

SECTION 21 12 23
FIRE PROTECTION SYSTEM PIPING, FITTINGS AND VALVES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Bid Manual, General and Supplementary Conditions apply to this Section.
- B. The contractor shall fully comply with all stages of construction including special coordination requirements.

1.2 SECTION INCLUDES

Pipe, fittings and connections to sprinkler.

1.3 REFERENCES

- 1. ASME B16.1
- 2. ASME B16.3
- 3. ASME B16.5
- 4. NFPA 13 - Latest Edition
- 5. NFPA 14 - Latest Edition
- 6. NFPA 101 – Latest Edition
- 7. NFPA 130 – Latest Edition
- 8. NFPA 416 - Latest Edition
- 9. UL 262
- 10. UL 312
- 11. UL 405

1.4 SUBMITTALS

- A. Submit under provisions of Shop Drawings, Product Data and Samples
 - 1. Product Data
 - 2. Samples
 - 3. Manufacturer's Certificate of the Product
 - 4. Manufacturer's Installation Instructions

1.5 QUALITY ASSURANCE

- A. Installation of entire system shall be accomplished by a manufacturer of approved sprinkler equipment, his representative or licensee, who is now or has been engaged in the installation of automatic sprinkler systems for the past five years.

1.6 REGULATORY REQUIREMENTS

- A. Conform to Factory Mutual standards
- B. Conform to Underwriter's Laboratories listings
- C. Conform to Global Risk Consultants requirements
- D. Sprinkler Systems: Conform work to NFPA 13.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Refer to Material and Equipment: Transport, handle, store, and protect products.
- B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

1.8 EXTRA MATERIALS

- A. Refer to Contract Closeout
- B. Refer to Operation and Maintenance Data.

2.0 PRODUCTS

- 2.1 Materials used shall be free of Asbestos, PCP and other carcinogenic materials.
- 2.2 All materials shall be new and of highest quality, made in the U.S.A.

2.3 SUBSTITUTIONS

- A. All reference to manufacturers or supplier's model numbers and other pertinent information are supplied to establish minimum standards of performance, function and quality. Equivalent equipment (FM approved) may be substituted for that specified. The submitted equipment shall equal or exceed the quality, performance, functions and features of the specified equipment. The supplier of the non specified equipment must obtain approvals as required by Substitutions and Product Options.

2.4 GENERAL

- A. All protection equipment and devices shall be UL listed and FMRC approved for the service required and shall be installed in conformance with NFPA 13. The electrical installation shall conform with the National Electrical Code (NEC). Hose threads shall conform with local fire bureau standards if so applicable.

2.5 PIPING

- A. Pipe (1½-inch and smaller) for new fire sprinkler systems shall be new, designed for 175 psi working pressure, conforming to ASTM specifications and shall have the manufacturer's name or brand along with the applicable ASTM standard permanently marked on each length of pipe. Pipe shall be schedule 40 black steel pipe in accordance

with ASTM A-53 and installed with screwed joints. Minimum pipe diameter is 1-inch.

- B. Pipe (2-inch and larger) for new fire sprinkler systems shall be new, designed for 175 psi working pressure, conforming to ASTM specifications and shall have the manufacturer's name or brand along with the applicable ASTM standard permanently marked on each length of pipe. Pipe shall be schedule 10 black steel pipe with roll groove joints.

2.6 FITTINGS

A. Joining of Piping on Sprinkler Systems.

1. Schedule 40 black steel pipe shall be joined by 150 lbs. black malleable iron screwed fittings in accordance with ANSI-B16.3.
2. Schedule 10 black steel pipe shall be joined by roll grooved couplings and mechanical fittings shall be malleable iron, 250 psi working pressure, in accordance with ASTM-A 47. Roll grooved pipe couplings shall be tested and approved by Factory Mutual and listed by Underwriter's Laboratories.

