

## **SECTION 211313 SPRINKLER AND STANDPIPE WORK**

### **PART 1 - GENERAL**

#### **1.01 DESCRIPTION AND SCOPE OF WORK**

- A. The work includes the Design and Installation a new wet pipe automatic sprinkler and standpipe system to comply with all applicable codes and as needed for this entire building. The contractor is responsible for all work required and to turn over complete and operable fire protection system to the Owner,
- B. The system and design shall include all piping, valves, sprinklers, fittings, hangers, seismic restraints, alarm devices, auxiliary devices and controls, alarm interface, backflow preventers, inspector test connections, fire department connections, hose connections, fire pumps and all accessories and miscellaneous items require for a complete operating system.
- C. The contractor is expected to make allowances for all necessary adjustments for the actual installation , the physical conditions affecting his work, and coordinate the actual pipe routing and equipment installation which may affect the performance of his work, and coordinate the actual pipe routing as necessary to accommodate the conditions, obstructions and the work of others. No extra payments will be allowed for the Contractor on account of extra work made necessary by his failure to make allowance s. The cost associated with this task shall be included in the Contractor's base bid.
- D. Prepare hydraulic calculations to meet the design criteria applied based on the code requirements for the occupancy of the facility.
- E. Order, pay and obtain a flow test from the Water Authority and based on the flow test results and the hydraulic calculations determine a fire pump is necessary. If a fire pump is required the contractor include in his bid for a complete installation of a fire pump including all necessary accessories such a control panel, jockey pump, test valves etc. Fire water service from the street to the building, and all backflow preventer and underground piping shall be part of the sprinkler installation.
- F. Contractor shall obtain all project drawings and utilize these in understanding and preparation of design drawings and installation drawings. The design drawings shall be prepared using the compatible

AutoCAD version used for the Architectural plans provided. The layout of sprinklers and piping shall be fully coordinated with The Architectural, structural, HVAC, plumbing and electrical drawings, copies of all these will be available to assist in the preparation of design and shop drawings.

- G. All sleeves, openings, cutting, patching, access panels and doors necessary for the installation of fire protection work is the responsibility of the fire protection contractor.
- H. Electrical Power and the fire alarm wiring for the fire pumps are provided in the electrical part of the contract based on estimated fire pump capacities, and this contractor shall make allowance in his bid to include for the cost of any additional cost of wiring and devices which may be necessary after the final capacities of the fire pumps are determined as required by this contractor.

## 1.02 RELATED SECTIONS

A. Refer to all available specification sections for the project to fully evaluate and understand the project requirements.

## 1.03 SUBMITTALS

- A. Design drawings- piping layout and sprinkler layouts, piping riser diagrams, hydraulic calculations, all prepared by a licensed professional engineer and submit these to the Building Department and obtain all necessary plan approvals and permits.
- B. Product Data: Certificate for Hose Threads: Verify that the hose threads on Fire Department connections match the threads on equipment used by the Newark City Fire Department.

Submit copies of all permits and approved drawings issued by the Building Department.

- C. Shop Drawings
  - 1. Complete sprinkler system layout indicating the locations of sprinkler heads, devices, and accessories. Include separate details of special or not easily visualized piping arrangements and inspector's test valves and connections.
  - 2. **Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13 for the commercial/retail spaces and 13 R for the residential part of the building, that have been**

**approved by authorities having jurisdiction, including hydraulic calculations, all signed and sealed by the licensed professional engineer.**

3. Hydraulic calculations shall be complete and cross referenced to the appropriate drawing sheets.
  4. Wiring Diagrams: Power, signal, and control wiring. Differentiate between manufacturer-installed and field-installed wiring.
- D. Test Reports as specified in the Field Quality Control Article.
- E. Certification of Installation: Submit certificate upon completion of sprinkler work, which indicates that work has been tested in accordance with The Newark City Building Department, NFPA 13 AND 13 R and also that system is operational, complete and has no defects.
- F. Maintenance data: Include an instruction manual describing the operation and maintenance of the system in the maintenance manual.
- G. Maintenance materials: Sprinkler heads, steel cabinet, wrench, caps and chains

