

**SECTION 21 1300 – FIRE SUPPRESSION SPRINKLER SYSTEM****PART 1 - GENERAL****1.1 DESCRIPTION**

- A. The provisions of the General Requirements, Supplementary Requirements, and Division 1 apply to the plumbing work specified in this Division.
- B. The requirements of this section apply to the fire suppression system.
- C. Provide all items, articles, materials, equipment, operations and/or methods listed, mentioned, shown and/or scheduled on the Drawings and/or in these Specifications, including all design, labor, supervision, services, permits, fees, and incidentals necessary and required to provide a complete and operable facility with complete systems as shown, specified, and required by applicable codes. Provide all labor and material and perform such other services necessary and reasonably incidental to the design and installation of an automatic sprinkler system for all areas indicated on the Drawings and as required by the Governing Agency.

**1.2 QUALITY ASSURANCE**

- A. Contractor Qualifications:
  - 1. Established Fire Protection Contractor regularly engaged in the design and installation of automatic fire sprinkler systems.
  - 2. Employ workers experienced and skilled in this trade.
  - 3. System Designer: Qualified and certified for the design of fire protection sprinkler systems. NICET level III or IV technician or Professional Engineer experienced in the design of sprinkler systems.
- B. Governing Agency: All work in accordance with and accepted by the following hereafter referred to Governing Agencies:
  - 1. State of Oregon Fire Marshal.
  - 2. City of Salem, Oregon Fire Marshal.
- C. Design Requirements:
  - 1. Comply with the latest issue of NFPA Standard 13.
  - 2. Design, lay out and install a hydraulically calculated wet and/or dry pipe system utilizing code approved automatic devices designed particularly for use in this type of system.
  - 3. Provide hydraulic calculation methods design data information in accordance with NFPA 13. Include a 10 percent margin of safety for available water pressure. Include all friction losses from point of flow test to remote sprinkler area.

3. Fire Sprinkler Coverage: As required by the Governing Agency and including fire protection of all areas. including the following:
  - a. Sleeping Areas.
  - b. Kitchen exhaust hood systems -see Captive Air drawings.
  - c. Exterior canopies of combustible construction.
  - d. Covered decks and patios.
4. Occupancy Hazard: Final Occupancy Hazard designation in accordance with the Governing Agency requirements – note the building has multiple occupancies.
5. Seismic Restraint: Include load calculations for seismic restraints on drawings.
6. Contractor shall review all drawings and determine where unheated spaces, concealed combustible spaces, overhead doors, or similar special conditions exist and provide sprinkler protection as required.
7. Revisions to the Contractor's design required by the Governing Agency shall be at the Contractor's expense.

D. Acceptable Manufacturers: All sprinkler specialty material by Reliable, Globe, Tyco, Victaulic, and Viking, with UL or FM approval for use in automatic sprinkler systems. All materials and equipment suitable for 175 psi working pressure.

E. Field Wiring: It is the intent of these specifications that all systems shall be complete and operable. Refer to all drawings and specifications, especially the electrical drawings, to determine voltage, phase, circuit ampacity and number of connections provided. Provide all necessary field wiring and devices from the point of connection indicated on the electrical drawings. All equipment shall be installed in compliance with the Electrical Code and the equipment's UL listing. Bring to the attention of the Architect in writing, all conflicts, incompatibilities, and/or discrepancies prior to bid or as soon as discovered.

### 1.3 WORK OF OTHER CONTRACTS

- A. Work under this contract shall be conducted in a manner to allow for the future installations of such equipment or items listed in other sections of this Specification.

### 1.4 WORK OF OTHER DIVISIONS

- A. Work under this Division shall be conducted in a manner to cooperate with the installation of such equipment or items as specified in other Divisions.
- B. Consult all Drawings and Specifications in this project and become familiar with all equipment to be installed. Coordinate all aspects of the construction with the other trades on the job to ensure that all work and materials required to provide a complete and operational facility are included in the bid.
- C. Coordinate work in congested areas with other trades. Give right-of-way to plumbing waste and vent piping and to ductwork.

