

SECTION 211000 - SPRINKLER SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Modifications to existing partial coverage wet-pipe sprinkler system to suit architectural renovations. Work generally to include relocation of heads to suit revised floor plan.
- B. System design, installation, and certification.

1.2 RELATED SECTIONS

- A. Division 9- Painting.
- B. Division 26 - Fire alarm systems and wiring connections.

1.3 REFERENCES

- A. ASTM 135 - Electric-Resistance-Welded Steel Pipe.
- B. NCSBC - North Carolina State Building Code.
- C. NFPA 13 - Installation of Sprinkler Systems.
- D. NFPA 70 - National Electrical Code.
- E. NFPA 101 - Life Safety Code.
- F. UL - Fire Resistance Directory.
- G. UL 199 - Automatic Sprinklers.

1.4 SCOPE OF WORK

- A. Hydraulic design of sprinkler system.
- B. Shop drawings.
- C. Flow switches, valves and accessories.
- D. Interior pipe, fittings, and valves.
- E. Hangers, supports and sleeves.
- F. Sprinkler heads and extra sprinkler cabinet.
- G. Testing and flushing.

1.5 DESIGN REQUIREMENTS

- A. Design modifications to existing partial coverage wet pipe sprinkler system as required to suit building renovations. Design shall comply with Owner's insuring agency guidelines, NFPA 13, NCSBC and local jurisdiction code requirements. Document existing sprinkler systems in field. Existing sprinkler piping may be reused to extent compatible with renovations. Coordinate layout with new architectural, plumbing, mechanical, and electrical work.
- B. Base design on the following criteria:
 - 1. Hazard occupancy and water supply requirements are not changed from current use. Verify existing design criteria.
 - 2. Utilize existing mains, alarm valves, etc. to extent practical.
 - 3. Interface new sprinkler piping with existing building sprinkler piping.
 - 4. Existing sprinkler interface with building fire and smoke alarm system is to remain. Provide extensions or modifications if required by renovation work.

1.6 SPRINKLER WORK IN CONNECTION WITH ELECTRICAL CONTRACT

- A. Minimal modifications to electrical work associated with existing sprinkler systems are anticipated. Sprinkler Contractor shall be responsible for any electrical work. Coordinate interface requirements with Electrical Contractor.
- B. All electrical work performed under the Sprinkler Contract shall comply with Division 23. All wiring shall be installed in conduit.

1.7 SUBMITTALS FOR REVIEW

- A. Procedures for submittals: Submit under provisions of relevant sections of the General and Supplemental General Conditions and Division 1 Specifications Sections
- B. Product Data: Provide manufacturers catalog data on sprinklers, valves, water flow and tamper switches, and specialties. Include performance ratings, rough-in details, weights, support requirements, and piping connections.
- C. Shop Drawings:
 - 1. Indicate hydraulic calculations, detailed pipe layout, hangers and supports, sprinklers, components and accessories. Indicate system controls.
 - 2. Submit drawings and calculations to State Construction Office (SCO), Local Fire Marshal and Owner's Insuring Agent for approval. After receiving approval from SCO, Local Fire Marshal and Owner's Insuring Agent, submit shop drawings and calculations for review prior to start of installation. Include SCO, Local Fire Marshal's and Owner's Insuring Agent approval stamp on submitted shop drawings.

1.8 SUBMITTALS AT PROJECT CLOSEOUT

- A. Procedures for submittals: Submit under provisions of relevant sections of the General and Supplemental General Conditions and Division 1 Specifications Sections
- B. Project Record Documents: Record actual locations of sprinklers and deviations of piping from drawings. Indicate drain and test locations.
- C. Contractor's Certificate: Certify that system has been tested and meets or exceeds specified requirements and code requirements.
- D. Operation and Maintenance Data: Include components of system, servicing requirements, record drawings, inspection data, replacement part numbers and availability, and location and numbers of service depot.
- E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.9 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years experience.
- B. Installer Qualifications: Owner approved, local and state licensed fire protection company specializing in performing the work of this section with minimum three years experience.

1.10 REGULATORY REQUIREMENTS

- A. Perform Work in accordance with NFPA 13, NCSBC and local jurisdiction. Comply with SCO "Fire Sprinkler Guidelines" See website: http://www.ncsco.com/documents/guidelines/Fire_Sprinkler_Guidelines_March2012.pdf
- B. Equipment and Components: UL listed and FM approved.
- C. Products Requiring Electrical Connection: Listed and classified by testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

1.11 DELIVERY, STORAGE, AND PROTECTION

- A. Submit under provisions of relevant sections of the General and Supplemental General Conditions and Division 1 Specifications Sections
- B. Store products in shipping containers and maintain in place until installation. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

1.12 EXTRA MATERIALS

- A. Provide extra sprinklers under provisions of NFPA 13.

