SECTION 21 13 13
WET-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Contracting Requirements and Division 01 General Requirements apply to this Section.

1.02 DEFINITIONS

A. Standard-Pressure Sprinkler Piping: Wet-pipe sprinkler system piping designed to operate at working pressure of 175 psig maximum.

1.03 SYSTEM DESCRIPTIONS

A. Wet-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing water and that is connected to water supply through flow switch. Water discharges immediately from sprinklers when they are opened.

1.04 PERFORMANCE REQUIREMENTS

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

B. Delegated Design: Design sprinkler system(s), including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated. Provide flow test data, hydraulic calculation and drawings.

C. Sprinkler system design shall be approved by authorities having jurisdiction.
   1. Margin of Safety for Available Water Flow and Pressure: 10 percent, including losses through water-service piping, valves, and backflow preventers.
   2. Sprinkler Occupancy Hazard Classifications shall conform to NFPA 13.
   3. Minimum Density for Automatic-Sprinkler Piping Design:
      a. Light-Hazard Occupancy: 0.10 gpm over 1500-sq. ft. area.
      b. Ordinary-Hazard, Group 1 Occupancy: 0.15 gpm over 1500-sq. ft. area. (2500 for FM insured buildings)
      c. Ordinary-Hazard, Group 2 Occupancy: 0.20 gpm over 1500-sq. ft. area. (3000 for FM insured buildings)
      d.
   4. Maximum Protection Area per Sprinkler:
      a. Light Hazard Occupancy: 225 sq. ft.
      b. Storage Areas: 130 sq. ft.
      c. Mechanical Equipment Rooms: 130 sq. ft.
      d. Electrical Equipment Rooms: 130 sq. ft.
      e. Other Areas: According to NFPA 13 recommendations unless otherwise indicated.
   5. Total Combined Hose-Stream Demand Requirement: According to NFPA 13 unless otherwise indicated:
      a. Light-Hazard Occupancies: 100 gpm

b. Ordinary-Hazard Group 1 Occupancies: 250 gpm
c. Ordinary-Hazard Group 2 Occupancies: 250 gpm (500 for FM insured buildings)

D. Seismic Performance: Sprinkler piping shall withstand the effects of earthquake motions determined according to NFPA 13 and ASCE/SEI 7.

1.05 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For wet-pipe sprinkler systems.

C. Delegated-Design Submittal: For sprinkler systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Coordination Drawings.

E. Qualification Data.

F. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations.

G. Fire-hydrant flow test report.

H. Field Test Reports and Certificates.

I. Field quality-control reports.

J. Operation and Maintenance Data.

PART 2 - PRODUCTS

2.01 STEEL PIPE AND FITTINGS

A. Schedule 40, Black-Steel Pipe for sizes 2” and smaller: ASTM A 53/A 53M.

B. Schedule 10, Black-Steel Pipe for sizes 2 ½” and larger: ASTM A 135 or ASTM A 795/A 795M.

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

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

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

F. Grooved-Joint, Steel-Pipe Appurtenances:
1. Galvanized and Uncoated, Grooved-End Fittings for Steel Piping: ASTM A 47/A 47M.

2. Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213, rigid pattern.

2.02 LISTED FIRE-PROTECTION VALVES

A. General Requirements:
1. Valves shall be UL listed or FM approved.
2. Minimum Pressure Rating for Standard-Pressure Piping: 175 psig .

B. Bronze Butterfly Valves (for sizes 2” and smaller):
1. Standard: UL 1091.

C. Iron Butterfly Valves (for sizes 2 1/2” and larger):
1. Standard: UL 1091.

D. Check Valves:
1. Standard: UL 312.
2. Type: Swing check.

E. Bronze OS&Y Gate Valves:
1. Standard: UL 262.

F. Iron OS&Y Gate Valves:
1. Standard: UL 262.

G. Indicating-Type Butterfly Valves:
1. Standard: UL 1091.

H. Non Rising Stem Gate Valves:
1. Standard: UL 262.
2. Body Material: Cast iron with indicator post flange.

2.03 TRIM AND DRAIN VALVES

A. General Requirements:
1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.

B. Angle Valves.

C. Ball Valves.

D. Globe Valves.

E. Plug Valves.

2.04 SPECIALTY VALVES

A. General Requirements:
1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.

2.05 SPRINKLER SPECIALTY PIPE FITTINGS

A. Flow Detection and Test Assemblies:
   1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.

B. Sprinkler Inspector's Test Fittings:
   1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.

2.06 SPRINKLERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Reliable Automatic Sprinkler Co., Inc.
   2. Tyco Fire & Building Products LP.
   3. Viking Corporation.
   4. Victaulic.