### 1.5 SUBMITTALS

## A. Working Drawings:

1. Prepare fire protection system working drawing showing locations and types of heads or outlets, alarm valves and devices, pipe sizes and cutting lengths, test tees and valves, drain valves, and other related items. Plans shall include identification of hydraulic nodes referenced in the calculations. Each remote area included in the calculations shall be clearly identified on the plans. Plans shall be stamped and signed by the responsible certified designer. Plans shall be completed using CAD.
2. Provide 3 sets of drawings showing sprinkler head locations and layout coordinated with architectural ceiling details including surface mounted light fixtures and similar items to the Architect for review prior to submitting details to the Governing Agencies.
3. Provide 6 sets of drawings to the Architect to be provided to Insurance Underwriter for approval.
4. Provide 6 sets of drawings to designated representatives of the Fire Marshal for approval.
5. Then provide 6 sets of approved Drawings to the Architect for final review.

## B. Submittals: Provide submittals for the following products.

1. Sprinkler Heads: Product Data for each type of head.
2. Alarm flow or pressure switches.
3. Fire department connection.
4. Backflow prevention valve assembly (see Civil Drawings for Vault location).
5. System control valves and trim.
6. Piping supports and braces.
7. Piping materials.
8. Alarm bell.
9. Air compressor or air maintenance device if used in place of dry sidewall heads.
10. Miscellaneous Equipment.

## C. Test Reports: Submit certificates of completion of tests and inspections.

## 1.6 EXTRA STOCK

- A. Additional Heads: Provide number, type and temperature rating installed as required to meet NFPA 13 requirements.
- B. Storage Cabinet: Provide as required to receive reserve sprinkler heads and special installation tools required.
- C. Index Label: Provide for each head indicating manufacturer, model, orifice, size or K-factor, and temperature rating. Also provide inside cabinet a list of heads stored within and brief description of where installed.

1.7 WARRANTY

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- A. Furnish, prior to application for final payment, three copies of written and signed guarantee effective a period of one year from date of completion and acceptance of entire project; agree to correct, repair and/or replace defective materials and/or equipment or the results of defective workmanship without additional expense to the Owner. Where no response satisfactory to the Owner has occurred within three working days from the written report of a warranty covered defect, the Contractor shall agree to pay for the cost of repair of the reported defect by a Contractor of the Owner's choice.
- B. Where the manufacturer's guarantee exceeds one year, the longer guarantee shall govern and include the Contractor's labor.

## PART 2 - PRODUCTS

### 2.1 MATERIALS AND EQUIPMENT

- A. Miscellaneous Sprinkler Specialties: Complete system including all items required by the Governing Agency including but not limited to:
  - 1. Electric alarm switch and indoor and outdoor 120 V alarm bell or horn/strobe.
  - 2. Valve monitoring switches with two outputs (one to fire alarm & one to sprinkler {alarm} bell).
  - 3. Wiring from the alarm switches to the point of connection in the Fire Alarm Control Panel. Coordinate with the Electrical Work specified in Division 28.
  - 4. If no alarm system is specified in Division 28, provide all necessary equipment and wiring for a local alarm system.
  - 5. Provide communication equipment with local fire department when required by Governing Agency.
  - 6. Dry pipe air compressor sized and arranged in accordance with the requirements of NFPA No. 13.
- B. Water Service Connection Backflow Preventer:
  - 1. Connect to primary water service with code approved double check valve assembly made up of two internally spring loaded check valves, shut-off valves and test cocks.
  - 2. When required by serving utility, include a smaller bypass double check assembly and meter. [When indicated on Civil Drawings, install backflow preventer in a precast concrete vault.]
- C. Sprinkler Heads: Approved heads with temperature ratings required for service indicated.
  - 1. Unfinished Areas: Upright, pendant or sidewall spray type, plain bronze.
  - 2. Finished Areas: White, flat plate concealed and sidewall heads in finished ceilings, walls, and soffits with white escutcheons. Where piping is exposed use bronze upright heads.