- B. Provide suitable wrenches for each sprinkler type.
- C. Provide metal storage cabinet located adjacent to alarm valve or as otherwise directed.

PART 2 PRODUCTS

2.1 VALVES

- A. Manufacturers: Nibco, Crane, Stockham, Grinnell, Mueller.
- B. Substitutions: Submit under provisions of relevant sections of the General and Supplemental General Conditions and Division 1 Specifications Sections.
- C. Interior valves:
 - 1. Swing check valves: Nibco No. F-908- W, UL, FM, bolted bonnet, horizontal swing, renewable seat and disc, 175 psi wwp.
 - 2. Spring check valves: Nibco No. W-900-W, UL, FM wafer style, rubber seat, spring actuated, 250 psi wwp.
 - 3. Gate valves: Nibco F-607-OTS, UL, FM, flanged pattern outside screen and yoke, 175 psi WP.
 - 4. Butterfly valves: Nibco WD3510-8 or LD3510-8, UL, FM, wafer or lug style, 250 psi wwp, lug style 200 psi wwp dead end rated, internal tamper switch.
 - 5. Ball valves: Nibco No. T -505-8 or 0-505-8, UL, FM, threaded or grooved, bronze body, three piece, internal tamper switches, 300 psi wwp.

2.2 PIPE AND FITTINGS

- A. Interior Sprinkler Piping:
 - 1. Steel Pipe: ASTM 135, Schedule 40, electric-resistance welded.
 - 2. Grooved Steel Piping: ASTM 135, Schedule 10, electric-resistance welded, suitable for roll grooving.
- B. Interior Sprinkler Pipe Fittings:
 - 1. Manufacturers: Victaulic, Sprink, Grinnell.
 - 2. Substitutions: Submit under provisions of relevant sections of the General and Supplemental General Conditions and Division 1 Specifications Sections.
 - 3. Mechanical couplings: Roll or cut groove rigid
 - 4. Sprinkler fittings: NFPA 13, UL, FM, Class 125 or Class 250 cast iron, screwed, flanged, or grooved-end.
 - 5. Provide all fittings by the same manufacturer.
- C. Drain Piping:
 - 1. Steel Pipe: ASTM A106 or A120, Schedule 40, galvanized..
- D. Drain Fittings: Class 250 malleable iron, screwed with galvanized coating.

2.3 HANGERS AND SUPPORTS

- A. Manufacturers: Grinnell, Carpenter and Patterson, Fee and Mason.
- B. Substitutions: Submit under provisions of relevant sections of the General and Supplemental General Conditions and Division 1 Specifications Sections.
- C. Clevis Hangers: NFPA 13, UL, FM
 1. Grinnell #260 MSS, Type I for pipe 2" through 12"
 2. Grinnell Figure #104, Type 6, adjustable split ring for pipe less than 2".
- D. Clamps: NFPA 13, UL, FM
 1. Riser Clamps: Grinnell #261, MSS Type 8, at floor slab penetrations to support risers.
 2. C-Clamps: Grinnell #92 with retainer clip, MSS Type 23.
 3. Nailable Beam Clamps: Grinnell Figure #218, MSS Type 30.
- E. Inserts: NFPA 13, UL, FM
 1. Concrete insert: Grinnell Figure #281, MSS Type 18, universal concrete insert, adequately sized and correctly positioned to support full load.
 2. Lightweight concrete: Grinnell #285.
 3. Continuous Concrete Insert: Grinnell Powerstrut #PS-349, pre-galvanized.
 4. Power inserts shall not be used in post tension construction unless approved by Structural Engineer.

2.4 SLEEVES

- A. Sleeves for Pipes Through Non-fire Rated Beams, Walls, Footings, and Floors: Schedule 40 galvanized steel pipe.
- B. Sealant for Non-fire Rated Construction: Acrylic caulk.
- C. Sleeves for Pipes Through Fire Rated Construction : Schedule 40 galvanized steel pipe. Provide suitable listed penetration assembly.

2.5 SPRINKLERS

- A. Manufacturers: Gem, Central, Grinnell.
- B. Substitutions: Submit under provisions of relevant sections of the General and Supplemental General Conditions and Division 1 Specifications Sections.
- C. General Requirements: UL Listed and FM approved except that full recessed type quick response sprinkler head may be UL listed only. Slip-type escutcheons not allowed.
- D. Brass Upright: Gem Model F980 designer, bulb type, 1/2" orifice, upright. Quick response Gem, Model FR-1, solder type, 1/2" orifice, upright.

