# SECTION 21 13 00 - 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 and standpipe 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 andinstallation 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 Portland, Oregon Fire Marshal.

C. Design Requirements:

1. Comply with the latest issue of NFPA Standard 13.

2. Design, lay out and install hydraulically calculated wet and dry pipe systems, including standpipes, 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 all friction losses from point of flow test to remote sprinkler area.

4. Fire Sprinkler Coverage: As required by the Governing Agency and including fire protection of all areas including the following:

a. Exterior canopies of combustible construction.

b. Covered decks and patios.

c. Covered parking areas.

d. Attic spaces of combustible construction.

e. Window wash sprinklers at exposures.

f. See fire protection plans for additional requirements.

5. Occupancy Hazard**:** Occupancy Hazard designation in accordance with the Governing Agency requirements.

6. Seismic Restraint: Include load calculations for seismic restraints.

7. 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.

8. 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, Viking, Automatic Sprinkler Corp. of America 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 Architectin 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.

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. Include pipe nodes and remote areas referenced in the calculations. Plans shall be stamped and signed by the responsible certified designer.Plans shall be completed using CAD.

2. Prepare drawings identifying and detailing all penetrations of structural elements. All such penetrations shall be reviewed and approved by the structural engineer prior to proceeding with installation drawings.

3. Provide 3 sets of drawings showing sprinkler head locations and layout coordinated with architectural ceiling details to the Architectfor review prior to submitting details to the Governing Agencies.

4. Provide 6 sets of drawings to the Architectto be provided to Insurance Underwriter for approval.

5. Provide 6 sets of drawings to designated representatives of the Fire Marshal for approval.

6. Then provide 6 sets of approved Drawings to the Architectfor 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. System control valves and trim.

5. Piping supports and braces.

6. Piping materials.

7. Alarm bell.

8. Standpipe components.

9. Air compressor or air maintenance device.

10. Miscellaneous Equipment.

11. Double detector check backflow preventer with remote reader.

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

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 alarm bell or horn/strobe.

2. Valve monitoring switches with two outputs (one to fire alarm & one to sprinkler 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.

B. 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 flush concealed ceiling and sidewall heads in finished ceilings, walls, and soffits with white escutcheons. Where piping is exposed use chrome plated 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: Bronze heads, field paint escutcheons at exterior locations to match adjacent surfaces.

C. 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.

2. At contractor’s option, one piece type 304 stainless steel, factory fabricated 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, 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, 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, in accordance with code and upon approval of the authority having jurisdiction, approved plastic fire sprinkler piping materials may be used.

6. At contractor’s option, flexible sprinkler head drops may be used in lieu of rigid piping. Hose assembly shall be UL listed and FM approved. Ceiling attachment bracket shall be seismically certified. Hose assembly constructed of fully welded corrugated stainless steel hose with stainless steel overbraid with threaded stainless steel pipe fittings. No gaskets, O-rings, flares, or similar mechanical joints permitted.

D. Pipe Escutcheons: Provide polished chrome escutcheons on pipe extending through finished walls and ceilings, oversized to meet seismic requirements.

E. 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 chromegate valve with cap and retaining chain.

F. 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.

G. Sprinkler Guards: Standard manufacture.

H. Floor Control Station: Assembly consisting of shutoff valve with tamper switch, flow switch, test valve and drain valve.

I. Water Service Connection Backflow Preventer:

1. Connect to fire water service with code approved double check valve assembly made up of two internally spring loaded check valves, indicating monitored shut-off valves and test cocks.

2. When required by serving utility, include a smaller bypass double check assembly and meter with remoter readout.

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 INSTALLATION

A. Connect to water supply source as shown on Drawings, check adequacy, and call any deficiency to attention of Architect. Verify underground piping has been flushed. 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 bend hanger rods. Provide seismic restraints and flexible connections in accordance with building code requirements.

D. Do not drill or punch flanges of beams, purlins, joists, etc. for hangar attachment without written permission from the structural engineer. Coordinate with the structural engineer for written criteria for drilling of holes in joists and beams for passage of sprinkler piping.

E. Locate sprinkler heads in repeating, modular pattern, centered and accurately coordinated with ceiling grid as indicated. Conceal all piping unless indicated otherwise. Coordinate design with lighting and exposed HVAC duct layout in areas without ceilings.

F. Maintain clearances between sprinkler heads and ceiling mounted items such as light fixtures. Use of pendant sprinklers to reduce clearances will not be permitted.

G. Flexible sprinkler head drops, including attachment brackets, shall be installed in accordance with the manufacturer’s 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 when located in the riser room. Mount hydraulic calculation placard in visible location on each riser.

J. Securely anchor the air compressor 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. All exposed piping and hangers shall be painted under Division 9.

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: Minimum NFPA Figure 24.1 information per NFPA 13.

END OF SECTION 21 13 00