DIVISION 21: FIRE SUPPRESSION

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SECTION 21 0500 - COMMON REQUIREMENTS FOR FIRE SUPPRESSION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Pipe, fittings, valves, and connections for sprinkler systems.

1.2 SUMMARY

A. Furnish and install an automatic fire sprinkler protection system as described in Contract Documents.
   1. Heads shall be installed as shown and work shall include but not necessarily be limited to the following areas:
      a. Replacement of existing fire sprinkler heads

1.3 RELATED REQUIREMENTS

A. Section 09 9123 - Painting: Preparation and painting of fire protection piping systems.

B. Section 21 1300 - Wet Pipe Fire Suppression Sprinklers: Sprinkler systems design.

1.4 REFERENCE STANDARDS

A. ASTM A 795/A 795M - Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use; 2008.

B. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2010.

C. NFPA 13 - Standard for the Installation of Sprinkler Systems; National Fire Protection Association; 2010.

D. UL (FPED) - Fire Protection Equipment Directory; Underwriters Laboratories Inc.; current edition.

E. UL 262 - Gate Valves for Fire-Protection Service; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

F. UL 312 - Check Valves for Fire-Protection Service; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

1.5 APPLICABLE CODES AND ORDINANCES

A. The following form a part of this specification:
   1. National Fire Protection Association Pamphlets: Standards of the National Fire Protection Association for the Installation of Sprinkler and Fire Protection Equipment.
      a. Pamphlet No. 13, 13D, 13R, 14, and applicable standards.
      b. Pamphlet No. 231, 231C and applicable standards.
      c. And as approved over this geographical area
   2. International Building Code
   3. International Fire Code
   4. Underwriter's Laboratories, Inc. Publications: List of Inspected Fire Protection Equipment and Materials.
   5. Applicable state and local codes and ordinances pertaining to fire protection systems and equipment.
   6. Requirements of State Fire Marshal.
   7. Requirements of Local Fire Marshal.
   8. Safety Code for Elevators and Escalators.
   9. Life Safety Code.

B. Work in Idaho must be done by an Idaho licensed sprinkler contractor and plans submitted to and approved by the office of the Idaho State Fire Marshall.

C. The contractor shall notify the Idaho State Fire Marshall and the Local Fire Department to witness the test of the fire sprinkler system.

1.6 FEES AND PERMITS

A. Fees or permits required to furnish and install the fire protection heads shall be included as part of this Section of the Contract Documents.

1.7 SUBMITTALS

A. See General Section – for submittal procedures.

B. Product Data: Provide manufacturers catalogue information. Indicate valve data and ratings.

C. Project Record Documents: Record actual locations of components and tag numbering.

D. Operation and Maintenance Data: Include installation instructions and spare parts lists.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Installer: The sub-contractor for the fire protection system shall be duly licensed by the state, county and city in which the project is being constructed. The fire sprinkler contractor must be engaged in the installation of the types of automatic fire sprinkler system required for this project and be fully familiar with all local conditions, specified codes and requirements. Prior to installation, submit data for approval showing that the Fire Sprinkler Contractor has successfully installed Automatic Fire Sprinkler Systems of the type and design as specified herein.

C. Designer: The designer for the fire sprinkler system shall be a staff employee of the “Installer” and shall be either a licensed Fire Protection Engineer in the State of Idaho, or a Certified Engineering Technician in Fire Protection, Level III (NICET Level III). Registration or certification shall be active during the entire contract period. The designer shall certify that the drawings and installation are in accordance with the intent of the plans and specifications. The designer shall make a complete and final inspection of the installation, including operating all alarms, control valves, checking all piping, seismic bracing, hangers, etc. After checking all components of the system, the designer shall provide a letter stating the installation is complete, operational and in accordance with approved plans and specifications. If changes have been made in the installation since the plans were approved, the designer shall correct the shop drawings and provide as-built drawings to the Owner with the letter.

