

Edited 10/11 - KS

**SECTION 15500**  
**FIRE PROTECTION SYSTEM**  
**(Wet Automatic Sprinkler System)**

**PART 1 GENERAL**

1.01 REQUIREMENTS

- A. Conform with applicable provisions of the General Conditions, Special Conditions and the General Requirements.
- B. Unless otherwise shown on the approved construction documents or otherwise specified, all materials and equipment used in installation of the fire protection system shall be listed and approved for intended service by Underwriters Laboratories, Inc. (UL) and Factory Mutual (FM). All system components shall be standard product of the latest design of the manufacturer. Equipment and material used shall generally be from a consistent manufacturer.
- C. Provide temporary fire protection during construction as required by the Building Code and the Fire Marshal.
- D. The work included in this contract consists of furnishing all labor, materials, equipment, tools and services, and includes all costs of permits and all costs whatsoever which may be required to install complete, properly working systems as described herein.
- E. See Division 16 for electrical work and building fire alarm system.
- F. Contractor shall verify prior to preparation of any documents, Insurance Carrier and their requirements for this project. Such data may be found in general conditions, general requirements or other portions of the specification manual.
- G. This Contract shall begin at point of connection to the underground riser supply line. Coordinate required work with Utility Contractor. This point of connection may occur at 5'-0" beyond building or at flange connection at base of riser.

1.02 GENERAL CONDITIONS AND SPECIAL CONDITIONS

- A. Bidding requirements, general conditions, general requirements, appendices and addendums apply to the work under this section as depicted in Project Specification Manual.
- B. The Contractor shall examine existing conditions and related work required for the design and installation of the fire protection system required under this section of the Specifications. The contractor shall provide a written report to the Architect describing any conditions that would prevent proper provisions of this work. Commencement of work without reporting unsuitable conditions to the Architect constitutes acceptance of conditions to the Contractor. The Contractor shall be required to perform any necessary removal, repair or replacement of work caused by unsuitable conditions that are unreported as described herein, at no additional cost to the owner.

1.03 WATER SERVICE/SUPPLY

- A. The Contractor shall conduct a flow test and determine volume and pressure of incoming water supply from water flow test data. Test shall be conducted in accordance with NFPA-291. Data to be used in hydraulic calculations shall include a minimum 5 psi or 10% safety factor (whichever is greater) on static and residual pressures, as well as, seasonal safety factors. Local authorities or Insurance may require additional safety factors.
- B. The connection to water service main and service line for the fire sprinkler system(s) shall be provided as indicated on the approved civil site utility construction documents and shall be furnished and installed by the Contractor complete including all required backflow prevention or detection devices (where required by Authorities having Jurisdiction).

#### 1.04 SUPERVISORY AND ALARM FACILITIES

- A. Equipment necessary to accomplish the required waterflow and supervisory alarm initiation shall be furnished and installed under this section of the specifications. Waterflow detection and supervisory devices shall be Listed and Approved as specified herein.
- B. Coordination of all wiring with electrical and/or alarm Subcontractors shall be complete in all respects for a complete system.
- C. Paddle-type waterflow indicators with adjustable pneumatic retard chamber (0-90 seconds) shall be provided to indicate waterflow for the new each sprinkler system.
- D. Valve supervisory switches shall be provided for all new valves controlling the water supply to the each sprinkler system.
- E. Electrical/Fire Alarm Contractors shall provide monitoring (off site) of sprinkler systems exceeding 20 sprinklers.

#### 1.05 REGULATORY REQUIREMENTS

- A. Hydraulic Calculations and Design Drawings: Drawings shall be prepared by a qualified registrant and bear stamp of approval of Authority Having Jurisdiction, Engineer, and (if required) Owner's fire insurance underwriter prior to submittal to Architect and Fire Protection Consultant for their records.
- B. This Contractor is directed to the fact that these specifications are performance type meaning that at the time of submission of bid the Contractor has contacted ALL governing agencies as to the scope of work to be done for the entire project as outlined herein. This shall include contacting ALL ready to use when the building is occupied by the Owner.
- C. If there is a conflict between the referenced standards, codes, or authorities having jurisdiction; then it shall be the Contractor's responsibility to bring the conflict to the attention of the Owner or his/her Agent immediately in an R.F.I. (Request For Information) format for resolution prior to commencement of any additional work. (Refer to attachment for an RFI sample/form found at the end of this section).

