SECTION 21 1100
FIRE SUPPRESSION PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pipe, fittings, valves, and connections for sprinkler systems.

1.02 RELATED SECTIONS

A. Section 21 0510 - General Fire Suppression Requirements:

B. Section 21 1300 - Fire-Suppression Sprinkler Systems: Sprinkler systems design.

1.03 REFERENCES

A. ASME B16.3 - Malleable Iron Threaded Fittings; The American Society of Mechanical Engineers; 1998 (R2006).

B. ASME B16.4 - Gray Iron Threaded Fittings; The American Society of Mechanical Engineers; 1998 (R2006).

C. ASME B16.5 - Pipe Flanges and Flanged Fittings; The American Society of Mechanical Engineers; 2003 (ANSI/ASME B16.5).

D. ASTM A 47/A 47M - Standard Specification for Ferritic Malleable Iron Castings; 1999 (Reapproved 2004).

E. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2006a.

F. ASTM A 135/A 135M - Standard Specification for Electric-Resistance Welded Steel Pipe; 2006.

G. ASTM A 795/A 795M - Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use; 2004.

H. NFPA 13 - Standard for the Installation of Sprinkler Systems; National Fire Protection Association; 2019.

I. NFPA 25 - Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems; 2017.

J. NFPA 72 - National Fire Alarm Code; 2019.

K. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures; 2018 with all Georgia State Amendments.

L. Georgia State Minimum Standard Fire Prevention Code, 2018 Edition, with all Georgia State Amendments.

M. UL (FPED) - Fire Protection Equipment Directory; Underwriters Laboratories Inc.; current edition.

N. UL 312 - Check Valves for Fire-Protection Service; Underwriters Laboratories Inc.; 2004.

O. Chapter 120-3-3 of the Rules of the Safety Fire Commissioner dated January 1st, 2020.

P. Georgia State Minimum Standard Building Code (International Building Code), 2018 Edition, with all Georgia State Amendments. NFPA Code, where more stringent, shall take precedence.

1.04 SUBMITTALS

A. Refer to Section 21 0510 - General Fire Suppression Requirements for submittal procedures and requirements.

B. Product Data: Provide manufacturers catalogue information. Indicate valve data and ratings.

C. Shop Drawings: Indicate pipe materials used, jointing methods, supports, floor and wall penetration seals. Indicate installation, layout, weights, mounting and support details, and piping connections.

1.05 QUALITY ASSURANCE

A. Fire Protection
   1. The Contractor expressly warrants that the company performing the installation of the fire protection systems has demonstrated proficiency in the installation, start-up and adjustment of such systems by the successful performance of work of the nature specified herein on at least 5 commercial or institutional buildings, each containing minimum of 10,000 ft2 of protected area or greater.
   2. The Contractor further warrants that the aforesaid subcontractor has trained personnel, instruments, tools, and equipment to perform the installation specified.
   3. The Contractor also warrants that the aforesaid installer has been in business performing services of the nature specified herein for at least the previous five consecutive years in the state of Georgia.
   4. Provide a certificate of competency as issued by the Georgia State Fire Marshal's Office.

B. Conform to UL and FM requirements.

C. Valves: Bear UL and FM label or marking. Provide manufacturer's name and pressure rating marked on valve body.

D. Products Requiring Electrical Connection: Listed and classified as suitable for the purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND PROTECTION

A. Deliver and store valves in shipping containers, with labeling in place.

B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

PART 2 PRODUCTS

2.01 GENERAL SYSTEM AND PRODUCT REQUIREMENTS

A. Sprinkler Systems: Conform work to NFPA 13.

B. Welding Materials and Procedures: Conform to ASME Code.

C. Renovated Area is primarily Ordinary Hazard Group 1. Pipe sizes shall be hydraulically calculated based upon contractor's flow test performed prior to construction.

D. Basis of design: Contractor shall perform, or have performed, at the same time, a Fire Flow and Twenty Four Hour Static Test to assure flow equals or exceeds specified basis of design flow rate prior to preparing shop drawings, installing system or performing calculations. Prepare calculations based on confirmed flow data or basis of design flow data, whichever is lowest. Flow test shall be performed in accordance with NFPA 13, NFPA 291, and Rules and Regulations of Safety Fire Commissioner, O.C.G.A. Chapter 120-3-3. Modify flow test pressures (static and residual), if pressure recorded in 24 hour test is lower than flow test pressures for minimum one hour duration, to lowest hour test pressure.

E. No pipe shall be routed above electrical panels and equipment as required by National Electrical Code, on control side or beneath suspended mechanical equipment except where specifically required by Code, in which case, provisions shall be made for service access and removal.