#### **1.04 SUPPLEMENTAL QUALITY ASSURANCE**

- A. Codes and Standards
1. NFPA Compliance: Design and Install fire protection systems in accordance with NFPA 13: and 13 R Standard for the Installation of Sprinkler Systems. **The residential portion of the building shall be designed and installed to comply with NFPA 13 R and the commercial portion shall be designed and installed to comply with the NFPA 13.**
  2. NFPA Compliance: Design and Install Install fire protection systems in accordance with NFPA 14 Fire Standpipe Systems.  
UL Compliance: Provide sprinkler products in accordance with UL standards; provide UL label on each product.
  3. New Jersey Building Code: Comply with the requirements of the Building Code requirements and with the Rules and Regulations of the Building Department, the Division of Fire Prevention of the Fire Department and all other public authorities having jurisdiction. T
  4. Fire Department/Marshal Compliance: Install sprinkler systems in accordance with local regulations of Fire Department or Fire Marshal.

5. Screw Thread Connections: Comply with local Fire Department/Marshal regulations for sizes, threading and arrangement of connections for fire department equipment to siamese connections.

## **1.05 EXTRA MATERIALS**

- A. Heads: For each style and temperature range required, furnish additional sprinkler heads, amounting to six heads when fewer than 300 heads are installed and twelve heads when between 300 and 1200 heads are installed. All the spare heads will be enclosed in a steel cabinet with a special sprinkler wrench to be delivered to the Authority. Obtain a receipt.
- B. Deliver also two spare caps and chains for each siamese connection. Obtain a receipt.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS AND MANUFACTURERS**

- A. Pressure and temperature ratings, and capacities as required. Provide proper selection as determined by the Authority to comply with installation requirements. Provide fittings of materials that match pipe materials used in the sprinkler systems.
  1. Sprinkler pipe and fittings: 2 inch and smaller may be PVC piping or carbon steel piping schedule 40 wall thickness.
  2. Stand Pipe and Sprinkler pipe and fittings: 2 inch and larger shall be carbon steel piping schedule 10 wall thickness, fittings shall be standard black iron and /or painted steel with end prep either threaded or grooved.
- B. Identification: Provide identification complying with in accordance with the following listing:
  1. Fire Protection Piping: Plastic pipe markers.
  2. Fire Protection Valves: Plastic valve tags.
  3. Fire Protection Signs: Provide the following signs:
    - a. At each sprinkler valve, sign indicating what portion of system valve controls.

- b. At each outside alarm device, sign indicating whom to call if device is activated.

C Piping: Provide pipes, fittings, specialties, supports and anchors in accordance with the following:

- 1 .PVC piping a Type I, Grade I Polyvinyl Chloride (PVC) compound with a Cell Classification of 12454 per ASTM D1784. The pipe shall be manufactured in strict compliance to ASTM D2241, consistently meeting and/or exceeding the Quality Assurance test requirements of this standard with regard to pressure rating, material, workmanship burst pressure, flattening, impact resistance, and extrusion quality. The pipe shall be manufactured in the USA using domestic materials, by an ISO 9001 certified manufacturer.
- 2 Black Steel Pipe: Schedule 10 or Schedule 40 Class 125, cast-iron
- 3 Threaded fittings, threaded joints; grooved pipe, mechanical coupling type fittings .
4. Adjustable steel clevis hangers, adjustable steel band hangers or adjustable band hangers for horizontal-piping hangers and supports.
  - a. Two-bolt riser clamps for vertical piping supports.
  - b. Steel turnbuckles and malleable iron sockets for hanger-rod attachments.
  - c. Concrete inserts, top-beam C-clamps, side beam or channel clamps or center beam clamps for building attachments. C-type clamps used to attach hangers to the building structure in areas subject to earthquakes shall be equipped with a retaining strap or safety hook to prevent movement. See Figure 7-7 of ASHRAE Practical Guide to Seismic Restraint, 1999. C-type clamps, with or without retaining straps, shall not be used to attach braces to the building structure.

The seismic bracing of sprinkler piping as governed by the codes..