- D. All work shall conform to the requirements of the applicable portions of the National Fire Protection Association (NFPA) Standards and Recommended Practices (including Appendices) listed herein:
  - 1. NFPA-13, 1996 Edition, "Standard for the Installation of Sprinkler Systems".
  - 2. NFPA-24, 1995 Edition, "Private Fire Service Mains and Their Appurtenances".
  - 3. NFPA-25, 1995 Edition, "Inspection Testing and Maintenance of Water-Based Fire Protection Systems".
- E. All work, materials and equipment shall conform to all Local, State and Federal Codes as well as all other Authorities having jurisdiction. If alternate editions of aforementioned standards, or additional standards are required then they shall be applied as accepted by Local and State codes.
- F. The Contractor shall be responsible for filing all documents, paying all fees and securing all permits, inspections and approvals necessary for conducting this work.

#### 1.06 EXTRA MATERIALS

- A. Furnish under provisions of Division 1.
- B. Provide extra sprinklers under provisions of NFPA 13. In addition, a minimum of two (2) spare sprinklers of each type and temperature installed shall be provided.
- C. Provide two (2) spare suitable wrenches for each sprinkler type.
- D. Provide metal storage cabinet in location designated by Architect/Owner's representative

#### 1.07 INTENT OF SPECIFICATIONS

- A. It is intended that the work performed pursuant to these specifications shall be complete in every respect; resulting in a system installed entirely in accordance with all current applicable codes, standards, manufacturer's recommendations and U.L. listings and FM approvals. All work in general consists of, but is not necessarily limited to, these specifications and latest accepted code approved design and installation standards.
- B. It is further intended that upon completion of work, the Owner shall be provided with the following:
  - 1. Complete information and drawings describing and depicting the entire system as installed, including all information necessary for maintaining, trouble-shooting, and expanding the system at a future date.
  - 2. Complete documentation of system testing.
  - 3. Written certification that the system has been tested and inspected, is installed entirely in accordance with the applicable codes, standards, manufacturer's recommendations, U.L. listings, F.M. approvals, etc. and is in proper working order.
  - 4. It is intended that the Contractor be responsible for work with other trades.

## 1.08 RELATED WORK PROVIDED BY OTHER SECTION

- A. The following related work shall be performed under other sections:
1. Painting of sprinkler piping and valves, including the placement and removal of bags or other protection devices on sprinklers to prevent paint from touching any portion of the sprinkler.
  2. Concrete filled pipe guard posts for protection of riser(s), backflow assembly, etc. shall be provided where equipment or materials are subject to vehicular traffic.
  3. Concrete splash blocks at main drain, inspector's test outlets and auxiliary drain outlets, if necessary.

## 1.09 WORK TO BE PERFORMED

- A. Complete automatic sprinkler system protection throughout the project in accordance with these specifications and/or drawings. Including, but not limited to the following:
1. Valve diagrams, pipe markers, metal signs and riser design placards.
  2. Operating and maintenance manual.
  3. New 2-way siamese-type fire department connection (F.D.C.) for A.S. system with National Standard Threads (N.S.T.) or as required by local fire department. Provide with check valve. Automatic drip is required if F.D.C. is not remotely located.
  4. Install A.S. system waterflow indicating equipment and valve supervisory devices on all devices and valves. Wiring shall be by Electrical and/or Alarm Contractor(s).
  5. Inspector's test and auxiliary drain locations necessary to test and completely drain each A.S. sprinkler system in accordance with Florence requirements.
  6. Shop drawings, fabrication drawings (if Contractor chooses to submit), equipment submittals, record drawings and other submittals required herein.
  7. Guarantee all new equipment and systems for a one year period after date of substantial completion as determined by Architect, Owner or His/Her Agent and Contractor.
  8. Repair all damage resulting from this work. Including all materials, fittings and fixtures. All pipe openings shall be closed so as to prevent obstructions and damage.
  9. Sleeves and related fire rated seals and waterproofing commensurate with the penetration.
  10. Inserts, hangers, clamps, earthquake sway bracing, etc., as required to hang and support piping in accordance with NFPA and/or this specification. Hangers to be pre-set.

11. Furnishing and/or installing backflow assembly(ies) in accordance with Florence requirements; and having said assembly(ies) tested and approved by a certified technician prior to request for final inspection. Assembly shall be approved for such use by authority having jurisdiction.
12. Accuracy of pre-fabricated pipe, location of sprinklers and deflectors (per NFPA and inspections), field fit of piping, piping elevations, riser nipple lengths and dimensioning.