- E. Chrome Pendent: Gem Model F980 designer, bulb type, ½” orifice, pendent. Quick response Gem, Model FR-1, solder type, ½” orifice, pendent.
- F. Horizontal Sidewall: Gem Model F950/Q-46, solder, ½” orifice. Quick response Gem, Model F A-I/Q-46, solder type, ½” orifice.
- G. Fully Recessed: Gem Model F946 cleanline, solder type, ½” orifice. Quick response Gem, model F975 bulb type, ½” orifice.
- H. Semi-recessed: Gem Model F948, solder type, ½” orifice” Quick response Gem, model FA-IR, solder type, ½” orifice.
- I. Chrome Pendent Quick Response: Gem Model FR- 1 , solder type, ½” orifice, pendent and upright. Provide quick response sprinkler head throughout smoke compartments containing patient sleeping rooms.
- J. Spare Sprinklers: Provide one sprinkler cabinet with 12 extra sprinkler heads and sprinkler wrench for emergency use. Locate cabinet in maintenance area. Provide a minimum of two extra sprinkler heads of each type sprinkler head used for the project. Add an extra sprinkler cabinet if necessary to house the spare heads.

2.6 SPECIALTIES

- A. Flow switch:
 - 1. Manufacturers: Notifier, Potter, Simplex.
 - 2. Substitutions: Submit under provisions of relevant sections of the General and Supplemental General Conditions and Division 1 Specifications Sections.
 - 3. Notifier Model No. WFD-6 vane type flow switch with pneumatic retard adjustable from 0 to 90 seconds, complete with double pole, double throw micro feature.
- B. Tamper switch:
 - 1. Manufacturers: Notifier, Potter, Simplex.
 - 2. Substitutions: Submit under provisions of relevant sections of the General and Supplemental General Conditions and Division 1 Specifications Sections.
 - 3. Notifier Model No. SGV for 4” and larger, Potter Model No. OSYSU-A2 for pipe size less than 4”, tamper switch double pole, double throw micro feature for 1/12-inch to 12-inch valves.

PART 3 EXECUTION

3.1 DESIGN

- A. Comply with NFPA, NCSBC SCO and local jurisdiction. Provide complete system design for sprinkler system as indicated on the drawings and specified herein.
- B. Coordinate layout of sprinkler system with architectural, structural, plumbing, mechanical, and electrical work

- C. Design to utilize existing sprinkler system to extent appropriate to meet design requirements.

3.2 INSTALLATION

- A. Document existing conditions.
- B. Install in accordance with NFPA 13, NCSBC, SCO and local requirements.
- C. Arrange work to be in coordination with work of other trades. Remove/rework existing sprinkler systems as necessary.
- D. Remove any existing sprinkler piping, hangers, wiring, etc. rendered obsolete by new work.
- E. Existing sprinkler heads and device which remain “as is” may be reused. Install new sprinkler heads and devices where renovations are required.
- F. Arrange renovations so as not block access to existing valves, inspector’s test connections, etc.
- G. Place pipe runs to minimize obstruction to other work.
- H. In areas with ceilings, place piping in concealed spaces above ceilings.
- I. Where lay-in ceilings are used, center sprinklers in two directions in ceiling tile and provide piping offsets as required.
- J. Install specified hangers in accordance with NFPA 13. Other NFPA 13 approved hangers are not allowed. Provide hangers on arm-outs of 12” or more. Support vertical risers 12’ o.c. maximum or at each floor. For “cloud” ceilings, drop piping from existing ceiling above as required. Arrange drops so as to minimize visual effect from floor.
- K. Sleeve pipes passing through rated or non-rated partitions, walls and floors. Smokeproof all penetrations rated or non-rated per NCSBC. Provide suitable listed penetration assemblies for piping penetrating rated construction.
- L. Prepare exposed, unfinished pipe, fittings, supports, and accessories in finished areas ready for finish painting by General Contractor. Refer to Division 9.
- M. Apply masking tape or paper cover to ensure concealed sprinklers, cover plates, and sprinkler escutcheons do not receive field paint finish. Remove after painting.
- N. Flush piping system of foreign matter.
- O. Install guards on sprinklers where required.

3.3 INTERFACE WITH OTHER PRODUCTS

- A. Ensure required devices are installed and connected as required to fire alarm system.

3.4 INSPECTION AND TESTING

- A. Obtain inspections as required by local jurisdiction.
- B. Provide system pressure test after modifications are complete.
- C. Provide system operational tests in accordance with NFPA 13 and local jurisdiction.
- D. Submit written test reports and certificates as required by NFPA 13 and local jurisdiction prior to request for Certificate of Occupancy.

END OF SECTION