

## SECTION 211000 - FIRE-SUPPRESSION SPRINKLER SYSTEM

### 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. Modify the existing sprinkler system to suit the new layouts.
- B. This Section includes fire-suppression sprinklers, piping, and equipment.
- C. Performance and Design Criteria: Provide products and systems complying with specific performance and design criteria indicated.

#### 1.3 SYSTEM PERFORMANCE REQUIREMENTS

- A. Design sprinklers and obtain approval from authorities having jurisdiction. The design of the automatic sprinkler system shall be complete with all necessary accessories for proper operation.
- B. The system shall be hydraulically calculated in accordance with all provisions of the Contract Documents and any authority having jurisdiction.
- C. Design sprinkler piping according to the following and obtain approval from authorities having jurisdiction:
  - 1. Include a 5 percent margin of safety for available water flow and pressure.
  - 2. Include losses through water-service piping, valves, and backflow preventers.
- D. Sprinkler Occupancy Hazard Classifications:
  - 1. Light Hazard:
    - a. Office and Public Areas
  - 2. Ordinary Hazard, Group 1:
    - a. General Storage Areas
    - b. Mechanical Equipment Rooms
    - c. Building Service Areas.
    - d. Electrical Equipment Rooms
- E. Minimum Density for Automatic-Sprinkler Piping Design shall be in accordance with NFPA 13. Maximum Protection Area per Sprinkler shall be in accordance with NFPA 13.

#### 1.4 GENERAL REQUIREMENTS

- A. Components and Installation: Capable of producing piping systems with 175-psig minimum working-pressure rating, unless otherwise indicated.
- B. Protect all systems from freezing. Provide freeze protection for sprinklers in unheated areas.
- C. Bundled/Grouped wired in concealed spaces: Non-combustible spaces having 15 or more non-plenum-rated wires grouped together shall be fully sprinklered.
- D. Seismic Performance: If required by the authority with jurisdiction, fire-suppression piping shall be capable of withstanding the effects of earthquake motions determined according to NFPA 13.
- E. Contractor shall obtain and pay for required permits.

#### 1.5 SUBMITTALS

- A. Shop Drawings: Submit working plans, prepared according to NFPA 13, and hydraulic calculations with cross reference to applicable drawings, water supply data, and equipment schedule with ratings for the system to the Owner's Representative, Insurance Underwriter, and other authorities having jurisdiction.
- B. Product Data: Catalog sheets, specifications, and installation instructions. Indicate UL or FM approval for each product. Include the following additional information:
  - 1. Pipe and fitting materials and methods of joining for sprinkler piping.
  - 2. Pipe hangers and supports.
  - 3. Piping seismic restraints.
  - 4. Valves, including specialty valves, accessories, and devices.
  - 5. Alarm devices. Include electrical data.
  - 6. Mechanical Devices: Complete description of intended use, including normal operating capacities and working pressures.
  - 7. Enclosures: Dimensions, materials, gages of metals; type of door hinges and locks, and methods of securing the enclosure members to the building construction.
- C. Design Data: The portions of the sprinkler system not sized on the Contract Drawings shall be sized in accordance with NFPA requirements for Hydraulically Designed Systems. Submit drawings and hydraulic calculations for approval.
- D. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three copies of a statement, signed and sealed by the responsible sprinkler system design professional. Indicate that products and systems comply with performance and design criteria in the Contract Documents.
  - 1. Certification: Submit Contractor's NICET certification and number or PE license number.
- E. 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."

- F. Maintenance Data: For each type of sprinkler specialty to include in maintenance manuals specified in Division 1.

## 1.6 QUALITY ASSURANCE

### A. Sprinkler Contractor

1. Installer Qualifications: An experienced installer who has designed and installed fire-suppression piping similar to that indicated for this Project and obtained design approval and inspection approval from authorities having jurisdiction.
2. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified sprinkler designer. Base calculations on results of fire hydrant flow test. 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.
3. Contractor shall be a licensed fire sprinkler contractor.

### B. Manufacturer Qualifications:

1. 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.
2. Sprinkler Components: Listing/approval stamp, label, or other marking by a testing agency acceptable to authorities having jurisdiction.
3. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
4. Factory Mutual Engineering Corporation (FM) Approval Guide

### C. NFPA Requirements:

1. NFPA#1 Fire Prevention Code, 2007 edition.
2. NFPA #13 "Standard for the Installation of Sprinkler Systems" 2007 edition.
3. NFPA 291: Recommend Practice for Flow Testing and Marking of Hydrants

## 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 and hinged cover, with space for a minimum of six spare sprinklers plus sprinkler wrench. Include the number of sprinklers required by NFPA 13 and wrench for sprinklers. Include separate cabinet with sprinklers and wrench for each type of sprinkler on Project.

## PART 2 - PRODUCTS

### 2.1 PIPING

- A. Pipe and fittings shall conform to the requirements of NFPA 13. Pipe shall be listed by UL and be FM approved, and installed per its listing and approval.

### 2.2 Sprinkler piping shall be black steel schedule 40, 2 inch and smaller, and thinwall 2 ½ inch and larger. C factor 120.