#### 1.10 QUALITY ASSURANCE

- A. Installer Qualifications: Installation and alterations of fire protection piping, equipment, specialties, accessories, and repair and servicing of equipment shall be performed only by a qualified installer. The term qualified means experienced in such work (experienced shall mean having a minimum of 5 previous projects similar in size and scope to this project), familiar with all precautions required and has complied with all the requirements of the Authorities having jurisdiction. Installer shall be licensed with the State and Local Authorities having jurisdiction. Submit evidence of such qualifications to the Owner or his/her Agent with submission of bid.

#### 1.11 DEFINITIONS

- A. Contractor: The Fire Protection Contractor and any of his/her sub-contractors, vendors, suppliers or fabricators.
- B. Provide: Furnish and install.
- C. Furnish: Purchase and deliver to other trades or Owner for installation.
- D. Install: Install materials, equipment or assemblies furnished by other trades or Owner.
- E. Concealed: Where used in connection with installation of piping and accessories, shall mean that hidden from sight as in chases, furred spaces, pipe shafts, or above suspended ceilings. "Exposed" shall mean "not concealed" as defined above.
- F. Owner: Owner or his/her designated Representative.
- G. Fire Protection Consultant:
  1. Fire Protection Engineering Services

#### 1.12 SUBMITTALS FOR ENGINEER REVIEW

- A. Within 30 days after award of contract, the Contractor shall submit six (6) sets of manufacturer's data sheets, hydraulic calculations, catalog cut sheets, shop drawings and data on devices for all necessary approvals prior to fabrication of materials.
- B. Contractor shall submit complete packages. Partial submittals will be returned without further explanation.
- C. Drawings shall have the Engineer's stamp of approval prior to submittal to the Authority Having Jurisdiction.

- D. No extension of the contract time will be granted for the Contractor's failure to allow sufficient time for review and processing, or for shop drawings that have been returned due to improper submission.
- E. The Contractor will not be authorized to start any portion of the work until the shop/fabrication drawings, catalog cuts and other required submittals for that portion are received, reviewed and approved by all required parties.
- F. The Owner or his/her Agent, Architect and Fire Protection Consultant shall review all submittals for conformance to these specifications.
- G. Contractor may submit for review and approval any proposed substitution of materials from that specified, with material submittals.**
- H. If submittals or proposed substitutions, upon review are found not to conform to the requirements of these specifications, the Contractor shall be required to resubmit with modification. Not approved items shall be resubmitted. The Contractor shall be responsible for the Owner's expenses for subsequent revisions of rejected submittals necessitated by the Contractor's failure to make the requested modifications. Such extra fees shall be deducted from payments by the Owner to the Contractor.**
- I. One set of drawings bearing the Engineer's approval stamp and the approval of the Authority Having Jurisdiction shall be submitted to the Engineer and Architect for their records.**

#### 1.13 MANUFACTURER'S DATA

- A. The Contractor shall submit with his/her bid, manufacturer's data sheets showing the type and model of all equipment or material proposed. This information shall include, but not be limited to:
  - 1. Type of pipe.
  - 2. Hangers.
  - 3. Valves.
  - 4. Pipe fittings/joining methods.
  - 5. Sprinklers.
  - 6. Waterflow devices.
  - 7. Supervisory devices.
  - 8. Waterflow alarms.
  - 9. Fire Department Connection(s).
  - 10. Escutcheons.
  - 11. Fire rated and waterproof penetration seals.

12. Pressure Gauges.

- B. When a data sheet shows more than one product, the proposed product shall be clearly indicated by arrows or other suitable means. This includes sprinkler orifice sizes, finishes and temperature ratings.

1.14 SHOP/FABRICATION DRAWINGS

- A. Shop/Fabrication drawings shall be at a minimum scale of 1/8 inch equals 1'-0" for plans. Plans shall include all required information as required in NFPA-13. Provide additional sprinklers (over code minimum quantities) to obtain symmetrical ceiling layouts. Provide sprinklers as required, in accordance with NFPA-13 for obstructions and ductwork.
- B. Design shall be based upon a complete and thorough survey and review of the work to be performed.

1.15 OPERATION AND MAINTENANCE MANUAL

- A. The Contractor shall provide the Owner with a looseleaf manual containing:
  - 1. A detailed description of the warranty.
  - 2. Manufacturer's product data sheets and installation manuals/instructions for all equipment installed.
  - 3. A list of recommended spare parts.
  - 4. Service Directory.
  - 5. 11-inch by 17-inch reduced copies of the "record" as-built drawings.
  - 6. NFPA Standard 25.
  - 7. Copy of Test Certificates.
- B. Within 30 days of the completion of the work, two (2) copies of the manual shall be delivered to the Owner.