- D. Valves: Provide valves as needed for a proper installation.
- E. Special Valves

1. Provide valves, UL listed, in accordance with the following listing. Provide sizes and types that mate and match piping and equipment connections.
  - a. Alarm Check Valve: Provide cast-iron water flow alarm check valve, 175 psi working pressure.
  - b. Water Flow Detector: Provide a paddle type sprinkler water flow detector in the sprinkler supply piping. Detector shall be equipped with a pneumatic retard device to prevent false alarms due to water surges.
2. The contractor shall provide the sprinkler electric alarm equipment including the control panel, bells, signs, wiring, etc.
3. Approved Manufacturers:

Grinnell Fire Protection Systems Co., Inc.  
Firematic Sprinkler Devices  
Reliable Automatic Sprinkler Co.  
Victaulic Co. of America.
- F. Gauges: Provide gauges shown on the Drawings and complying with Section 23: Thermometers and Gauges
- G. Sprinkler Head
  1. Provide sprinkler head of type in accordance with the following listing. Provide fusible links for 165° F or heat responsive, frangible glass bulb design rated at 155°F unless otherwise indicated on the Drawings.
    - a. Quick response Extended coverage with secured retaining flange: Side wall and Upright and Pendent sprinklers.
    - b. Finishes for side wall and Upright, and Pendent: chrome plate for occupied areas, cast or plain brass for unoccupied areas.
    - c. Common Area and nonresidential area with hung ceiling shall be recessed concealed type, white cover plate.
  - c. Sprinkler Cabinet and Wrench: Provide steel, baked red enameled, sprinkler box with capacity to store sprinkler heads and wrench.

2. Approved Manufacturers:

Firematic Sprinkler Devices, Inc.  
Grinnell Corp.  
Viking Corp.  
Reliable Automatic Sprinkler Co.  
Victaulic Co. of America.

H. Pressure Reducing Valves: Provide listed pressure-reducing valves that are intended to keep the maximum outlet pressure to 165 psi at any point in the system. Valves shall be rated for maximum inlet pressure of 250 psi and be suitable for field outlet set pressure ranging from 80 to 150 psi. Valves shall be similar to PRV-1 as manufactured by TYCO.

- 1) Pressure gauges shall be provided on the inlet and outlet sides of each pressure-reducing valve.
- 2) A relief valve shall be installed on the discharge side of the pressure-reducing valve

I. Provide valves, UL listed, in accordance with their listing. Provide sizes and types that match piping and equipment connections.

a. 2½" Angle Hose Valve and 1½" Hose connection (for stages greater 1,000 square feet):

Angle hose valve, with threads conforming to FDNY standards, shall be 2½" similar to Potter Roemer Fig. 4075, 2½" X 1½" red enamel steel hose rack similar to Potter Roemer Fig. 2794; 2½" hose rack brass nipple similar to Fig. 2756 (Potter Roemer); 2½" x 1½" brass reducer (Potter Roemer Fig. 2810); 1½" pin lug brass coupling (Potter Roemer, Fig. 2934); 1½" lined poly flex hose (length as may be required) see Potter Roemer, Fig. 2915; 1½" brass nozzle see Potter Roemer, Fig. 2947; 2½" escutcheon see Potter Roemer Fig. 2751. Provide 1½" diameter hose of sufficient lengths to suppress a fire in the stage area. Hose connections shall be equipped with a fog nozzle and be mounted in a cabinet. Fire hose valve shall be installed inside a cabinet as specified herein.

b. 2½" Angle Hose Valve: Angle hose valve, with female x female threads conforming to FDNY standards, shall be 2½" similar to Potter Roemer Fig. 4075; 2½" cast brass cap with female hose thread as per Potter Roemer Fig. 4625 with pin lugs and chain. If hose is not installed in a cabinet,

escutcheon shall be Potter Roemer model 4712. Fire hose valve shall be installed inside a cabinet as specified herein. .

