

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. The design and installation of a hydraulically calculated automatic fire sprinkler system complete and ready for operation, for the remodeled area.
- B. Modification of the existing sprinkler systems as indicated on the drawings. Size system by pipe schedule in accordance with NFPA 13 and NFPA 14 the latest editions.
- C. Existing piping to be removed as indicated on the drawings. Removal of piping to include all hangers and supports.
- D. Existing accessible piping to be disconnected from their supply, drained, removed, and all remaining inaccessible piping capped.
- E. Replacement of all existing sprinklers. Work to include all necessary piping modifications, new sprinklers and new sprinkler escutcheons.

**1.2 RELATED WORK**

- A. Treatment of penetrations through rated enclosures: Section 07 84 00, FIRESTOPPING.
- B. Painting of exposed pipe: Section 09 91 00, PAINTING.
- C. Section 21 05 11, COMMON WORK RESULTS FOR FIRE SUPPRESSION.
- D. Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

**1.3 DESIGN CRITERIA**

- A. The design, materials, equipment, installation, inspection, and testing of the automatic sprinkler system shall be in accordance with the required advisory provisions of NFPA 13.
- B. Base system design hydraulic calculations using the area/density method on the following criteria and in accordance with NFPA 13 latest edition.
  - 1. Sprinkler Protection:
    - a. All patient care, treatment, office, waiting areas, and corridors: Light hazard, 0.10 gpm/sq. ft. over the hydraulically most remote 1500 sq. ft.
    - b. Electric Closets and storage between 100 and 250 sq. ft.: Ordinary Hazard, Group 1, 0.15 gpm/sq. ft. over the hydraulically most remote 1500 sq. ft.

2. Add water allowance of 250 gpm for inside and outside hose streams to the sprinkler requirements at the connection to the distribution main.
3. Hydraulic Calculations: The calculated demand including hose stream requirements shall fall no less than 10 percent below the available supply curve.

**1.4 QUALIFICATIONS:**

- A. Designer's Qualifications: Design work and shop drawings shall be prepared by a licensed engineer practicing in the field of Fire Protection Engineering or a NICET (National Institute for Certification in Engineering Technologies) Level III sprinkler technician.
- B. Installer's Qualifications: The installer shall possess a valid State fire protection contractor's license. The installer shall provide documentation of having successfully completed three projects of similar size and scope.
- C. On-site emergency service within four hours notification.

**1.5 SUBMITTALS**

- A. Submit as one package in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Sprinkler design shall be done by a certified professional. All plans shall be stamped by qualified P.E.
- C. Emergency service point of contact name and 24 hour emergency telephone number.
- D. Manufacturer's Literature and Data:
  1. Pipe and fittings.
  2. Valves
  3. Drips
  4. Sprinkler Cabinets
  5. Sprinkler Plugs
  6. Pipe Hangers and Supports
- E. Detailed drawings in accordance with NFPA 13 the latest editions. Drawings shall be prepared using CADD software stamped by fire protection professional engineer and include all new and existing sprinklers and piping. Use format in use at the VA medical center. Drawings are subject to change during the bidding and construction periods. Any wall and ceiling changes occurring prior to the submittal

of contractors shop drawings shall be incorporated into the contractors detailed design at no additional contract cost.

F. Hydraulic calculations for each sprinkler system in accordance with NFPA 13 latest edition.

G. Recommended preventive maintenance schedule.

#### **1.6 AS-BUILT DOCUMENTATION**

A. A Mylar as-built drawing and two blue-line copies shall be provided for each drawing. One copy of final CADD drawing files shall also be provided on 3 1/2 in., 1.44 mb diskette, for each drawing.

B. Four sets of manufacturer's literature and data updated to include submittal review comments and any equipment substitutions.

C. Four sets of hydraulic calculations for each sprinkler system updated to include submittal review comments and any changes to the installation which affect the calculations including one electronic set in PDF format.

D. Four copies of the hydrostatic report and NFPA 13 material and test certificate for each sprinkler system.

E. Four sets of operation and maintenance data updated to include submittal review comments and any equipment substitutions including one copy of NFPA 25.