1.16 RECORD DRAWINGS

- A. The Contractor shall maintain on the site an accurate record of all changes made to the system layout from that shown on the approved drawings.
- B. Upon completion of the work, before final approval, one (1) set of reproducible mylar "record" drawings and two (2) additional sets of blue line "record" drawings shall be delivered to the Owner. Contractor shall coordinate this with Architect.
- C. At least one set of approved drawings with all required stamps of approval shall be maintained on-site and made available to all Authorities having jurisdiction on demand during construction phase of work.

1.17 VALVE DIAGRAMS

- A. At the completion of the work, provide a small scale of the building(s) indicating the location of all control valves, low point drain(s), and inspectors test(s). The plan shall be neatly drawn and color coded to indicate the portion of the building protected by each system, framed under glass (not plastic) and permanently mounted on the wall adjacent to each sprinkler riser.

#### 1.18 CHANGES

- A. Make no changes in installation from layout as shown on the approved drawings unless change is specifically approved by the Engineer. This does not include minor revisions for the purpose of coordination, or to clear ducts or obstructions.
- B. Any changes made other than stated above are at the Contractor's own expense and responsibility.

#### 1.19 LEAK DAMAGE

- A. The Contractor shall be responsible during the installation and testing period of the sprinkler system for any damage to the work by others, to the building, its contents, etc. caused by leaks in any equipment, by unplugged or disconnected pipes, fittings, etc., or by overflow, and shall pay for the necessary replacement or repairs to work of others, damaged by such leaks.

#### 1.20 FREIGHT AND HAULING

- A. Deliver materials to the job site, unload and store in location determined by the Owner's Representative and General Contractor.

#### 1.21 BASE BID

- A. The base bid shall be lump-sum or in accordance with Division I of specifications.
- B. The Contractor shall indicate the number of sprinklers included in the base bid, including the number of sprinklers allowed for obstructions and ductwork.

#### 1.22 CLEANUP

- A. Maintain the premises free from accumulation of waste material or rubbish caused by this work.
- B. At the completion of the work, remove all surplus materials, grease, oil, etc. from piping, tools, etc., and leave premises in a neat, clean workmanlike manner.

#### 1.23 SAFETY

- A. All work shall be performed in compliance with the Occupational Safety and Health Act of 1970 and Construction Safety Acts Standards (or current).

1.24 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and protect products to site under provisions of Division 1.
- B. Store products in shipping containers and maintain in place until installation. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

1.25 EMERGENCY SERVICE

- A. During the warranty period, the Contractor shall provide emergency repair service for the entire automatic sprinkler system. This service shall be provided on a 24-hour per day, 7 day per week basis. Coordinate details with Owner's Representative.

1.26 SPARE PARTS AND SPECIAL TOOLS

- A. Contractor shall install code approved metal sprinkler cabinet(s) containing sprinklers of all types, finishes, and temperature ratings used and two (2) sets of sprinkler wrenches compatible with each type of sprinkler provided. The cabinets shall be installed at the locations approved by the Owner and NFPA requirements. Sprinkler and cabinet quantities shall be per NFPA-13.
- B. The Contractor shall supply the Owner with two (2) complete sets of special tools and equipment necessary to perform routine maintenance on the sprinkler systems.

1.27 FINAL APPROVAL AND ACCEPTANCE

- A. Final approval and acceptance of the work will not be given by the Owner until:
  - 1. The completed sprinkler system(s) has/have been inspected, tested and approved by the Owner, Architect, and all other Authorities having jurisdiction.
  - 2. Required submittals, system operation and maintenance manuals, "record" drawings, spare parts and special tools have been provided to, reviewed, and accepted by the Owner.

1.28 GUARANTEE PERIOD

- A. The following guarantee is a part of the specifications and shall be binding on the Contractor.
- B. "The Contractor guarantees that this installation is free from mechanical defects. He agrees to replace or repair to the satisfaction of the Architect any part of the installation that may fail within a period of one year after date established below, provided that such failure is due to defects in the materials and workmanship or to failure to follow the specifications and drawings. Warranty of the Contractor furnished equipment or systems shall begin on the date the system or equipment is placed in operation for beneficial use of the Owner or occupancy by the Owner, whichever occurs first."