D. Valves: Bear UL label or marking. Provide manufacturer's name and pressure rating marked on valve body.

E. Products Requiring Electrical Connection: Listed and classified as suitable for the purpose specified and indicated.

F. Final Inspection: The Sprinkler Contractor CET or PE responsible for overseeing this project shall make a complete and final inspection of the installation, checking out all alarms, valves, piping, seismic bracing, hangers, etc., conduct a final main drain test on the system, and provide documentation of this final inspection

PART 2 - PRODUCTS

2.1 FIRE PROTECTION SYSTEMS

A. Sprinkler Systems: Conform work to NFPA 13.

B. Welding Materials and Procedures: Conform to ASME Code.

2.2 ABOVE GROUND PIPING

A. Steel Pipe: ASTM A 795 Schedule 10 or ASTM A 53 Schedule 40, black.
1. Steel Fittings: ASME B16.9, wrought steel or buttwelded.
2. Cast Iron Fittings: ASME B16.1, flanges and flanged fittings, ASME B16.4 and threaded fittings.
3. Malleable Iron Fittings: ASME B16.3 and threaded fittings.
4. Mechanical Grooved Couplings: Malleable iron housing clamps to engage and lock, "C" shaped elastomeric sealing gasket, steel bolts, nuts, and washers; galvanized for galvanized pipe.

2.3 PIPE HANGERS AND SUPPORTS

A. Hangers for Pipe Sizes 1/2 to 1-1/2 inch (15 to 40 mm): Malleable iron, adjustable swivel, split ring.

B. Hangers for Pipe Sizes 2 inches (50 mm) and Over: Carbon steel, adjustable, clevis.

C. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

D. Wall Support for Pipe Sizes to 3 inches (80 mm): Cast iron hook.

E. Wall Support for Pipe Sizes 4 inches (100 mm) and Over: Welded steel bracket and wrought steel clamp.

F. Vertical Support: Steel riser clamp.

G. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

H. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
1.

2.4 DRAIN VALVES

A. Compression Stop:
1. Bronze with hose thread nipple and cap.

B. Ball Valve:
1. Manufacturers:
a. Milwaukee Model BBSC with threaded ends
b. Nibco Model T-505 with threaded ends
c. Nibco Model G-505 with grooved ends
2. Brass with cap and chain, 3/4 inch (20 mm) hose thread.

PART 3 - EXECUTION

3.1 FIRE SPRINKLER CONTRACTOR

A. It is the responsibility of the Fire Sprinkler Contractor to inspect the job site prior to fabricating materials.

3.2 PREPARATION

A. Drain down existing piping for head replacement.

B. Provide fire watch for systems shut down and building is unoccupied.

3.3 INSTALLATION

A. Install sprinkler system and heads, hangers, and supports in accordance with NFPA 13.

B. Areas Subject to Freezing Temperatures:

1. Branches serving these areas may contain a cold weather valve and anti-freeze loop or dry heads.

C. Provide drain valves at main shut-off valves, low points of piping and apparatus.

D. Work shall be executed and inspected in accord with laws, ordinances, rules and regulations of local authorities having jurisdiction over such work. Should any change in the drawings or specifications be required to conform to these ordinances, Fire Sprinkler Contractor shall notify the Architect-Engineer at time of submitting his bid. After entering into the contract, Fire Sprinkler Contractor shall be held to complete all necessary work to meet local requirements without expense to Owner.

E. Sprinkler system shall be installed such that spacing of sprinkler heads in relation to ceiling shall not exceed that permitted for type of ceiling construction involved.

F. Should any cutting of walls, floors, ceilings, partitions, etc., be required for proper installation of the work or apparatus of Fire Sprinkler Contractor, such cutting shall be done at his own expense and in a manner acceptable to Architect-Engineer. All drilling and patching for anchor bolts, hangers, and other supports shall be subject to approval of Architect-Engineer.

