

SECTION 21 13 00 - FIRE SUPPRESSION SPRINKLER SYSTEM

PART 1 - GENERAL

DESCRIPTION

The provisions of the General Requirements, Supplementary Requirements, and Division 1 apply to the plumbing work specified in this Division.

The requirements of this section apply to the fire suppression system.

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.

QUALITY ASSURANCE

Contractor Qualifications:

Established fire protection contractor regularly engaged in the design and installation of automatic fire sprinkler systems.

Employ workers experienced and skilled in this trade.

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.

Drawings shall be sealed by a licensed Professional Engineer experienced in fire protection.

Governing Agency: All work in accordance with and accepted by the following hereafter referred to Governing Agencies:

Fire Marshal State of Oregon.

Fire Marshal for City of Salem.

Design Requirements:

Comply with the latest issue of NFPA Standard 13. **Comply with NFPA 24 for underground utilities.**

Design, lay out and install a hydraulically calculated wet pipe system utilizing code approved automatic devices designed particularly for use in this type of system.

Provide hydraulic calculation methods design data information in accordance with Chapter 8, NFPA 13. Include a 10 percent margin of safety for available water pressure and flow rate. Include all friction losses from point of flow test to remote sprinkler area.

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

Auto shop and diesel shop.

Window sprinklers at rated walls with sprinklers. See Drawings for location.

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

Shop and Construction Areas are Ordinary Hazard Group 2.

Classrooms are Light Hazard.

Seismic Restraint: Include load calculations for seismic restraints on drawings. **Seismic importance factor for new additions is 1.5. For remodeled areas seismic importance factor is 1.0.**

Revisions to the Contractor's design required by the Governing Agency shall be at the Contractor's expense.

Flow and pressure information on the Drawings is based on testing prior to looping of the water mains on site (see Civil Drawings). Contractor shall perform flow tests after looping is completed if other data is used for hydraulic calculation.

See Drawings for areas where fire sprinkler system is to be modified for improvements under seismic alternate.

See Drawings for Alternate related to fire protection riser at new South addition.

Acceptable Manufacturers: All sprinkler specialty material Grinnell/Gem, Central, Reliable, Globe, Star, 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.

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.

WORK OF OTHER CONTRACTS

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.

WORK OF OTHER DIVISIONS

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.

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.

Provide AutoCAD drawings and files to other trades for coordination. Prepare accurate shop drawings showing the actual physical dimensions required for the installation. Submit prior to purchase/fabrication/installation of any of the elements involved in the coordination.

Coordination of piping and heads is particularly critical in auditorium. Review all auditorium drawings in preparation of design.

SUBMITTALS

Working Drawings:

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 comply with the requirements of Chapter 8, 2013 NFPA 13, irregardless of the edition adopted by the Governing Agencies and used for design. Plans shall be stamped and signed by the licensed Professional Engineer responsible for the design.

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

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

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

Then provide 6 sets of approved Drawings to the Architect for final review.

Submittals:

Sprinkler Heads: Product data for each type of head.

Alarm flow or pressure switches.

Fire department connection.

Backflow prevention valve assembly.

System control valves.

Piping materials.

Alarm bell.

Miscellaneous equipment.

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

EXTRA STOCK

Additional Heads: Provide number, type and temperature rating installed as required to meet NFPA 13 requirements.

Storage Cabinet: Provide as required to receive reserve sprinkler heads and special installation tools required.

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.

WARRANTY

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.

Where the manufacturer's guarantee exceeds one year, the longer guarantee shall govern and include the Contractor's labor.

Warranty period shall start when all phases of construction are complete.

PART 2 - PRODUCTS**MATERIALS AND EQUIPMENT**

Miscellaneous Sprinkler Specialties: Complete system including all items required by the Governing Agency including but not limited to:

Electric alarm switch and indoor and outdoor 120 V alarm bell or water motor gong.

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

Fire department hose connections.

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.

Water Service Connection Backflow Preventer:

Connect to primary water service with code approved double check valve assembly made up of two brass, internally spring loaded check valves, shut-off valves and test cocks. Valves shall be approved by serving jurisdiction. Provide with integral tamper switches allowing direct connection to the fire alarm system.

When required by serving utility, include a smaller bypass double check assembly and meter. Install backflow preventer in a precast concrete vault indicated on the Drawings. See civil drawings for more information.

Sprinkler Heads: Approved heads with temperature ratings required for service indicated. All shall be quick response early suppression type and rated heads.

Unfinished Areas: Upright, pendant or sidewall spray type, plain bronze.

Finished Areas: Chrome plated recessed and sidewall heads in finished ceilings, and where piping is exposed use chrome plated upright heads.

Dry pendant or dry sidewall heads for small areas subject to freezing. Chrome plated at interior finished locations and plain bronze in unfinished areas and exterior locations.

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.

Escutcheons: Provide polished chrome escutcheons on pipe extending through finished walls and ceilings. Provide oversized escutcheon to comply with current code.

Underground Water Piping: Materials and installation methods shall comply with NFPA 24. 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. Where acceptable to the serving utility, PVC pipe and fittings, Class 200, AWWA C900, may be installed 5 feet outside of the building line.

Above Ground Water Piping: Use standard weight (schedule 40) black or galvanized 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. Galvanized pipe required for dry system.

At Contractor's option, Schedule 10 black or galvanized 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. Galvanized pipe required for dry system.

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. Galvanized pipe required for dry system.

Valves: UL and/or FM listed for fire protection service.

Iron body OS&Y pattern, bronze mounted double disc, parallel seat.

Iron body butterfly style with EPDM liner, bronze disc with lever or indicating type gear operator.

Bronze body ball valve, three-piece design, with approved operator.

Where required by Governing Agency, provide wall or post style indicating valves.

Standpipe Valves: Angle or straight pattern rough brass gate valve with cap and retaining chain.

Valve Monitoring Switches: Provide approved monitoring switches where shown on the Drawings or required by Governing Agency. In vaults and other areas where flooding conditions may occur, provide submersible type switches.

Guards: Standard manufacture.

Fire Department Connection: Exposed/Free standing with riser sleeve, 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.

PART 3 - EXECUTION**INSTALLATION**

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 23.

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 hereinbefore specified Underwriters Laboratories, Inc. and NFPA standards.

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. Provide seismic restraints and flexible connections in accordance with building code requirements.

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.

Locate and install the required fire sprinkler alarm, flow, and test and drain valves where required by the Governing Agency.

Where sprinkler lines penetrate fire rated partitions, provide fire stopping system in accordance with Section 22 05 00.

Where sprinkler lines penetrate classroom or auditorium walls, provide acoustic seal. See Section 22 05 00 for more information.

TEST

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

Test to be performed on all new and existing systems in the building.

PAINT

Paint all exposed piping and hangers in accordance with Section 09 91 00. Do not paint heads.

CERTIFICATE OF COMPLETION

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.

Certificate: Minimum NFPA Figure 16-1 information per NFPA 13.

Provide a laminated drawing on the wall near the riser showing the zones served by each riser.

END OF SECTION 21 13 00