**PART 2 PRODUCTS**

## 2.01 DESIGN CRITERIA

- A. Provide wet-pipe sprinklers in all areas as required by NFPA, Authorities having jurisdiction, these specifications and/or approved construction documents.
- B. **Design and hydraulically calculate each wet-pipe sprinkler system to produce a discharge density over the most hydraulically demanding area of operation as required by NFPA and Authorities having jurisdiction.**

## 2.02 PIPING

- A. Manufacturers:
  - 1. Allied Tube and Conduit (Grinnell)
  - 2. Western Tube and Conduit Corp.
  - 3. Bull Moose Tube Company
- B. Underground outside of building: See Civil Drawings and Specifications for complete description.
- C. Underground inside of building: Class 200 ductile iron with mechanical-restricted joints. Interior of pipe and fittings shall be cement lined.
- D. Sprinkler system piping or tubing shall meet the requirements of NFPA 13, be U.L. listed and F.M. approved. Contractor shall base his/her bid on the use of any one or a combination of the following: In addition, all pipe shall have a minimum Corrosion Resistance Ratio (CRR) of 1.00 or greater, as per U.L. listings.
- E. Pipe meeting ASTM A-795 and/or A-135 requirements for above grade use. All piping shall be black carbon steel.
- F. Flanges and flanged fittings shall be 175 psi cast iron with standard ring gaskets.
- G. Pipe and fittings shall be listed by Underwriters Laboratories, Inc. and approved by Factory Mutual for use in fire protection systems and designed to withstand a working pressure of not less than 175 psi.
- H. All pipe and fittings exposed to the weather, downstream of all inspector's test valves, between exterior wall and check valve on FDC, or located in a corrosive atmosphere shall be hot-dipped zinc coated (galvanized).
- I. Flexible couplings shall be U.L. and F.M. approved.
- J. Pipe penetrations through masonry and fire rated construction shall be sleeved and sealed with fire rated seals commensurate with the building construction.
- K. Pipe penetrations through floors and exterior walls shall be approved waterproof seals.
- L. When system piping pierces a foundation wall below grade or is located under the foundation wall, clearance shall be provided to prevent breakage of piping due to building settlement. Do not locate pipe joints within or under a foundation wall and a 1-3 inch

clearance shall be provided around piping by use of sleeve for piping piercing a foundation wall. Sleeve properly and fill clear space with approved waterproof packing.

- M. Use of foreign-made piping or fittings shall not be permitted.
- N. Use of copper or CPVC piping and fittings in accordance with NFPA-13 and pipe listing is permissible where prior-approved only.

## 2.03 VALVES

- A. Except for miscellaneous small valves, all valves shall be plainly marked with the name or registered trademark of the manufacturer, size of the valve, and U.L. or F.M. identification mark. All valves shall be suitable for 175 psi working water pressure.
- B. All water supply control valves shall be an indicating (OS and Y or Butterfly) type and shall be furnished with a valve supervisory device.
- C. All water supply control, drain and test valves shall be permanently identified to show their function and the sprinkler system zone they serve.
- D. All valves shall be located within six (6) feet of the floor.

## 2.04 SPRINKLERS

- A. Manufacturers:
  - 1. Viking
- B. Ceiling (Finished):
  - 1. Type: **Recessed Pendent**
  - 2. Sprinkler Finish: **Chrome**
  - 3. Escutcheon: **Chrome**
- C. Exposed Areas:
  - 1. Type: Upright or pendent type.
  - 2. Sprinkler Finish: **Brass**
- D. Sidewall Type:
  - 1. Type: Horizontal sidewall
  - 2. Sprinkler Finish: Chrome
  - 3. Escutcheon: Chrome]
- E. Guards: Finish to match sprinkler. Provide where sprinkler is susceptible to mechanical damage and/or located at less than 7'-0" above floor.

- F. In exposed areas and ceilings, sprinkler activation shall be glass bulb type. Solder type sprinklers shall be acceptable above ceilings only and in concealed type sprinklers.
- G. All sprinkler colors shall be factory – applied.
- H. Utilize quick response sprinklers where possible in accordance with NFPA 13.
- I. Sprinklers required due to ceiling projections/obstructions and ductwork are not considered additional sprinklers. Contractor shall be responsible for identifying these locations.
- J. Install ordinary, intermediate and high temperature sprinklers of proper degree rating wherever necessary to meet requirements of NFPA, and Authorities having jurisdiction.
- K. Provide corrosion resistant sprinklers with factory applied coating where sprinkler is to be located in a corrosive atmosphere (locker/shower areas, canopies, etc.).
- L. Sprinkler and escutcheon finishes shall be suitable for area or ceiling finish provided. Verify finish of all sprinklers and escutcheons with Owner or his/her Agent prior to ordering.

#### 2.05 HOSE THREADS

- A. Hose threads for hydrants and fire department Siamese connections shall match those of the local Fire Department, and/or shall be National Standard Thread (N.S.T.) type.