F. Manufacturers literature, hydraulic calculations, reports and operation and maintenance data shall be in a labeled 3-ring binder.

#### **1.7 WARRANTY**

A. All work performed and materials and equipment furnished under this contract shall be free from defects for a period of one year from date of acceptance by the government.

B. All new piping and equipment incorporated into the new system shall be hydrostatically tested and warranted as new.

#### **1.8 APPLICABLE PUBLICATIONS**

A. Publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. National Fire Protection Association (NFPA)  
13-2010.....Installation of Sprinkler Systems

C. Underwriters Laboratories Inc. (UL)  
2011.....Fire Protection Equipment Directory

- D. Factory Mutual Engineering Corporation (FM)  
2010.....Approval Guide
- E. American Society for Testing and Materials (ASTM)  
F442-09.....Chlorinated Poly (Vinyl Chloride) (CPVC)  
Plastic Pipe
- F. American Society of Sanitary Engineering (ASSE)  
1015-2009.....Double Check Backflow Prevention Assembly
- G. Complete maintenance and inspection service for the sprinkler systems shall be provided by a factory trained authorized representative of the manufacturer of the major equipment for a period of one year after acceptance of the entire installation by the government.
- H. Contractor shall provide all necessary test equipment, parts and labor to perform required maintenance.
- I. All inspections, testing and maintenance work required by NFPA 25, NFPA 20, NFPA 13 and recommended by the equipment manufacturer shall be provided. Work shall include operation of sprinkler system alarm and supervisory devices.
- J. Maintenance and testing shall be performed on a quarterly basis. A computerized preventive maintenance schedule shall be provided and shall describe the protocol for preventive maintenance of equipment. The schedule shall include a systematic examination, adjustment, and cleaning of all equipment.
- K. Non-included Work: Maintenance service shall not include the performance of any work due to improper use, accidents or negligence for what the contractor is not responsible.
- L. Service and emergency personnel shall report to the Engineering Office or their authorized representative upon arrival at the hospital and again upon the completion of the required work. A copy of the work ticket containing a complete description of work performed and parts replaced shall be provided.
- M. Emergency Service:
  - 1. Normal and overtime emergency call-back service shall consist of an on-site response to calls within four hours of notification.
  - 2. Overtime emergency call-back service shall be limited to minor adjustments and repairs to affect the integrity of the system.

3. The single sprinkler system must be operational before the responding service person leaves the facility.

## **PART 2 - PRODUCTS**

### **2.1 GENERAL**

All devices and equipment shall be Underwriters Laboratories Inc. listed for their intended purpose. All sprinklers shall be Factory Mutual approved.

### **2.2 PIPING AND FITTINGS**

- A. Sprinkler piping downstream of the isolation valve on wet-pipe systems shall be per NFPA 13 black steel.
- B. Threaded or flanged fittings shall be ANSI B1 6.3 cast iron, class 125 minimum. Threaded fittings are not permitted on pipe with wall thickness less than schedule 40.
- C. All fittings on galvanized piping shall be galvanized in accordance with ASTM A53.
- D. Slip type or clamp-on type rubber gasketed fittings shall be listed for each piping application.
- E. Piping Materials Standards:
  1. Ferrous piping - follow ASTM A 795 Standard
  2. Welded and seamless steel pipe - follow ANSI/ASTM A 53
  3. Wrought steel pipe - follow ANSI/ASME B36.10M
- J. Fitting Materials Standards:
  1. Cast iron threaded fitting, Class 125 and 250 - follow ASME B16.4
  2. Cast iron pipe flanges and flanged fittings - follow ASME B16.1
  3. Malleable iron threaded fittings, Class 150 and 300 steel - follow ASME B16.3
  4. Factory made wrought steel butt weld fittings - follow ASME B16.9
  5. Buttwelding ends for pipe, valves, flanges, and fitting - follow ASME B16.25
  6. Wrought copper and copper alloy solder joint pressure fittings - follow ASME B16.22
- K. Pipe Identification - All pipe, including specially listed pipe allowed by NFPA 13, shall be marked continuously along its length by the manufacturer in such a way as to properly identify the type of pipe. Pipe identification shall include the manufacturer's name, model designation, or schedule.