3. Dry pendant or dry sidewall heads for small areas subject to freezing and for pendant heads on dry pipe systems.
4. Exterior Areas: Upright, pendant or sidewall spray type, plain bronze. Field paint escutcheons at exterior locations to match adjacent surfaces.

D. System Piping:

1. Underground Water Piping: Ductile cast iron water pipe; ANSI A-21.51; with mechanical joints, ANSI A-21.10 and ANSI A21.11; and with concrete thrust blocks as detailed on the Drawings (Civil)
2. At Contractor's option, one piece type 304 stainless steel, factory assembled and tested sprinkler riser may be used.
3. Above Ground Water Piping: Use standard weight (schedule 40) black steel pipe ASTM A53, A135, or A795, with antimicrobial interior coating and cast iron screwed or mechanical joint fittings especially adapted and approved for sprinkler work. Use reducing fittings where changes in pipe size occur. Bushings are prohibited. [Provide galvanized pipe for dry systems.]
4. At Contractor's option, Schedule 10 black steel pipe ASTM A135 or ASTM A795 with antimicrobial interior coating, and mechanical joint fittings specifically approved for sprinkler use, may be substituted for the black steel pipe specified above. Pipe shall be UL listed and FM approved for 300 psi working pressure. Pipe must have a CRR of 1.00 or greater. [Provide galvanized pipe for dry systems.]
5. At Contractor's option, thin wall threadable steel pipe, ASTM A135 or A795, and cast iron or malleable iron screwed fittings 1½" and smaller, approved for sprinkler work. [Provide galvanized pipe for dry systems.]
6. At Contractor's option, in accordance with code, manufacturers listing, and upon approval of the authority having jurisdiction, approved plastic fire sprinkler piping materials may be used. Coordinate with other trades (firestopping, painting, etc.) and verify only compatible materials are installed in contact with the piping.
7. At Contractor's option, flexible sprinkler head drops may be used in lieu of rigid piping. Hose assembly shall be UL 2443 listed and FM 1637 approved. Devices shall approved per be IBC 1621 or ASCE 7 as an alternative to seismic escutcheons. Ceiling attachment bracket shall be seismically certified. Hose assembly constructed of fully welded corrugated 304 stainless steel hose with stainless steel overbraid with threaded stainless steel pipe fittings. Device shall be listed for 175 PSI working pressure. Hose and 304 stainless steel threaded ends shall be welded per AHSI / AWS B2.1-00. No gaskets, O-rings, flares, or similar mechanical joints permitted. FlexHead Industries or equal.

E. Pipe Escutcheons: Provide polished chrome escutcheons on pipe extending through

finished walls and ceilings, oversized to meet seismic requirements..

- F. Valves: UL and/or FM listed for fire protection service.
  - 1. Iron body OS&Y pattern, bronze mounted double disc, parallel seat.
  - 2. Iron body butterfly style with EPDM liner, bronze disc with indicating type gear operator.
  - 3. Bronze body ball valve, three-piece design, with approved operator.
  - 4. Where required by Governing Agency, provide wall or post style indicating valves.
  - 5. Standpipe Valves: Angle or straight pattern rough brass gate valve with cap and retaining chain.
- G. Valve Monitoring Switches: Provide approved monitoring switches where required by Governing Agency. In vaults and other areas where flooding conditions may occur, provide submersible type switches.
- H. Flexible Expansion/Seismic Loop: Factory fabricated assembly consisting of two elbows and return bend or three elbows, and two lengths of flexible hose to allow free movement in three axis. Return bend or elbow shall include a drain/vent fitting. Hose shall be fully welded stainless steel corrugated metal style with metal overbraid. Connections to match piping system except connection 2" and larger shall be grooved or flanged style. UL listed for fire sprinkler systems. Metraflex "Metraloop" or Unisource "FireV".
- H. Sprinkler Guards: Standard manufacture.
- I. Fire Department Connection: Wall mounted cast brass construction with clappers on each inlet and threads matching the fire district equipment. Number of inlets and sizes as approved by the fire district. Standard, Allenco, Seco, Potter-Roemer, or acceptable substitute.
- J. Dry Pipe Sprinkler Valve: Externally resettable valve with high and low air pressure monitoring switches, pressure alarm switch, and required test and operation trim. Provide with air maintenance device where connected to plant air.
- K. Dry pipe Air Compressor: Air compressor shall be specifically designed for fire sprinkler service. Tank mounted compressors shall include mounting feet for attachment to the floor, receiver drain and relief valves, and pressure gauge. Compressor shall be belt or direct drive and include pressure switch.