3.4 FIELD TESTING

A. All portions of the system shall be hydrostatically tested.

B. Flushing of all existing piping prior to installing new heads shall be done in accord with National Fire Protection Association. Contractor to include price of flushing each building in their bid.

C. On completion of the work, system shall be tested by full flow.

1. Each control valve for each sprinkler system shall be tested by use of an inspector's test valve or the application of heat to sprinkler head most remote from the valve.
2. All alarms and other devices shall be tested.
3. All appliances and equipment for testing shall be furnished by Fire Sprinkler Contractor.
4. Expenses, except for water and electricity used in connection with the tests, shall be defrayed by Fire Sprinkler Contractor.
5. On completion of tests by Fire Sprinkler Contractor, any defects detected shall be corrected by Fire Sprinkler Contractor at his own expense and additional tests made until systems are proved satisfactory.
6. Fire Sprinkler Contractor shall submit to Architect-Engineer a certificate covering materials and tests, similar to that specified by National Fire Protection Association, with a request for formal inspection at least five working days prior to date of inspection. The State and Local Fire Marshalls shall also be notified to witness this test. At such inspection any or all of required tests shall be repeated as directed by the Architect-Engineer.

END OF SECTION 21 0500

SECTION 21 1300 – WET PIPE FIRE SUPPRESSION SPRINKLERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Wet-pipe sprinkler system.

B. System design, installation, and certification.

1.2 RELATED REQUIREMENTS

A. Section 21 0500 - Common Requirements for Fire Suppression: Pipe, fittings, and valves.

1.3 REFERENCE STANDARDS

A. UL (FPED) - Fire Protection Equipment Directory; Underwriters Laboratories Inc.; current edition.

1.4 SUBMITTALS

A. See Section 01 3300 – for submittal procedures.

B. Product Data: Provide data on sprinklers, valves, and specialties, including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.

C. Shop Drawings:
1. Submit preliminary layout of finished ceiling areas indicating only sprinkler locations coordinated with ceiling installation.
2. Indicate hydraulic calculations, detailed pipe layout, hangers and supports, sprinklers, components and accessories. Indicate system controls.
3. Submit shop drawings to authority having jurisdiction for approval. Submit proof of approval to Architect.

D. Project Record Documents: Record actual locations of sprinklers and deviations of piping from drawings. Indicate drain and test locations.

E. Manufacturer's Certificate: Certify that system has been tested and meets or exceeds specified requirements and code requirements.

F. Operation and Maintenance Data: Include components of system, servicing requirements, record drawings, inspection data, replacement part numbers and availability, and location and numbers of service depot.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 01 6000 - Product Requirements, for additional provisions.
2. Extra Sprinklers: Type and size matching those installed, in quantity required by referenced NFPA design and installation standard.
3. Sprinkler Wrenches: For each sprinkler type.

1.5 QUALITY ASSURANCE

A. Maintain one copy of referenced design and installation standard on site.

B. Conform to UL requirements.

C. Designer Qualifications: Design system under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State of Idaho.

D. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

E. Equipment and Components: Provide products that bear UL label or marking.

F. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in shipping containers and maintain in place until installation. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Sprinklers, Valves, and Equipment:
1. Tyco Fire Suppression & Building Products: www.tyco-fire.com.
2. Viking Corporation: www.vikinggroupinc.com.
3. Reliable: www.reliablehvac.com
4. Central: www.aecinfo.com
5. Substitutions: See Section 01 6000 - Product Requirements.

2.2 SPRINKLER SYSTEM

A. Sprinkler System: Provide coverage for entire building.

B. Occupancy: Comply with NFPA 13 for hazard classification.

C. Water Supply: Determine volume and pressure from water flow test data.
1. Revise design with test data available prior to submittals.

