SECTION 13900 – FIRE PROTECTION

PART 1: GENERAL

1.01 WORK TO BE PREFORMED

A. The work described in this Performance Specification consists of providing all labor, materials, equipment permits, transportation, inspections, incidentals and services necessary and required to design, determine adequacy of the existing utilities to serve this system, fabricate, install, test, and secure required approvals of a complete automatic fire extinguishing system where shown on the Drawings, as specified herein, and as needed for a complete and proper installation in accordance with pertinent requirements of the Fire Rating Bureau and governmental agencies having jurisdiction. Any material not specifically mentioned in this specification or not shown on drawings but required for proper performance and operation shall be furnished and installed. The directives and guidance provided by the Applicable Publications listed below will be considered MINIMUM standards. Where a greater level of performance or protection is required by the drawings or specifications, then the greater level will be taken to be the minimum standard required by these contract documents. In no case shall any indicator or directive within the Drawings or Specification be taken to be a request or directive below minimum code requirements. Should there be a conflict between minimum code requirements and Contract Document requirements, apply to the Architect/Engineer for resolution.

B. Work includes, but is not limited to:

1. Provide, design, fabricate, and install a complete hydraulically calculated fire protection automatic wet sprinkler system for total building coverage of the new retail stores for two buildings, Portland, Maine in accordance with the standards of these specifications. The system is to be designed for light hazard in all areas, except utility storage and mechanical areas. The entire roof, all rooms, shafts, spaces above ceilings (except where NFPA 13 provides an exception) and hallways shall be protected.

2. Provide drawings of the system which shall be reviewed by and acceptable to Fire Rating Bureau of the State of Maine and State Fire Marshal having jurisdiction and the City of Portland Fire Department.

3. Work begins at flanged outlet left by others in a plumb and level position above the floor in the Recieve/Utilities Room where shown on the drawings.

4. Provide glycol loops for sprinklers installed in areas subject to freezing temperatures.

5. Provide quick-response heads throughout building.

6. Provide test data verifying adequacy of water supply pressure and flow for the expanded system.

The Contractor shall satisfy himself of an adequate water supply in designing the system and shall confirm this through the City of Portland Water District. Submit both static and dynamic data for records, as well as backflow preventer approved by City of Portland Water District.

1.02 RELATED WORK

A. Section 01045 – Cutting and Patching

B. Division 15 – Mechanical

C. Division 16 - Electrical

D. Section 16721 – Fire Alarm Systems

1.03 QUALITY ASSURANCE

A. Qualification of Installers: The entire fire protection automatic sprinkler system shall be fabricated, installed and tested by a Maine licensed Contractor qualified to install sprinkler systems. He shall submit evidence of his qualifications upon request.

B. Codes and Standards Publications [current edition being enforced by authority having jurisdiction];

1. NFPA 13: Installation of Sprinkler Systems

2. NFPA 70: National Electric Code

3. NFPA 70A to E: Protective Signaling Systems

4. NFPA 101: Life Safety Code

5. B.O.C.A.: Building Code

6. Factory Manual (FM) Approval Guide

7. Underwriters Laboratories, Inc. (UL)

8. State Fire Marshall's Office – Publications and Directories.

1.04 SUBMITTALS

A. Shop Drawings:

1. Prior to the submittal for Architect/Engineer's review, secure the approval and stamp of review of the Fire Rating Bureau having jurisdiction.

2. Before any fire sprinkler system materials are fabricated, submit complete layout and shop drawings to, and obtain approval from, the Architect/Engineer in accordance with the requirements of the General Conditions and Supplementary Conditions of these specifications.

3. Upon request, the Architect/Engineer will furnish without charge to the Contractor one set of reproducible transparencies or a CAD file of those drawings included in the Contract Documents, which may be suitable for use in preparation of layout drawings.

4. Shop drawings shall include:

a. Layout drawing of the complete overhead sprinkler system including complete hydraulic computer calculations. These drawings shall indicate accurate locations of all piping, sprinkler heads, drain locations and other apparatus associated with this system indicating relationship to architectural conditions, structural conditions, lighting layouts, speaker layouts, detector

layouts, ducts and diffuser layouts, plumbing, mechanical and electrical layouts.

b. All items and data required to be shown by the Fire Rating Bureau having jurisdiction.

c. Complete details and sections as required to clearly define and clarify the design, including a materials list with catalog cuts describing all proposed materials by manufacturer's name and catalog number.