#### 2.06 FIRE DEPARTMENT CONNECTION

- A. New fire department connection(s) shall be provided in accordance with requirements of all Authorities having jurisdiction. Provide with check valve. Approved automatic drip shall be required only where FDC is not remotely located.

#### 2.07 HANGERS

- A. Use beam clamps or hang from top chord of joists. Do not hang from bottom chord of joist or bridging. Use drop in anchors if required.
- B. Trapeze hang all mains where possible. Verify all hanger types with Structural Drawings and Engineer prior to commencement of any work.
- C. Provide sway bracing. Install in accordance with NFPA-13. Pipe to be generally supported by clamps and rods and secured to overhead construction.

### **PART 3 EXECUTION**

#### 3.01 INSTALLATION

- A. Installation of fire protection systems shall conform to the requirements of the applicable provisions of NFPA and in accordance with Chapter 38 of the Uniform Building Code.
- B. The arrangements of all piping systems shall conform to the architectural requirements and field conditions, and shall be run straight and direct, forming right angles or parallel

lines with building walls and other pipes, and shall be neatly spaced. Offsets will be provided where required. Standard fittings shall be used for offsets. All risers shall be erected plumb and true, and shall be parallel with the walls and other pipes and shall be neatly spaced. All work shall be coordinated with all sections of Division 15, Mechanical, and Division 16, Electrical, in order to avoid interference of pipe and unnecessary cutting of floors and walls.

C. Installation of mechanical and fire protection system within the ceiling cavity is in the following order of priority:

1. Plumbing soil, waste and roof drain lines.
2. Supply, return and exhaust ductwork.
3. Steam and condensate piping.
4. Heating hot water and chilled water piping.
5. Lighting, bus ducts and electrical cable trays.
6. Fire sprinkler mains.
7. Domestic hot and cold water mains.
8. Vent piping (for waste systems).
9. Fire sprinkler branch piping.
10. Domestic hot and cold water branch piping.
11. Special piping systems (such as medical gas).
12. Pneumatic control piping.

The Fire Protection Contractor shall respect these priorities. Shop prefabrication of the sprinkler system is on the Contractor's on own risk. If any field modifications are required to accommodate other trades, those modifications will be at the Contractor's own expense. All offsets of the sprinkler piping shall be provided with proper (as per NFPA) drains and air relief.

### 3.02 ANCHORAGE FOR TEES & BENDS (PIPING BELOW BUILDING FLOOR SLAB)

- A. All tees and bends on pipe installed underground shall be anchored. Pipe clamps and tie rods, thrust blocks, approved retainer glands, or other approved methods may be used. The types of pipe and soil conditions determine the method. Fittings shall be provided with lugs when clamps and rods are to be used. After installation, rods and clamps should be thoroughly covered with asphalt or other acceptable corrosion-resistant material. The area of bearing face of concrete thrust block shall comply with UPC Section 1008.1.4, AWWA Standards and NFPA 24.

### 3.03 TEMPORARY FIRE PROTECTION

- A. During the construction of the building and until the permanent fire extinguishing system has been installed and is in service, temporary fire protection shall be provided as required by the Fire Marshal.

#### 3.04 APPROVALS

- A. Upon completion of testing of this system, the Contractor shall furnish the Architect with a Certificate of Approval from the legally constituted authorities having jurisdiction.

#### 3.05 GENERAL

- A. Sprinklers in finished areas are to be installed on a true axis line in both directions with a maximum deviation from the axis line of 1/2", plus or minus. Heads exceeding this, as directed by the Architect, shall be removed and reinstalled.
- B. Apply masking tape, plastic covers (available from many sprinkler manufacturers) or paper cover to ensure sprinklers and/or cover plates do not receive field paint finish.
- C. Flush entire piping system of foreign matter prior to connection of underground piping with overhead piping system.
- D. Hydrostatically test entire system.
- E. Require test be witnessed by all authorities having jurisdiction.
- F. Coordinate the central-monitoring of all systems in excess of 100 sprinklers with electrical/fire alarm contractor.
- G. All holes made by the Contractor in any wall, ceiling or floor shall be patched by the Contractor, restoring the wall, ceiling or floor to its original condition, fire resistance and integrity.
- H. Removal and repair of all finished surfaces shall be coordinated with the Architect and subject to his/her approval.
- I. Location of all equipment, controls, piping, valves and drain shall be subject to Architect/Owner approval.
- J. Standard metal signs shall be provided in accordance with NFPA-13.
- K. All sprinklers and equipment shall be installed in accordance with manufacturer's instructions. All special tools recommended by the manufacturer shall be used.
- L. Install equipment in accordance with manufacturers instructions.
- M. Locate fire department connection per NFPA with sufficient clearance from walls, obstructions or adjacent siamese connectors to allow full swing of fire department wrench handle.
- N. Locate outside alarm gong/bell/horn-strobe on exterior building wall.