## PART 3 - EXECUTION

### 3.1 COORDINATION:

- A. Where the work must be sequenced and positioned with precision in order to fit into the available space, prepare accurate large scale shop drawings showing the actual physical dimensions required for the installation coordinated with other trades and

submit prior to purchase/fabrication/installation of any of the elements involved in the coordination.

- B. Cooperate with other trades in furnishing material and information for sleeves, bucks, chases, mountings, backing, foundations and wiring required for installation of mechanical items.
- C. Coordinate all work with other trades and determine in advance necessary pipe routing to avoid conflicts. Rerouting of piping to avoid conflicts with plumbing piping or ductwork shall be the responsibility of the Contractor.

### 3.2 INSTALLATION

- A. Connect to water supply source as shown on Drawings, check adequacy, and call any deficiency to attention of Architect. Coordinate with work in Division 22 and 33.
- B. Install all piping in a true and even manner with lines pitched for drainage and system arranged so that it can be entirely emptied of water. Install hangers at all branch line connections to cross mains and at all other points as required in NFPA standards.
- C. Support all pipe work from building construction with mild steel hangers spaced not more than 12 feet on centers. Support mains independently of branches, and in no case shall branch hangers assume any portion of the weight of mains. Do not drill or punch flanges of beams, purlins, joists, etc. for hanger attachment without written permission from the structural engineer. Do not bend hanger rods. Provide seismic restraints and flexible connections in accordance with building code requirements.
- D. Locate sprinkler heads in repeating, modular pattern, centered and accurately coordinated with ceiling grid as indicated. Coordinate design with lighting, HVAC system, and other ceiling features.
- E. Conceal all piping in areas with finished ceilings unless indicated otherwise.
- F. Install all wet system piping on the warm side of the building insulation. In attic spaces with blown in insulation, provide batt insulation, tenting, or baffles above the piping to prevent insulation from filling the area between the heated space and the piping.
- G. Flexible sprinkler head drops, including attachment brackets, shall be installed in accordance with the manufacturers instructions and approvals.
- H. Locate and install the required fire sprinkler alarm flow switch, relief valve, and test and drain valves where required by the Governing Agency. Identify valves with approved permanent placard.
- I. Provide a listed, supervised shutoff valve and a pressure gauge in each riser. A backflow preventer assembly may serve as the shutoff valve for a single riser when located in the riser room. Mount hydraulic calculation placard in visible location on each

riser.

- J. Securely anchor air compressors in place and connect to the dry pipe valve with rigid piping and a braided/corrugated flexible stainless steel connector.

3.2 TEST

- A. Test all pipes to a hydrostatic pressure of 200 psi and maintain for four hours minimum. Perform other tests as directed by Governing Agency.

3.3 PAINT

- A. Paint all exposed piping and hangers in accordance with Section 09 9100.
- B. Do not paint sprinklers.

3.4 CERTIFICATE OF COMPLETION

- A. Obtain and deliver to Owner a certificate, in duplicate, stating that system as installed has been inspected and accepted by authorities and/or agencies having jurisdiction, and that all regulations affecting work have been satisfied. Submit an acceptable certificate to the Owner before final payment is requested.
- B. Certificate: Contractors Material and Test Certificate for Aboveground Piping, Figure 25.1 per NFPA 13.

END OF SECTION