1. Hose valve shall have nominal 2½" with female inlet and male threads conforming to FDNY standards. It shall be an angle valve, cast brass body, complete with wheel handle, with red enameled finish caps and chain. Valves shall be Potter Roemer Fig. 4065 or Croker Corp. Fig. 5015. Cap with chain shall be Potter Roemer 4625 or Croker Corp. Fig. 5713. Threads shall be to Fire department specifications. Provide escutcheon plate Potter Roemer No. 2751 or Croker Corp. Fig. 5735 for valve.
3. Pressure Reducing Valves:
  - a. 2½" Hose stations: when the normal static pressure measured at a hose connection exceeds 100 psig, the valve shall be equipped with an adjustable type pressure restricting device so that the static and residual pressures will not exceed 100 psi.
  - b. 1½" Hose stations: when the normal static pressure measured at a hose connection exceeds 100 psig, the valve shall be equipped with an adjustable type pressure restricting device to limit static and residual pressures at the outlet of the hose connection to 100 psi.
  - c. Provide listed pressure-reducing valves that are intended to keep the maximum outlet pressure to 165 psi at any point in the sprinkler portion of the system. Valves shall be similar to PRV-1 as manufactured by TYCO. Pressure gauges shall be installed on the inlet and outlet sides of each pressure-reducing valve. Relief valve shall also be provided on the discharge side of the pressure-reducing valve.
  - d. Provide labeling/indications on pressure reducing valves relating to building's address and the stairs/floors served by the valve.
4. Backflow Prevention Valve

The backflow preventor valves shall be electrically supervised by a tamper switch installed in accordance with NFPA 72 and separately annunciated. Tampering with the backflow preventor valves shall



send a signal to the fire alarm system.

5. Electrical Subcontractor shall provide the sprinkler electric alarm equipment including the control panel, bells, signs, wiring, etc. All equipment for the Sprinkler Alarm system which is not specifically called for to be provided by any other contractors and/or subcontractors shall be provided by the Master Fire Suppression Piping Contractor.
6. Approved Manufacturers:  
Anvil International/Anvil Star  
Firematic Sprinkler Devices  
Reliable Automatic Sprinkler Co.  
Victaulic Co. of America.  
Tyco Fire Suppression & Building Products  
Potter Electric Signal Company  
Globe Fire Sprinkler Corporation  
Shurjoint Piping Products
- I. Gauges: Provide gauges shown on the Drawings and complying with the following:
  1. Provide pressure gauges of materials, capacities and ranges, designed and constructed for use in service as required:
    - a. Type: General use, 1% accuracy, ANSI B40.1
    - b. Case: drawn steel or brass, cast aluminum, shatterproof glass lens, 4½" diameter.
    - c. Connector: brass with 1/4" male NPT.
    - d. Scale: white coated aluminum, with permanently etched markings.
    - e. Range: conform to the following:
      - 1) Vacuum: 30" Hg - 15 psi
      - 2) Water: 0 – 300 psi
  2. Approved Manufacturers:  
Ametek/US Gauge  
Ernst Flow Industries  
Marsh Bellofram  
Miljoco Corporatjuion  
Trerice (H.O) Co.  
Weiss Instruments, Inc.  
Wesler Instruments

J. Pressure Gauge Cocks:

1. Provide pressure gauge cocks between pressure gauges and gauge tees on piping systems. Construct gauge cock of brass with 1/4" female NPT on each end, and "T" handle brass plug.
  - a. Syphon: 1/4" straight coil constructed of brass tubing or loop-shaped section of brass, stainless-steel or steel pipe with 1/4" male NPT on each end.
  - b. Snubber: 1/4" brass bushing with corrosion resistant porous metal disc, through which pressure fluid is filtered. Select disc material for fluid served or pressure rating.
2. Manufacturers: same as for pressure gauges

K. Pressure and/or Temperature Gauge Connector Plugs:

1. Provide gauge connector plugs rated for 500 psi at 200°F. Construct of brass and finish in nickel-plate equipped with 1/4" or 1/2" NPS fitting, with self-sealing valve core type neoprene gasketed orifice suitable inserting 1/8" OD probe assembly from dial type insertion pressure and/or temperature gauge. Equip orifice with gasketed screw cap and chain.
2. Approved manufacturers:

Miljoco Corporation  
MG Piping Products Co.  
Peterson Equipment Co.  
Sisco, A Spedco, Inc. Co.  
Trerice (H.O) Co.  
Watts Regulator Co.