- A. System piping shall be substantially supported to the building structure. The installation of hangers and supports shall adhere to the requirements set forth in N.F.P.A. 13. Materials used in the installation or construction of hangers and supports shall be listed and approved for such application.

### 2.3 JOINING MATERIALS

- A. Furnish in accordance with NFPA 13.

### 2.4 SPRINKLERS

- A. Fire sprinklers shall be of one manufacturer throughout the building. No mixing of sprinkler brands shall be permitted. Sprinklers shall be of all brass frame construction with a quick response frangible bulb type fusible element.
- B. Automatic Sprinklers: With heat-responsive element complying with the following:
  - 1. UL 199
  - 2. UL 1767, for early suppression, fast-response applications.
- C. Sprinkler Types and Categories: Nominal 1/2-inch orifice for "Ordinary" temperature classification rating, unless otherwise indicated or required by application.
- D. Provide quick response sprinklers.
- E. Institutional sprinklers shall be UL Listed quick response, pendent, standard coverage sprinklers approved for light and ordinary hazard. Sprinkler and deflector to be of bronze construction, with ½" NPT thread. Levered fusible solder link shall consist of an approved black-painted beryllium-nickel link assembly. Fusible link shall be designed to release a suspended load that exceeds 50 lbs. when dropped from a 1-inch height. Water seal shall consist of a Teflon-coated Bellville spring washer and bronze diffuser sub-assembly containing no plastic parts. Institutional escutcheons shall be of zinc or aluminum construction with zinc ring plate and tamper resistant screws. Sprinkler K-factor shall be nominal 5.6. Sprinkler temperature rating shall be Ordinary 165 °F. Standard cover finish: Bright chrome plated. Quick response institutional sprinklers shall be Reliable Model XL Institutional or approved equal.
- F. Sprinkler Escutcheons: Materials, types, and finishes of sprinklers. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.

## 2.5 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. Sprinkler Branch-Line Test Fittings: Brass body with threaded inlet, capped drain outlet, and threaded outlet for sprinkler.
- C. Drop-Nipple Fittings: UL 1474, adjustable with threaded inlet and outlet, and seals.

## 2.6 VALVES

- A. Valves shall be UL listed and FMG approved

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. The nature of the work requires coordination with other trades. Shop fabrication shall be done at the Contractor's risk. Relocation of piping and components to avoid obstructions may be necessary. Relocation, if required, shall be done at the Contractor's expense. The installation shall be performed in a workmanlike manner as determined by the Owner's Representative and in accordance with the Contract Documents, manufacturer's printed installation instructions, and submitted and Owner's Representative reviewed drawings.
- B. Existing Sprinkler System Shutdown:
  - 1. Follow NFPA 13 recommendations.
  - 2. Before shutting down the sprinkler system to perform the Work, notify the Owner's Representative in writing, and the local fire department that the system is to be shut down temporarily. Give schedule which states date and time of proposed shut down and the approximate length of time that the system will be out of service. Request instructions for precautions that should be taken during the shut down period.
  - 3. Do not shut down the system until schedule is approved by the Owner's Representative.
  - 4. Return the existing system to pre-shutdown operation immediately after the Work has been completed. Give written notice to the Director's Representative that the system has been returned to pre-shutdown operation.

### 3.2 SPRINKLER APPLICATIONS

- A. General: Use sprinklers according to the following applications:
  - 1. Rooms/spaces without Ceilings: Upright sprinklers.
  - 2. All occupied rooms with Finished Ceilings: Concealed
  - 3. Quiet Spaces and Sensory Room: Institutional
  - 4. Wall Mounting: Sidewall sprinklers.

B. Finishes

1. Unfinished spaces not exposed to view: rough bronze.
2. Finished spaces: White
3. Provide escutcheons with matching color for finished spaces.

3.3 SYSTEM INSTALLATIONS

- A. Earthquake Protection: Install piping according to NFPA 13 to protect from earthquake damage.
- B. A sprinkler head wrench of each style and model installed shall be provided to the owner at the completion of the project. A representative sampling of each sprinkler head style and model shall be provided to the owner and housed in a sprinkler head cabinet at or near the sprinkler riser. The number of sprinkler heads provided to the owner shall be in accordance with NFPA 13.
- C. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, sized and located according to NFPA 13

3.4 SPRINKLER INSTALLATION

- A. Install sprinklers in suspended ceiling in center of all ceiling tiles.
- B. Install sprinkler piping with drains for complete system drainage.
- C. Hangers and Supports: Comply with NFPA 13 for hanger materials.

3.5 LABELING AND IDENTIFICATION

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

3.6 FIELD QUALITY CONTROL

- A. Flush, test, and inspect sprinkler piping according to NFPA 13, "System Acceptance" Chapter.
- 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. Replace piping system components that do not pass test procedures and retest to demonstrate compliance. Repeat procedure until satisfactory results are obtained.
- G. Fill wet-pipe sprinkler piping with water.
- H. Energize circuits to electrical equipment and devices.
- I. Coordinate with fire alarm tests. Operate as required.

### 3.7 CLEANING

- A. Clean dirt and debris from sprinklers.
- B. Remove and replace sprinklers having paint other than factory finish.

### 3.8 PROTECTION

- A. Protect sprinklers from damage until Substantial Completion.

END OF SECTION 210000