2.02 ABOVE GROUND WET SYSTEM PIPING

A. Steel Pipe: ASTM A 135 Schedule 10 or ASTM A 795 Schedule 40, black. Piping 1-1/2" and smaller shall be threaded. Piping 2" and larger shall be grooved with rigid couplings.
   1. Malleable or Cast Iron Fittings: ASME B16.3, threaded fittings and ASTM A 47/A 47M.
   2. Mechanical Grooved Couplings: Rigid ductile iron housing clamps to engage and lock, "C" shaped elastomeric sealing gasket, steel bolts, nuts, and washers; galvanized for galvanized pipe. Reducing couplings and flanges are NOT allowed.

2.03 PIPE HANGERS AND SUPPORTS

A. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Carbon steel, adjustable swivel ring.

B. Hangers for Pipe Sizes 2-inches and Over: Carbon steel, adjustable, clevis.

C. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

D. Vertical Support: Steel riser clamp.

E. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

F. Provide support for any vertical pipe 36" in length or greater except armovers. Provide supports 12'-0" O.C. maximum or at floor levels.

G. Threaded rods shall NOT be bent. Bending is permitted only in unthreaded sections of hanger rods. Bending shall occur as close to the hanger as possible. Provide a swivel assembly if required.

H. Hangers when Pressure exceeds 100psi: Provide surge clips or extend threaded rod to secure sprinkler pipe to hanger for the last hanger closest to the end sprinkler head in a pendent position to prevent upward movement, Refer to NFPA 13 9.2.3.4.4 and 9.2.3.5.2.

PART 3 EXECUTION

3.01 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and foreign material, from inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Storage: All piping shall be stored above ground and protected to prevent dirt and debris from entering pipe.

3.02 INSTALLATION

A. Install sprinkler system and service main piping, hangers, and supports in accordance with NFPA 13 and these specifications.

B. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.

C. Install piping to conserve building space, to not interfere with use of space and other work.

D. Group piping whenever practical at common elevations.

E. All piping shall be installed above ceilings in a concealed manner except where no ceilings are present

F. Sleeve pipes passing through partitions, walls, and floors.

G. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

H. Reducing Tees: Weld-on threaded outlet tees and Coupolet-300 by Bonney Forge Division of Energy Products Group, Central Sprink 701, "TEE-LET" 300 by Merit Manufacturing Corp., NAP300 by North Alabama Pipe Corp., F400 by Grinnell Corp. may be used for side outlet reducing tees more than two pipe sizes smaller than main. Discs shall be retrieved and connected to pipe at point of cutting. Cutting shall comply with NFPA 13, Chapter 6.5.2.9.

I. Couplings may be used on gridded systems at only one end of each gridded branch line or on 2 1/2" or larger riser nipple to 2" or smaller branch line to facilitate connection provided that the coupling is connected to piping by a cut groove. Rolled grooves are not acceptable.

J. Pipe Hangers and Supports:
   1. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
   2. Place hangers within 12 inches of each horizontal elbow.
   3. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
   4. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
   5. Hangers when pressure exceeds 100psi:

a. Provide surge clips or extend threaded rod to prevent upward movement on the end sprinkler head, Refer to NFPA 13 Figure A.9.2.3.4.4.
b. The unsupported armover length and unsupported branchline length shall not exceed 12” for end sprinklers in the pendent position.

K. Slope piping and arrange systems to drain at low points. Use eccentric reducers to maintain top of pipe level.

L. Prepare pipe, fittings, supports, and accessories for finish painting. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding. Refer to Section 09 9000.

M. Do not penetrate building structural members unless indicated.

N. Provide sleeves when penetrating floors and walls. Seal pipe and sleeve penetrations to achieve fire resistance equivalent to fire separation required.

O. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

P. Die cut threaded joints with full cut standard taper pipe threads with red lead and linseed oil or other non-toxic joint compound applied to male threads only.

Q. Provide drain valves at main shut-off valves, low points of piping and apparatus. Route drains to interior mop basins or exterior of building in locations acceptable to architect.

3.03 CLEANING AND PROTECTION

A. All materials, equipment and mechanical rooms shall be cleaned prior to the Final Observation.

B. Wash down and scrub clean all mechanical room floors, walls, equipment bases and equipment.

C. Paint equipment where finish has been damaged requiring retouching of finish to match factory finish.

D. Chipped or scraped paint shall be retouched to match original finish.

E. All dents and sags in equipment casing shall be straightened.

F. All equipment, pipe, pipe fittings and appurtenances shall be free of rust and stains prior to Material completion.

3.04 FINISHING EQUIPMENT AND MATERIAL

A. Use paint systems specified in Division 9 for the substrates to be finished.

B. Re-install electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

C. Paint all exposed pipes, unless otherwise indicated.

D. All ferrous fasteners and hanger supports not having a corrosion resistant plated finish shall be painted to prevent rust.

E. Paint all equipment, including that which is factory-finished, exposed to weather or to view on the roof and outdoors.

F. Paint all exposed un-insulated ferrous materials.

END OF SECTION