L. Siamese Connections

1. Provide siamese connections as required; complete with necessary check valves, drips, caps and chains, etc. Check valves shall be iron body with bronze clappers and seats. Caps shall be of galvanized iron and shall be finished in green enamel. Siamese fittings shall be of polished heavy cast brass or cast bronze with heavy cast brass or cast bronze plate. Plate shall be inscribed "AUTOMATIC SPRINKLER" and "FULLY SPRINKLERED BUILDING". The latter inscription shall be either an integral part of the plate or on a separate nameplate securely fastened to or above the siamese connection. Where sidewalk siamese connections are indicated on the Drawings, the riser pipe shall be red brass.
  - a. Where a fence encloses a portion of the building containing a Fire Department connection, Contractor shall provide and secure to the fence directly opposite the siamese connection

a steel sign containing the following wording: "F.D. Siamese Sprinkler Connection located...Feet behind Sign." Sign shall be finished in porcelain enamel with one inch red letters on white background.

2. Approved Manufacturers:

Elkhart Brass Mfg. Co., Inc.  
Croker  
Potter Roemer

- M. Ladders: Provide permanent heavy steel ladders to provide access to valves in accordance with the code requirements. Ladders shall be of width and height required, shall be made of heavy steel bars and heavy rungs and shall be permanently fastened at location. Where the shut-off valve adjacent to the sprinkler alarm valve is located higher than 6' above the floor, ladder shall be provided where directed.

**N2.10 ROOF MANIFOLD**

- A. Roof manifold shall be cast brass, three-way horizontal type of size indicated on the Drawings, Potter-Roemer Fig No. 5881 or Croker Corp. Fig. 6850. Roof manifold shall be fitted with three cast brass valves equal to Potter-Roemer Fig. No. 4065 or Croker Corp. Fig. 5015. Cap with chain shall be Potter-Roemer 4625 or Croker Corp. Fig. 5713. Threads shall be to Fire Department Specifications.

**2.11 CABINETS**

- A. Fire Valve Cabinets: For use with fire hose valves, the cabinet shall be recessed type, 20 gauge steel body and white enamel inside. Exposed trim and door shall be 18 gauge, type 304 stainless steel with a No. 4 finish. Cabinet doors shall have duo-panel wire inserted clear glass. Door shall be hinged right or left as required. Cabinet shall be Potter Roemer SS-1810-SS-AW or Croker corp. Fig. 1700-SS-AW. Due to changes that may occur during pipe installation, the Contractor shall verify the size of the fire valve cabinet before ordering same.
- B. Lobby Storage Cabinet: This cabinet with built-in storage shelf shall be recessed type, 20 gauge steel body and baked white polyester finish inside. Exposed trim and door shall be 18-gauge, with continuous steel hinge (brass pin). Cabinet door shall have duo-panel wire inserted clear glass. Door shall be hinged right or left as required with lock and key in a key cabinet. Cabinet shall be Potter Roemer 1302or Croker Corp. Fig. 2190 or approved equal.

1. Class I standpipe requires the installation of a storage cabinet on the main entrance floor. Where one standpipe riser is installed in the building, the cabinet shall contain at least one fog nozzle, one 1½” spanner wrench, one 2½” wrench, one 2½”x 1.5” non-swivel reducing coupling, and 125’ of 1½” hose. Where two or more standpipe risers are installed in the building, at least two of the required items of equipment shall be provided.
  2. The equipment specified for the Lobby Storage Cabinet shall be of one manufacturer for each complete unit.
- C. Key Storage Cabinet: The key to the “Lobby Storage Cabinet” shall be kept in a locked “Key Storage Cabinet”, openable only by a Fire Department city wide standard key. The cabinet shall be labeled “For Fire Department Use Only”. A metal sign stating where the storage cabinet is located shall be placed in each stair enclosure on the main entrance and on each floor. The cabinet shall hold a key for the lobby storage cabinet. Cabinet installation requires 5”x5”x3” wall opening. Cabinet shall be Potter Roemer model #1950 NYFD Yale lock #SYA1, or Croker Fig. 2928 or Fig. 2920.