### 3.06 STARTING AND COMPLETION DATES

- A. The schedule for installation of the sprinkler systems will be established at the pre-bid meeting. Coordinate schedule closely with General Contractor, Owner and Architect.

### 3.07 INSPECTION

- A. The Contractor shall daily examine all areas in which the work will be performed. The Contractor shall immediately report unsatisfactory working conditions to the Owner or his/her Agent for resolution. The Contractor shall not proceed with the work until all unsatisfactory working conditions have been corrected.
- B. Owner, Architect, and all Authorities having jurisdiction shall be allowed to conduct inspections and tests as they choose. Approved sprinkler plans must be available on the project site during installation and inspection of the work.

### 3.08 GENERAL PREPARATION

Coordinate work of this Section with other affected work.

### 3.09 PIPING PREPARATION

Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.  
Remove scale and foreign material, from inside and outside, before assembly.  
Prepare piping connections to equipment with flanges or unions.

### 3.10 PIPING INSTALLATION

- A. Install piping in accordance with NFPA 13 for sprinkler systems, NFPA 14 for standpipe and hose systems and NFPA 24 for service mains.
- B. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.
- C. Install piping to conserve building space and not interfere with use of space and other work.
- D. Group piping whenever practical at common elevations.
- E. Install piping to allow for expansion and contraction without stressing pipe, joints or connected equipment.
- F. Slope piping and arrange systems to drain at low points.
- G. System shall be designed to allow for expansion and contraction.
- H. 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 Division 9.
- I. Do not penetrate building structural members unless indicated in writing by Structural Engineer of record.

- J. Provide sleeves when penetrating footings, floors and/or walls. Seal pipe and sleeve penetration to achieve fire resistance equivalent to fire separation required.
- K. Die cut screw 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.
- L. Install valves with stems upright or horizontal, not inverted. Remove protective coatings after installation.
- M. Provide gate or butterfly valves for shut-off valves or isolating service.
- N. Provide drain valves at main shut-off valves, low points of piping and apparatus.
- O. Installation or use of unidentified or foreign-made pipe, tube or fittings is not permissible.
- P. Where sprinkler piping is installed in finished areas, the Contractor shall install all new piping so that it is concealed above finished ceilings, provide a minimum separation of 12" between the ceiling height and the bottom of the sprinkler pipe. Pipe installed in unfinished areas may be exposed.
- Q. All exposed pipe that passes through a wall, ceiling, or floor shall be provided with escutcheon plates.
- R. All piping shall be installed so as not to obstruct any portion of a window, doorway, stairway or passageway, and shall not interfere with the operation or accessibility of any mechanical, plumbing or electrical equipment. Run piping horizontally and at right angles to walls and ceilings or along slope of ceilings.
- S. All sprinkler piping, drain and test piping, etc. installed through exterior walls shall be galvanized and have a 4'-0" minimum length to first valve located inside insulated building envelope.
- T. All sprinkler piping must be substantially supported from building structure and only approved type hangers shall be used. Sprinkler lines under ducts shall not be supported from ductwork, but shall be supported from building structure with trapeze hangers where necessary, in accordance with NFPA-13. Tapping or drilling of structural elements is not permitted. Use beam clamps or hang from top chord of joist. Do not hang from bottom chord of joist.
- U. Pendent sprinklers shall be in alignment with, and parallel to ceiling fixtures, walls, etc.
- V. Install sprinkler piping in exposed areas as high as possible using necessary fittings and auxiliary drains to maintain maximum clear head room, and to keep space aesthetically acceptable to Architect/Owner.
- W. Sprinklers shall be installed per the requirements of NFPA 13 with regard to ducts, obstructions, steel beams and joists, partitions, and ceiling projections. Provide additional sprinklers as required.
- X. Provide sprinkler protection below any ducts, banks of piping, etc., greater than 48" in width in all sprinklered areas.
- Y. Contractor shall provide complete sprinkler protection before combustible contents are moved into the building.

- Z. All sprinkler piping and fittings shall be so installed such that system may be drained. System shall primarily be designed to drain through main drain at riser(s).
- AA. Minimum and maximum deflector distances shall be per NFPA requirements. A minimum of 18–inches from deflector to top of storage shall be provided.
- BB. A minimum distance between sprinklers, as required by NFPA and the individual sprinkler U.L. listing or F.M. approval, shall be provided to avoid cold soldering of sprinklers.
- CC. Provide fire protection during construction as required by local Authorities having jurisdiction.