B. General Requirements:
   1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
   2. Pressure Rating for Automatic Sprinklers: 175 psig minimum.

C. Automatic Sprinklers with Heat-Responsive Element:
   1. Early-Suppression, Fast-Response Applications: UL 1767.
   2. Nonresidential Applications: UL 199.
   3. Characteristics: Nominal 1/2-inch orifice with Discharge Coefficient K of 5.6, and for "Ordinary" temperature classification rating unless otherwise indicated or required by application.
   4. Tyco Model WS type window sprinklers for fire rated glass separations, if applicable.
   5. Dry pendent or sidewall quick response sprinkler heads for unheated areas subject to freezing, if applicable.

D. Sprinkler Finishes:
   1. Chrome plated.
   2. Bronze.

E. Sprinkler Guards:
   1. Standard: UL 199.

2.07 ALARM DEVICES

A. Water-Flow Indicators:
   1. Standard: UL 346.
   2. Water-Flow Detector: Electrically supervised.

B. Valve Supervisory Switches:
   1. Standard: UL 346.

C. Indicator-Post Supervisory Switches:
   1. Standard: UL 346.

2.08 ESCUTCHEONS

A. General: Manufactured ceiling, floor, and wall escutcheons and floor plates.

2.09 GROUT

A. Standard: ASTM C 1107, Grade B, posthardening and volume adjusting, dry, hydraulic-cement grout.

PART 3 - EXECUTION

3.01 PIPING INSTALLATION

A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.

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

C. Install seismic restraints on piping. Comply with requirements for seismic-restraint device materials and installation in NFPA 13.

3.02 JOINT CONSTRUCTION

A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.

3.03 VALVE AND SPECIALTIES INSTALLATION

A. Install listed fire-protection valves, trim and drain valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.

3.04 SPRINKLER INSTALLATION

A. Install sprinklers in suspended ceilings in center of narrow dimension of acoustical ceiling panels.

3.05 FIRE-DEPARTMENT CONNECTION INSTALLATION

A. Install wall-type, fire-department connections.

B. Install automatic (ball drip) drain valve at each check valve for fire-department connection.

3.06 ESCUTCHEON INSTALLATION

A. Install escutcheons for penetrations of walls, ceilings, and floors.

3.07 SLEEVE INSTALLATION

A. General Requirements: Install sleeves for pipes and tubes passing through penetrations in floors, partitions, and walls.

3.08 SLEEVE SEAL INSTALLATION

A. Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble sleeve seal components and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.09 IDENTIFICATION

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

3.10 FIELD QUALITY CONTROL

A. Perform tests and inspections.

3.11 CLEANING

A. Clean dirt and debris from sprinklers.

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

3.12 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain specialty valves.

3.13 PIPING SCHEDULE

A. Sprinkler specialty fittings may be used, downstream of control vales, instead of specified fittings.

B. Standard-pressure, wet-pipe sprinkler system, NPS 2 and smaller shall be one of the following:
1. Standard-weight, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.

C. Standard-pressure, wet-pipe sprinkler system, NPS 2-1/2 and larger, shall be one of the following:
1. Schedule 10, black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

3.14 SPRINKLER SCHEDULE

A. Use sprinkler types in subparagraphs below for the following applications:
1. Rooms without Ceilings: Upright sprinklers

2. Rooms with Suspended Ceilings: Pendent, recessed, flush, or concealed sprinklers as indicated.
3. Wall Mounting: Sidewall sprinklers.
4. Spaces Subject to Freezing: Upright, sidewall or dry pendent sprinklers.
5. Special Applications: Extended-coverage, flow-control, and quick-response sprinklers where indicated.

B. Provide sprinkler types in subparagraphs below with finishes indicated.
1. Concealed Sprinklers: Rough brass, with factory-painted white cover plate.
2. Flush Sprinklers: Bright chrome, with bright chrome escutcheon.
3. Recessed Sprinklers: Bright chrome, with bright chrome escutcheon.
4. Upright, Pendent and Sidewall Sprinklers: Chrome plated in finished spaces exposed to view; rough bronze in unfinished spaces not exposed to view.

END OF SECTION 21 13 13