## 2.12 FIRE HOSE

- A. Fire hose shall be Polyflex fire hose (125 feet provided in the lobby), model # 2915 by Potter Roemer
- B. Provide signs as required by Fire Department. Potter Roemer Fig. 6300 Series or Croker Corp. Fig. 2957
- M. Ladders: Provide permanent heavy steel ladders to provide access to valves in accordance with the code requirements. Ladders shall be of width and height required, shall be made of heavy steel bars and heavy rungs and shall be permanently fastened at location. Where the shut-off valve adjacent to the sprinkler alarm valve is located higher than 7’ above the floor, ladder shall be provided where directed.
- N. Pipe Escutcheons
  1. Pipe escutcheons shall have inside diameter closely fitting pipe outside diameter or outside of pipe insulation where pipe is insulated. Select outside diameter of escutcheon to completely cover pipe penetration hole in floors, walls, or ceilings; and pipe sleeve extension, if any. Escutcheons shall be cast or sheet brass, solid or split-hinged, with brass set screw. Provide chrome finish for occupied areas exposed to view.
  2. Manufacturers:  
Zurn Industries, Inc.

McGuire Mfg. Co.

- O. Pipe Sleeves: Provide pipe sleeves of one of the following. Pipe sleeve must be appropriate type and thickness for the UL firestopping assembly selected:
1. Sheet-Metal: Fabricate from galvanized sheet metal; round tube closed with snaplock joint, welded spiral seams, or welded longitudinal joint. Fabricate from the following gauges: 3" and smaller, 20 gage minimum; 4" to 6", 16 gage; over 6", 14 gage minimum.
  2. Steel-Pipe: Fabricate from Schedule 40 galvanized steel pipe; remove burrs.
  3. Iron-Pipe: Fabricate from cast-iron or ductile-iron pipe; remove burrs.
  4. Firestop penetration materials for sealing sleeves shall be listed by Underwriters Laboratories. For pipes passing through fire-rated floor, cast-in place firestop device with Underwriters Laboratories listing, is permitted as an acceptable sleeve alternative to a metallic sleeve with firestopping material. The cast-in place device is a one-step firestopping process that does not require additional firestop penetration materials for sealing the sleeves. The device shall be installed where required for sleeving purposes. The cast-in place firestop device shall not be used for wall applications.
  5. Materials for sealing space between each pipe and sleeve through non-rated interior walls shall consist of mineral wool and sealant.

## 2.02 PAINTING

- A. Paints used on dedicated sprinkler piping shall not:
1. Exceed the VOC content limits established in the Green Seal Standard GS-11 Paints, first edition, May 20, 1993.
  2. Exceed the VOC content limit of 250 g/L established in the Green Seal Standard GC-03, Anti-Corrosive paints, second edition, January 7, 1997.
- B. Provide colors indicated in Paragraph 3.03.C
1. First (1<sup>st</sup>) coat – Alkyd Vinyl Acrylic – Latex Primer – 1.2 Mills DFT
  2. Second (2<sup>nd</sup>) coat – Semi-Gloss Vinyl Acrylic Latex – Enamel – 1.3 Mills DFT

## **PART 3 - EXECUTION**

### **3.01 SUPPLEMENTAL INSTALLATION**

- A. Approval of Sprinkler System: All necessary permits for work in connection with the installation of the sprinkler system shall be obtained by the Contractor before commencing any of the sprinkler work. The Authority will prepare and submit plans to the Building Department and obtain approval of the sprinkler system.
  
- B. Installation of Identification
  - 1. Install fire protection signs on sprinkler system in accordance with the NJ Building Code and NFPA 13 and 13 R requirements.
  - 2. Each valve in the sprinkler system shall be tagged in accordance with the code requirements.
  
- C. Piping Installation
  - 1. Comply with requirements of NFPA 13 and 13 R for installation of sprinkler piping materials. Install piping products where indicated, in accordance with manufacturer's written instructions and in accordance with recognized industry practices to ensure that piping systems comply with requirements and serve intended purposes.
  - 2. with other work including plumbing piping, as necessary to interface components of sprinkler piping properly with other work.
  - 3. Install drain piping at low points of piping systems and at the alarm valve, a valve drain connection that will be carried down to the floor to discharge into the nearest floor drain. Low points of sprinkler piping that cannot be drained through the alarm valve drain or when there is no alarm valve, shall also be provided with drains as may be shown on the Drawings or as required.
  - 4. Install valved hose connections of sizes as required, on sprinkler at ends of branch lines and cross mains. Install Inspector's test connection where indicated, or at most remote point from riser.
  