### 3.11 SYSTEM DRAINS

- A. Provide 2" main drain valves at system control valves and extend piping to outside building. Provide a 4'-0" minimum length of main drain piping from exterior wall penetration to angle valve.
- B. Provide all auxiliary drains where necessary, extend and terminate at safe location.
- C. Pipe all drains to a location where water drained will not damage stock, equipment, vehicles, planted areas, etc., injure personnel, or patrons, or cause an unsightly wet area in front of any entrances.
- D. Plugs used for auxiliary drains shall be brass.

### 3.12 CEILING AND WALL PLATES

- A. Install chrome wall plates wherever exposed sprinkler piping passes throughout ceiling and walls.

### 3.13 SLEEVES

- A. Set sleeves securely in place for all pipes passing through floor and masonry wall openings.
- B. Space between sleeve and pipe shall be filled with packing commensurate with construction. Provide chrome wall plates at each side of wall.
- C. Sleeves and seals through floors and exterior wall shall be watertight.
- D. All sleeves shall meet requirements of all Authorities having jurisdiction and Owner.

### 3.14 FIRE DEPARTMENT CONNECTION

- A. Install fire department connection properly connected to piping. Provide with check valve. Where located inside building, distance from check valve to wall mounted F.D.C. shall be 4'-0" minimum, and automatic drip connection shall be provided.
- B. Where remotely located F.D.C. shall be provided with check valve. Concrete pad shall also be provided and concrete thrust block installed.

- C. Provide standard name plate marked "automatic sprinklers" or as appropriate for the system installed.

### 3.15 RISER VALVES

- A. Install Riser valves, including paddle type waterflow indicator connected to fire alarm system.
- B. Coordinate with the Fire Alarm Contractor the central-monitoring of all systems in excess of 20 sprinklers as required per NFPA and IBC requirements.

### 3.16 INSPECTOR'S TEST

- A. Provide inspector's test connections as specified in NFPA 13 requirements. Discharge orifice shall have same size orifice as smallest orifice of any sprinklers installed.
- B. Provide 1" site glass where inspector's test discharge cannot be readily observed while operating valve.
- C. Pipe all inspector's test connection discharges to atmosphere at location where water drain will not damage stock, equipment, vehicles, planted areas, etc., injure personnel, or patrons, or cause an unsightly wet area in front of any entrance.
- D. All pipe and fittings downstream of inspector's test valve shall be galvanized.

### 3.17 WELDING AND FLAME CUTTING

- A. No welding or flame cutting by the Contractor shall be permitted on the premises.
- B. Shop welding (off-site) shall meet all NFPA-13 and related requirements. Retrieve all discs from piping prior to site delivery.

### 3.18 FINAL INSPECTION AND TESTS

- A. Overhead sprinkler piping: Tested for a period of two hours at a hydrostatic pressure of 200 lbs. and all piping, valves, sprinklers, etc., shall be watertight.
- B. Underground piping: Tested (by Utility Contractor) for a period of two hours at a hydrostatic pressure of 200 lbs. in accordance with NFPA Standards. Leakage shall not exceed quantities indicated. Coordinate with Utility Contractor to ensure proper testing and test schedule.
- C. Replace piping system components that do not pass the test procedures specified, and retest repaired portion(s) of the system.
- D. All underground piping shall be thoroughly flushed (by Utility Contractor) in accordance with the requirements of NFPA Standards, prior to connection to overhead piping system. The flush test must be witnessed by all Authorities having jurisdiction. A test shall be made before the trench in which pipe is laid is backfilled. Coordinate with Utility Contractor to ensure proper testing and test schedule.

- E. The Contractor shall make arrangements with all Authorities have jurisdiction for final inspection and witnessing of the final acceptance tests.
- F. If, when the Owner's consultant or any other Authorities having jurisdiction visit the job site for this purpose after being advised by the Contractor that the work is completed and ready for test, the work has not been completed, or the final acceptance tests are unsatisfactory, the Contractor shall be responsible for Consultant's extra time and expenses for reinspection and witnessing the retesting of the work. Such extra fees shall be deducted from payments by the Owner to the Contractor.
- G. Contractor shall provide at least (5) working days notice to Architect and Owner via General Contractor for all tests and field observations.
- H. Flushing of all piping shall be conducted with water flowing at a minimum velocity of 10 feet per second.

END OF SECTION