2.7 PIPE HANGERS AND SUPPORTS

- A. Spacing and arrangement shall conform to NFPA-13. Contractor shall install hangers and supports to adequately support the lines without interfering with their inherent flexibility and as required to prevent sagging or vibration, and to brace vertical risers.
- B. Hangers shall be wrought iron clevis type, UL listed and FM approved.
- C. Pipe rests shall be saddle type. UL listed and FM approved.
- D. Riser clamps shall be used for vertical pipe supports. UL listed and FM approved.
- E. Vertical pipe shall be supported at every floor and base of riser clamped securely to the building structure.
- E. Contractor shall furnish and place all inserts, bolts and expansion shields before concrete is poured. Explosion type fasteners are not permitted on property.

2.8 FIRE HOSE OUTLETS

Hose outlet valves shall be 2-1/2-inch angle type with 1-1/2 inch reducers, cast brass with red handle, UL listed, FM approved, and rated for a working pressure of 300 psi or greater. Hose valve threads shall conform to the requirements of the Fire Department requirements.

2.9 FIRE VALVE CABINETS

- A. Hose valve cabinets: Cabinet to be fire rated where applicable and equipped with portable fire extinguisher as per NFPA-10 (Universal Dry Chemical Extinguisher, 2A:10 BC, max. height of hose valve above finished floor of 5'-0"). UL listed and FM approved. Provide " FIRE HOSE AND FIRE EXTINGUISHER" decal on door.

- B. Control valve cabinets: Same requirements for hose valve cabinets, except cabinet shall not be equipped with portable fire extinguisher. There is also no height requirement for control valves. UL listed and FM approved. Provide "SPRINKLER VALVE" decal on door. Execution shall be in accordance with part 3 of section 10522- fire extinguishers, cabinets and accessories.

3.0 EXECUTION

3.1 PREPARATION

- A. Ream pipe 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. Painting:
 - 1. Paint all aboveground fire protection piping red.
 - 2. Give all exposed iron work, hangers, supports, and anchors, two coats of asphalt base aluminum paint.
 - 3. Remove all dirt, rust, scale, and grease from surfaces to be painted.
 - 4. Sprinkler heads shall not be painted. Sprinkler head cover plates to be painted only by the manufacturer to maintain the UL rating of the assembly.
 - 5. Apply protective coating of coal tar primer and enamel to all pipe threads.

3.2 INSTALLATION

- A. Install piping in accordance with NFPA 13 for sprinkler systems.
- 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. Sleeve pipes passing through partitions, walls, and floors.
- F. Seal all new sprinkler pipe penetrations through fire rated walls with UL approved fire rated penetration assemblies.
- G. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- H. All items provided shall be compatible with approved fire alarm system.

I. Flushing:

1. Contractor shall flush all connections to existing systems, and new or modified work, in accordance with NFPA requirements. Flushing of all parts of the new work shall be accomplished before sprinkler heads are installed.
2. Any debris not removed by flushing operations shall be removed by the contractor prior to sprinkler head installation.

J. Testing:

1. All fire protection piping shall be hydrostatically tested by the contractor at a minimum of 200 psig for a period of 2 hours. Portions of systems normally subjected to working pressure in excess of 150 psi shall be tested at a pressure of 50 psi in excess of the normal working pressure. Piping shall be flushed in accordance with NFPA 13. Piping above suspended ceilings shall be inspected before testing. The alarms and other devices shall be tested by the Contractor. The water flow alarms shall be tested by flowing water through the test and drain assembly. The Contractor shall submit a signed and dated certificate with request for a formal inspection and tests similar to that specified in NFPA 13 when all connections have been made and tests have been completed.
2. Personnel necessary to be present at all fire systems acceptance testing are the following; Installing Contractor, Manufacturer's Representative, Building and Zoning Mechanical and Electrical Inspector, Fire Department's Fire Inspector and, Risk Management Representative, and Insurance Carrier Representative.
3. After testing, all leaks in the system shall be repaired, and all defective work shall be removed and replaced in a satisfactory manner. Tests shall be repeated until work is deemed satisfactory by the above personnel in 3.02.J.2.
4. All concealed work must remain uncovered until the required tests have been completed.
5. All tests shall be performed in accordance with the applicable provisions of NFPA 13 and shall include use of NFPA Forms 85A and 85B.

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