- D. Installation of Valves
  - 1. Install alarm valves and water flow detectors where required.

2. Valves shall have built-in tamper switches for use in applications where supervision of the open position of the valve may be desired. The tamper switch is operated by a cam connected to the valve stem. The Contractor should make certain that the valve disc when fully open does not interfere with the operation of other system components immediately adjacent to the valve.
- E. Installation of Sprinkler Pressure Gauges: Install gauges in accordance with the code requirements.
- F. Installation of Electrical Devices: Provide wiring requirements for electrical wiring of control panel, bells, and valves tamper switch, alarm valves, and water flow detectors.
- G. Installation of Sprinkler Head
1. Install sprinkler head at the proper position as required. Install concealed type sprinkler heads with factory painted white cover plate in areas with suspended ceilings. Install recessed type sprinkler head with manufacturer supply escutcheon.
  2. Install sprinkler piping, heads, and all other items and accessories to clear electric lighting fixtures.
- H. Interconnection of Standpipe:
- a. Standpipe risers shall be cross-connected at, or below, the street entrance floor level, except as otherwise provided.
  - b. Standpipe risers that supply a zone shall be cross-connected with other risers below, or in, the story of the lowest hose outlets from the water source in a zone. Horizontal check valves shall be installed in the run of each riser continuing into a higher zone in such a manner as to permit all upper zones of the system within each two-way Fire Department connection in accordance with NFPA 14 to be fed through one riser from the zone below and to prevent any lower zone of the system from being supplied from a zone above, except as otherwise permitted by NFPA 14. Two-way Fire Department connections shall be interconnected.
  - c. Risers supplied by an upper level connection shall be provided with manual control valves or remote control valves, so arranged that risers supplied by the upper level cross-connection may independently be shut-off from the tank

supplies.

- d. Cross connection shall be at least as large as the largest riser supplied by the cross connection. However, when supplying 2", but no more than 4" risers, the cross connection shall not be less than 5". The cross connection shall not be less than 6" for all other riser combinations.
  - e. Where there is no cellar, cross connection may be hung from the ceiling of the lowest story.
  - f. Each two-way Fire Department connection shall be connected to a riser or cross connection connecting other two-way Fire Department hose connections or risers within each two-way Fire Department zone provided in accordance with NFPA 14. The pipe from the two-way Fire Department connection to the riser or cross connection shall be 5" I.P.S., except that a 4" pipe shall be sufficient when such pipe supplies a single 4" riser system. The pipe from the two-way Fire Department connection shall be run as directly as practicable to the riser or cross connection.
8. All parts of the fire protection system (standpipe/sprinkler) that may be exposed to frost shall be protected from freezing by any of the following methods:
- a. The piping shall be frost-proofed with insulation having a thermal conductance of 0.1 Btu/hr per square foot of surface per degree F at a mean temperature of 70°F to 75°F (21°C to 24°C). Insulation shall be protected to prevent water infiltration, and when exposed to the weather the insulation shall be covered with a 45 pound (20kg) roofing felt jacket or equivalent.
  - b. Electric tracers may be used in conjunction with the insulation.

#### D. Installation of Valves

- 1. Install valves and water flow detectors where indicated on the Drawings.
- 2. Valves shall be fitted with tamper switches for supervision of the open position of the valve. The tamper switch is operated by a cam connected to the valve stem. The Contractor should make certain



that the valve disc when fully open does not interfere with the operation of other system components immediately adjacent to the valve.

3. Install the floor control valve assembly inside the specified recessed cabinet or an access panel.
- E. Installation of Fire protection Pressure Gauges: Install gauges.
- F. Installation of Electrical Devices: Provide wiring requirements for control panel, bells, valves, tamper switch, alarm valves, and water flow detectors.

