. Total Combined Hose-Stream Demand Requirement: According to NFPA 13.
- D. Seismic Performance: Fire-suppression piping shall be capable of withstanding the effects of earthquake motions determined according to NFPA 13.
- E. Elevator fire protection: if required by Fire Marshall, provide per NFPA 13 and 1996 ASME/ANSI A17.1, Safety Code for Elevators and Escalators.

1.4 SUBMITTALS

- A. Product Data: For the following:
 - 1. Piping materials, including sprinkler specialty fittings.
 - 2. Pipe hangers and supports.
 - 3. Valves, including listed fire-protection valves, unlisted general-duty valves, and specialty valves and trim.
 - 4. Sprinklers, escutcheons, and guards. Include sprinkler flow characteristics, mounting, finish, and other pertinent data.
 - 5. Fire department connections, including type; number, size, and arrangement of inlets; caps and chains; size and direction of outlet; escutcheon and marking; and finish.
 - 6. Alarm devices, including electrical data.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, which have been approved by authorities having jurisdiction, including hydraulic calculations, if applicable.
- D. 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" and "Contractor's Material and Test Certificate for Underground Piping."
- E. Field quality-control test reports.
- F. Operation and Maintenance Data: For sprinkler specialties to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Installer's responsibilities include designing, fabricating, and installing fire-suppression systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of recent fire hydrant flow test.

- B. Sprinkler designer shall be legally qualified and licensed to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of fire-suppression piping that are similar to those indicated for this Project in material, design, and extent.
- C. As a minimum, sprinkler designer shall be certified by the *National Institute for the Certification in Engineering Technologies* at Level III for fire protection automatic sprinkler systems layout.
- D. Manufacturer Qualifications: Firms whose equipment, specialties, and accessories are listed by product name and manufacturer in UL's "Fire Protection Equipment Directory" and FM's "Fire Protection Approval Guide" and that comply with other requirements indicated.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- F. Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX.
- G. NFPA Standards: Fire-suppression-system equipment, specialties, accessories, installation, and testing shall comply with the following:
 - 1. NFPA 13, "Installation of Sprinkler Systems, 1999 Edition."
 - 2. NFPA 24, "Installation of Private Fire Service Mains and Their Appurtenances, 1995 Edition."
 - 3. NFPA 291, "Fire Flow Testing and Marking of Hydrants"
 - 4. NFPA 101

1.6 COORDINATION

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

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Sprinkler Cabinets: Finished, wall-mounting, steel cabinet with hinged cover, with space for number of sprinklers required by NFPA 13; and sprinkler wrench.

PART 2 - PRODUCTS

2.1 PIPE AND TUBE FITTINGS

- A. Furnish and install in accordance with NFPA 13.
- B. Piping shall be steel, galvanized or black, ASTM Standards as required by NFPA 13.

- C. Press-fit is not acceptable.
- D. Acceptable manufacturer's of Grooved-Joint Piping Systems:
 - 1. Central Sprinkler Corp.
 - 2. Star Pipe Products; Star Fittings Div.
 - 3. Victaulic Co. of America.
 - 4. Gruvlok

2.2 DIELECTRIC FITTINGS

- A. Assembly shall be copper alloy, ferrous, and insulating materials with ends matching piping system. Furnish and install where dissimilar materials meet and as required by NFPA.

2.3 SPRINKLER SPECIALTY FITTINGS

- A. Sprinkler specialty fittings shall be UL listed or FMG approved, with 175-psig minimum working-pressure rating, and made of materials compatible with piping.
- B. Provide fittings as required to comply with NFPA 13.

2.4 LISTED FIRE-PROTECTION VALVES

- A. Valves shall be UL listed or FMG approved, with 175-psig minimum pressure rating.
- B. Provide valves as required to comply with NFPA 13.

2.5 SPECIALTY VALVES

- A. Sprinkler System Control Valves: UL listed or FMG approved, cast- or ductile-iron body with flanged or grooved ends, and 175-psig minimum pressure rating.

2.6 SPRINKLERS

- A. Listed residential or quick response sprinklers shall be used, complying with NFPA 13.
- B. Manufacturers:
 - 1. Central Sprinkler Corp.
 - 2. Grinnell Fire Protection.
 - 3. Reliable Automatic Sprinkler Co., Inc.
 - 4. Star Sprinkler Inc.
 - 5. Viking Corp.
- C. Automatic Sprinklers: With heat-responsive element complying appropriate UL application.
- D. Sprinkler Types and Categories: as required by NFPA.

- E. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers. Adjust for flush finish with surface.
- F. Sprinkler Guards: Wire-cage type, including fastening device for attaching to sprinkler.
- G. Rooms without Ceilings: Upright sprinklers
- H. Rooms with Suspended or Finished Ceilings: Pendent sprinklers. All branch piping shall be concealed.
- I. Wall Mounting: Sidewall sprinklers.
- J. Finishes
 - 1. Upright, Pendent, and Sidewall Sprinklers in finished spaces exposed to view: white.
 - 2. Unfinished spaces not exposed to view: rough bronze.

2.7 FIRE DEPARTMENT CONNECTIONS

- A. Wall-Type, Fire Department Connection: Comply with NFPA 13R; UL 405, 175-psig minimum pressure rating; with corrosion-resistant-metal body with brass inlets, brass wall escutcheon plate, brass lugged caps with gaskets and brass chains, and brass lugged swivel connections. Include inlets with threads according to NFPA 1963 and matching local fire department sizes and threads, outlet with pipe threads, extension pipe nipples, check devices or clappers for inlets, and escutcheon plate with marking similar to "AUTO SPKR".
 - 1. Type: Flush, with quantity of inlets required by local fire department.
 - 2. Escutcheon plate: square or rectangular.
 - 3. Type: Exposed, projecting, with two inlets and round escutcheon plate.
 - 4. Finish: Rough chrome-plated.