B. As-Built Drawings: During progress of the work, maintain an accurate record of all changes made in the fire sprinkler system installation from the layout and materials shown on the approved shop drawings.

C. Manual: Upon completion of this portion of the work, and as a condition of its acceptance, deliver to the Architect/Engineer for the Owner two copies of a manual describing the system operation and maintenance detail. Prepare manuals in durable plastic binders approximately 8-1/2" X 11" in size with at least the following:

1. Identification on, or readable through, the front cover stating general nature of manual.

2. Neatly typewritten index near the front of the manual, furnishing immediate information as to location in the manual of all emergency data regarding the installation.

3. Complete instructions regarding operation and maintenance of all equipment involved.

4. Complete nomenclature of all replaceable parts, their part numbers, current cost, and name and address of nearest vendor of parts.

5. Copy of all guarantees and warranties issued.

6. Copy of the as-built drawings.

7. Where contents of manuals include manufacturer's catalog pages, clearly indicate the precise items included in this installation and delete, or otherwise clearly indicate, all manufacturer's data with which this installation is not concerned.

D. Operating Instructions Training

1. Schedule an organized training session, prior to the completion of the work, giving detailed instructions to the responsible personnel designated by the Owner, in the operation and maintenance of all work installed under this Section. A letter with two (2) copies containing the name of the person or persons to whom the instructions were given and the dates of the instruction period (s) shall be submitted to the Owner. The Owner may wish to videotape the instructional training session.

1.05 PRODUCT HANDLING

A. Protection: Use all means necessary to protect fire sprinkler system materials before, during, and after installation and to protect the installed work of all other trades.

1. All materials shall be transported, stored, protected and handled in accordance with the manufacturer's instructions.

2. The Sprinkler Contractor shall be responsible for the care and protection of all work included under this Section until it has been tested and accepted.

3. Protect all equipment and materials from damage from all causes including theft. All materials and equipment damaged or stolen shall be repaired or replaced with equal (the same) material or equipment at no cost to the Owner.

4. Protect all equipment, outlets and openings with temporary plugs, caps, and covers. Protect work and materials of other trades from damage that might be caused by work or workmen and make good damage thus caused.

5. The Sprinkler Contractor shall be responsible for all consequent damage caused by his work or workmen to the materials and/or others.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect/Engineer and at no additional cost to the Owner.

1.06 GUARANTEE

A. This contractor shall guarantee all materials and workmanship furnished by him or his Subcontractors to be free of defects for a period of one year from the date of final acceptance of the completed systems and shall make good, repair or replace any defective work which may develop within that time at his own expense and without expense to the Owner.

B. The warranty shall include parts, labor, prompt (24 hour) field service, pickup and delivery. Upon receipt of notice from the Owner of failure of any component during the guarantee period, the system shall be repaired/replaced (as appropriate) promptly with new parts including all damage to areas, material and other systems resulting from such failures. Any equipment requiring excessive service shall be considered defective and shall be replaced.

PART 2: PRODUCTS

2.01 DESIGN

A. General:

1. All materials furnished under this Section shall be U.L. listed and/or F.M. approved and shall meet the requirements of all agencies having jurisdiction.

2. The design shall be complete in all regards and shall include, but not necessarily be limited to, all required valves, fittings and other items for coverage.

3. Sprinkler work shall be laid out to adequately cover the areas of the building in accordance with the requirements of all authorities having jurisdiction over its installation and to afford adequate clearance with the work of the Heating, Ventilating, Plumbing and Electrical Contractors. Piping shall generally be run parallel to walls and girders. Before installing any piping, the Sprinkler Contractor shall consult with the Contractors for the other trades to avoid interfering with their work, and he shall be responsible for any expense involved due to negligence in not so doing.