### **3.03 FIELD QUALITY CONTROL**

- A. Sprinkler Piping Flushing: Prior to connecting sprinkler risers for flushing, flush water feed mains, lead-in connections and control portions of sprinkler piping. After fire sprinkler piping installation has been completed and before piping is placed in service, flush entire sprinkler system, as required to remove foreign substances, under pressure as specified in NFPA 13 and 13 R. Continue flushing until water is clear, and check to ensure that debris has not clogged sprinkler heads.
- B. Test
1. Hydrostatic Testing: After flushing system, test fire sprinkler piping hydrostatically, for period of 1 hour, at not less than 200 psi at the lowest cross connection to the siamese connection and at a pressure of not less than 100 psi at the top most sprinkler head. Check system for leakage of joints. Measure hydrostatic pressure at low point of each system or zone being tested.
  2. Repair or replace piping system as required to eliminate leakage in accordance with NFPA standards for "little or no leakage" and retest as specified to demonstrate compliance.
  3. Test the entire sprinkler installation, including sprinkler alarm system, in accordance with the requirements of the Building Code and give at least 2 days advance notice in writing of tests and inspections to the Inspection Authority. Tests shall be conducted in the presence of the authorized representative and the Authority's Representatives, Fire Department and any other public authority having jurisdiction. In lieu of the presence of the authorized representative, the Authority may accept a signed statement of an Architect or Engineer, whose

name is submitted with the advanced notification specified above, declaring that Architect or Engineer has witnessed the tests and that the sprinkler system meets the requirements of the Building Code. All tests shall be performed as part of this contract.

### **3.04 ADJUSTING AND CLEANING**

- A. Cleaning and Inspecting: Clean and inspect fire protection systems.

### **3.05 SYSTEM ACCEPTANCE/FLOW TEST**

- A. Standpipe System: A water flow test shall be conducted at each roof outlet to verify that the required pressure is available at the required flow. The system shall deliver 500 gpm at 65 psi at the hydraulically most remote standpipe and 250 gpm at 65 psi for additional standpipes.

1. Where pumps are part of the water supply, testing shall be conducted while the pumps are operating.
2. Alarm and Supervision Tests: Each alarm and supervisory device provided shall be tested in accordance with NFPA 72, National Fire Alarm Code.
3. Each pressure-restricting device shall be tested to verify that the installation is correct; that the device is operating; and that the inlet and outlet pressures and flow at the device are in accordance with the design.

- B. Sprinkler System

1. The main drain valve shall be opened and remain open until the system pressure stabilizes
2. The static and residual pressures shall be recorded on the contractor's test certificate
3. Water flow detecting devices including the associated alarm circuits shall be flow tested through the inspector's test connection and shall result in an audible alarm on the premises within 5 minutes after such flow begins and until such flow stops.
4. All components of the sprinkler system and auxiliary must have been pressure tested as a composite system
5. Discharge tests of the sprinkler system shall be conducted using the

fire department connections (Fire Department connections)

6. Pressure gauges shall be installed at critical points and readings shall be taken under various modes of auxiliary equipment operation.
7. Water flow alarm signals shall be responsive to discharge of water through the system test pipes (Fire Department connections) while auxiliary equipment is in each of the possible modes of operation.

### 3.06 TESTING AND INSPECTION

Provide all required testing and inspection for 12 months after the system is accepted and Owner takes occupancy.

### END OF SECTION

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### LIST OF SUBMITTALS

SUBMITTAL	DATE SUBMITTED	DATE APPROVED
Product Data:	_____	_____
1. Manufacturer's Product Data		
2. Installation Instructions		
3. Certificate: Hose Threads		
NEWARK DOB		
1. Permits:	_____	_____
2. Approved Drawings		
Shop Drawings:	_____	_____
1. Sprinkler Layout		
2. Hydraulic Calculations		
3. Wiring Diagrams		
Test Reports:	_____	_____

Certification of Installation:

\_\_\_\_\_

Maintenance Data:

\_\_\_\_\_

1. Spare Parts Lists
2. Instruction Manual
3. Maintenance Manual

Maintenance Material:

\_\_\_\_\_

1. Head
2. Steel Cabinet
3. Wrench
4. Caps and Chains

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