2.8 ALARM DEVICES

- A. Water flow alarms shall be provided in accordance with NFPA 13.
- B. Connect to the building fire alarm system.

2.9 BACKFLOW PREVENTERS

- A. Manufacturers:
 - 1. Ames Co., Inc.
 - 2. Cla-Val Co.
 - 3. Conbraco Industries, Inc.
 - 4. Watts Industries, Inc.; Water Products Div.
 - 5. Zurn Industries, Inc.; Wilkins Div.

- B. General: ASSE standard, backflow preventers. Furnish and install as required by local water district.
- C. Reduced-Pressure-Principle Backflow Preventers: ASSE 1013, suitable for continuous pressure application. Include outside screw and yoke gate valves on inlet and outlet, and strainer on inlet; test cocks; and pressure-differential relief valve with ASME A112.1.2, air-gap fitting located between two positive-seating check valves.
- D. Double-Check-Valve Backflow Prevention Assemblies: UL 312, FM approved; with two UL 312, FM-approved, iron-body, 175-psig working-pressure, flanged-end check valves and two UL 262, FM-approved, iron-body, outside screw and yoke, flanged, 175-psig working-pressure gate valves.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Hydrant flow tests for sprinkler system design shall be not greater than 5 years old. The authority having jurisdiction may require a current test when deemed necessary. Perform fire-hydrant flow test according to NFPA 291. Use results for system design calculations required in Part 1 "Quality Assurance" Article.
- B. Report test results promptly and in writing.

3.2 EARTHWORK

- A. Refer to Division 2 for excavating, trenching, and backfilling.

3.3 EXAMINATION

- A. Examine roughing-in for hose connections and stations to verify actual locations of piping connections before installation.
- B. Examine walls and partitions for suitable thicknesses, fire- and smoke-rated construction, framing for hose-station cabinets, and other conditions where hose connections and stations are to be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.4 JOINT CONSTRUCTION

- A. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for basic piping joint construction.
- B. Threaded Joints: Comply with NFPA 13 for pipe thickness and threads. Do not thread pipe smaller than NPS 8 with wall thickness less than Schedule 40 unless approved by authorities having jurisdiction and threads are checked by a ring gage and comply with ASME B1.20.1.

- C. Pressure-Sealed Joints: Use UL-listed tool and procedure. Include use of specific equipment, pressure-sealing tool, and accessories.
- D. Steel-Piping, Grooved Joints: Use Schedule 40 steel pipe with cut or roll-grooved ends and Schedule 30 or thinner steel pipe with roll-grooved ends; steel, grooved-end fittings; and steel, keyed couplings. Assemble joints with couplings, gaskets, lubricant, and bolts according to coupling manufacturer's written instructions. Use gaskets listed for dry-pipe service for dry piping.
- E. Dissimilar-Metal Piping Joints: Construct joints using dielectric fittings compatible with both piping materials.

3.5 SERVICE-ENTRANCE PIPING

- A. Connect fire-suppression piping to water-service piping of size and in location indicated for service entrance to building. Refer to Division 2 Section "Water Distribution" for exterior piping.
- B. Install shutoff valve, backflow preventer, pressure gage, drain, and other accessories as required at connection to water-service piping.
- C. All underground supply piping from the water utility shutoff to the sprinkler system connection shall be hydrostatically tested at 50 psi above the expected static pressure for two hours, to ensure the reliability of the materials and installation.
- D. Underground mains and lead-in connections to system risers shall be flushed before connection is made to sprinkler piping, in order to remove foreign materials that may have entered the underground piping during the course of the installation. For all systems, the flushing operation shall be continued until water is clear. Flushing shall be at the hydraulically calculated water demand rate of the system.

3.6 BACKFLOW-PREVENTER INSTALLATION

- A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.

3.7 PIPING INSTALLATION

- A. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for:
 - 1. Basic piping installation.
 - 2. Fire –Barrier penetrations.
- B. Install in accordance with NFPA 13 requirements.
- C. Install sprinkler piping with drains for complete system drainage.
- D. Seal all pipe penetrations with fire sealant as specified.

3.8 LABELING AND IDENTIFICATION

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

3.9 COMMISSIONING

- A. Flush, test, and inspect sprinkler systems according to NFPA 13 requirements.
- B. Verify that specialty valves, trim, fittings, controls, and accessories are installed and operate correctly.
- C. Verify that specified tests of piping are complete.
- D. Verify that damaged sprinklers and sprinklers with paint or coating not specified are replaced with new, correct type.
- E. Verify that sprinklers are correct types, have correct finishes and temperature ratings, and have guards as required for each application.
- F. Verify that potable-water supplies have correct types of backflow preventers.
- G. Verify that fire department connections have threads compatible with local fire department equipment.
- H. Fill wet-pipe sprinkler piping with water.
- I. Energize circuits to electrical equipment and devices.
- J. Adjust operating controls and pressure settings.
- K. Coordinate with fire alarm tests. Operate as required.
- L. Report test results promptly and in writing to Architect and authorities having jurisdiction.

3.10 CLEANING AND PROTECTION

- A. Clean dirt and debris from sprinklers.
- B. Remove and replace sprinklers with paint other than factory finish.
- C. Protect sprinklers from damage until Substantial Completion.

END OF SECTION 13915