D. Storage Cabinet for Spare Sprinklers and Tools: Steel, located adjacent to alarm valve.

2.3 SPRINKLERS

A. Suspended Ceiling Type: Semi-recessed pendant type with matching screw on escutcheon plate.
1. Finish: Enamel, color white.
2. Escutcheon Plate Finish: White.
3. Fusible Link: Fusible solder link type temperature rated for specific area hazard.

B. Concealed Ceiling Type: Fully recessed with surface cap.
1. Finish: Enamel, color white.
2. Surface Cap Finish: White.
3. Fusible Link: Fusible solder link type, temperate rated for specific area hazard.

C. Exposed Area Type: Pendant upright type with guard.
1. Finish: Brass.
2. Fusible Link: Fusible solder link type temperature rated for specific area hazard.

D. Sidewall Type: Semi-recessed horizontal sidewall type with matching screw on escutcheon plate.
1. Finish: Brass.
2. Escutcheon Plate Finish: Brass.
3. Fusible Link: Fusible solder link type temperature rated for specific area hazard.

E. Dry Sprinklers: Standard pendant type with matching screw on escutcheon plate.
1. Finish: Brass.
2. Escutcheon Plate Finish: Brass.
3. Fusible Link: Fusible solder link type temperature rated for specific area hazard.

F. Guards: Finish to match sprinkler finish.

G. Spray Nozzles: Brass with solid cone discharge, 30 degrees of arc with blow-off dust cap.

2.4 SPRINKLER HEADS

A. Sprinkler head orifice sizes shall be in accordance with National Fire Protection Association.

B. Any change in spacing must be in straight rows with lights and walls.

C. Sprinkler heads shall be automatic and conventional (spray) type approved by a nationally recognized testing laboratory.

D. Each head shall have an orifice of nominal 1/2" diameter.

E. Sprinkler heads shall be pendant type where installed above a hung ceiling.

2.5 PROTECTIVE GUARDS

A. Heavy wire protective guard shall be provided for sprinkler heads located in heavy use areas where damage may result including, but not limited to:

B. Gyms, Wrestling rooms

C. Locker rooms

D. Multi-purpose rooms

E. Shops

F. Equipment rooms

PART 3 - EXECUTION

3.1 INSPECTION

A. It is the responsibility of the Fire Sprinkler Contractor to inspect the job site prior to fabricating materials. The Fire Sprinkler Contractor shall coordinate the design with all plans and other contractors so that construction can be done without problems. The Fire Sprinkler Contractor shall call for a meeting with all trades to coordinate and sequence installation with the progress of other mechanical and structural systems and work out spaces for all of the work. By doing so, the project will proceed at the General Contractor’s completion schedule.

3.2 INSTALLATION

A. Install in accordance with referenced NFPA design and installation standard.

B. Install equipment in accordance with manufacturer's instructions.

C. Install system in compliance with methods detailed in NFPA-13, including seismic requirements for Area 3.

D. Submit equipment data sheets for review by the Architect prior to the start of the installation.

E. Fire sprinklers shall be centered in ceiling tile in one direction and a minimum of 4-inches from acoustical ceiling (“T”) grid. Provide piping offsets or flexible offsets as required that meet the code. Install fire sprinkler head guards on fire sprinklers lower than 7-feet above finished floor and as identified in 2.05.

F. Provide white painted escutcheons around exposed piping, where piping passes through walls or ceilings in a finished area.

G. Field Changes: Do not make field changes for head layout or sizing without prior approval, after the approval of the fire sprinkler drawings.

H. Flush entire piping system of foreign matter prior to installing new heads.

I. Hydrostatically test entire system.

J. Require test be witnessed by Fire Marshal.

K. Conduct an inspection and operational test at the end of the one-year warrantee period in accordance with NFPA-25. Provide a written report to the Owner at the completion of the inspection.

3.3 ACCEPTANCE

A. Acceptance of installation is subject to final inspection and approval by:
1. Idaho State Fire Marshal's Office.
2. Local Fire Department.
3. Architect or his Representative

END OF SECTION 21 1300

END OF DIVISION 21