### 2.3 SPRINKLERS

- A. Quick response sprinklers shall be standard type except as noted below. The maximum distance from the deflector to finished ceiling shall be 2 in. for pendent sprinklers. Pendent sprinklers in finished areas shall be provided with concealed type. The sprinkler shall be installed in the flush position with the element exposed below the ceiling line. At the specified locations, provide the following type of sprinklers.

LOCATION	TYPE
Mechanical Equipment Rooms, Electrical Rooms	Quick Response, Upright or Telephone Closets, Transformer Vaults Pendent Brass [93 °C (200 °F)]
All Patient Treatment, Elevator Lobbies and Corridors	Quick Response, Recessed Pendent, Chrome Plated [66-74 °C [150- 165 °F)]
Operating Rooms	Quick Response, Recessed Pendent, Chrome Plated, Sidewall [66-74 °C (150-165 °F)]

- B. Do not use quick response sprinklers in the same sprinkler zone with other sprinklers types. In sprinklered light hazard patient zones that are expanded into fully sprinklered zones, revise the existing system to contain quick response sprinklers.
- C. Sprinklers to be installed as per NFPA 13.

### 2.4 TOOLS AND REPLACEMENT PARTS

- A. Sprinkler Cabinet:
1. Provide a minimum 5 percent spare sprinklers with escutcheons with a minimum of two of each type/or as required by NFPA-13, whichever is more demanding.
  2. Provide a minimum of two of each type sprinkler wrenches used.
  3. Install cabinets in each building where directed by the Project Engineer.
  4. Spare sprinklers shall be kept in a cabinet where ambient temperatures do not exceed 100 Deg F.

### 2.5 WALL, FLOOR AND CEILING PLATES

- A. Exposed piping passing through walls, floors or ceilings shall be provided with chrome colored escutcheon plates.
- B. Comply with NFPA 101 Fire Barrier Penetration codes.

## **2.6 HANGERS**

- A. Hangers shall be designed to support five times the weight of the water filled pipe plus 250 Lb at each point of piping support.
- B. These points of support shall be adequate to support the system.
- C. The spacing between hangers shall not exceed the value given for the type of pipe as indicated in NFPA 13 tables.
- D. Hanger components shall be ferrous.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Drains, Test Pipes and Accessories:
  - 1. Provide a drain at locations for complete drainage of the system.
  - 2. Provide test pipes in accordance with NFPA 13. Test pipes shall be valved and piped to discharge through proper orifice as specified above for drains.
- B. Conceal all piping, except in pipe stairwells and rooms without ceilings.
- C. Install new piping and sprinklers aligned with natural building and other sprinklers lines.
- D. Piping arrangement shall avoid contact with other piping and equipment and allow clear access to other equipment or devices requiring access or maintenance.
- E. Cutout disks, which are created by cutting holes in the walls of pipe for flow switches and non-threaded pipe connections, shall be affixed near to the pipe where the originated. They shall be displayed until final inspection and then removed.
- F. For each new or existing fire department connection, locate the symbolic sign given in NFPA 170 a distance of 8 to 10 ft. above each connection location. The sign shall be 18 x 18 in. with symbol at least 14 x 14 in.
- G. Firestopping shall comply with Section 07 84 00, FIRESTOPPING. All holes through stairways, smoke barrier walls, and fire walls shall be sealed on a daily basis.
- H. Provide hydraulic design information signage as required by NFPA 13.

### **3.2 TEST**

- A. Automatic Sprinkler System: NFPA 13 and 25.

**Anderson Mikos Architects, ltd.**

RENOVATE CARDIOLOGY DEPARTMENT, BLDG 200

EDWARD HINES, JR. V.A. HOSPITAL

SECTION 21 10 00

HINES, ILLINOIS

WATER-BASED FIRE-SUPPRESSION SYSTEMS

### **3.3 INSTRUCTIONS**

Furnish the services of a competent instructor for not less than two four-hour periods for instructing personnel in the operation and sprinkler system, on the dates requested by the COTR.

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