4. All piping in areas having ceilings shall be concealed including supply mains through finished areas.

B. Specific:

1. Under the base bid, a fully operating sprinkler system shall be installed with complete above ceiling coverage.

2. Provide a tee off the main for each tenant space to service future tenant fit up.

2.02 MATERIALS

A. The quality of materials required for this installation shall be that required by the agencies having jurisdiction.

1. SPRINKLER HEADS:

a. All sprinkler heads shall be quick response U.L. listed sprinklers and shall be ordinary type tested in accordance with UL-199. Sprinkler heads shall be of the required temperature rating for space usage.

b. Finished areas: Commercial Quick Response, Recessed, Pendent & Sidewall, Automatic Sprinkler Heads - with recessed escutcheon, support cup and head to be painted white by manufacturer.

c. Unfinished Areas (closets, etc.): Commercial Quick Response, Pendent, Upright & Sidewall (completely heated areas), with brass finish.

d. Unfinished & Mechanical Areas: Upright or Pendent, Automatic Sprinkler with brass finish.

e. In addition to the heads actually required for system, Contractor shall furnish three (3) extra sprinkler heads of each type, finish and temperature rating used and two suitable wrenches, all contained in a metal cabinet. The cabinet shall be installed in the same room as the sprinkler entrance valve.

f. Sprinkler Guards: Provide and install sprinkler guards in all areas where sprinklers might be subject to mechanical damage. Units to be compatible with sprinkler heads.

2. ALARM VALVE:

a. Approved wet pipe valve complete with all trim shall be furnished and installed where indicated on the drawings.

b. Water motor gong shall be installed in location approved by the Architect/Engineer.

c. Approved O.S. and Y. gate valve shall be installed on street side of the alarm valve. Supply and install supervisory switch on valve.

3. Fire Department Connection: Siamese fire department connection shall be provided and installed with the required check valve and automatic drip, located as indicated on architectural drawings.

4. PIPE:

   a. Sprinkler piping shall be all metal and in accordance with NFPA Standard #13

5. VALVES:

   a. All valves shall be the product of one approved manufacturer and shall be designed for pressures suitable for the duties to be imposed upon them in the system. They must be in accordance with the requirements of authorities having jurisdiction over the work.

   b. All shut-off valves on system shall have supervisory switches furnished and installed.

6. FITTINGS:

   a. All fittings shall be the products of an approved manufacturer's standard weight and shall be designed for pressure suitable for the duties to be imposed upon them in the system.

   b. Screwed fittings shall have clean cut tapered threads.

   c. Fittings shall conform to the requirements of NFPA No. 2, Chapter 3.

7. PIPE HANGERS:

   a. All horizontal piping shall be supported at intervals required by NFPA Standard # 13.

   b. All vertical piping shall be securely anchored and provided with alignment guides where necessary.

   c. Pipe hangers shall be of the type approved and listed in NFPA Standard # 13.

   d. Pipe shall not be supported from piping of other trades.

8. SLEEVES AND ESCUTCHEONS:

   a. Contractor shall set sleeves for all piping penetrating walls and floors. Sleeves through masonry shall be steel pipe sleeves two sizes larger than the pipe. Piping passing through walls other than masonry shall be provided with # 24 gauge galvanized steel tubes with wired or hemmed edges.

   b. Sleeves set in concrete floors shall finish flush with the underside but extend a minimum of one inch above the finish floor. Sleeves set in partitions shall finish flush with each side.

   c. Where piping passes through finish walls, floors, ceilings and partitions, provide and set two piece nickel-plated steel floor and ceiling plates. Head escutcheons in finished areas shall be painted white by the manufacturer.

   d. Space between sleeves and pipes shall be caulked with high temperature rope to make smoke and water tight.

e. Points of penetration of piping through fire rated or smoke retardant walls, floors and ceilings shall be through iron pipe sleeves. Sleeves shall be of the next clearance size.

1. Fill space between sleeve and pipe with fire barrier caulking to prevent smoke or fire passage. Sealant shall be "FIBERFRAX" fire putty ceramic fiber by Carborundum Company or approved equal and installed in accordance with the manufacturer's instructions.

9. FLOW SWITCHES: Furnish and install a water flow detector to indicate system water flow. Flow switches have 0 to 60 second retard devices set at a minimum of 30 seconds.

10. ELECTRICAL ALARMS:

a. Electrical contacts, supervisory switches on all valves shall be supplied and installed.

b. Connection to the alarm and supervisory contacts and all wiring shall be provided under this section.

2.03 EXPANSION AND CONTRACTION

A. Long runs of pipe shall be provided with suitable means to permit free movement resulting from expansion and contraction of the pipe.

2.04 INSPECTORS TEST AND DRAIN

A. Provide and install an Inspectors Test connection as required by NFPA Standard #13. Also provide the necessary main drains and auxiliary drains at all points in the system.

2.05 BACKFLOW PREVENTER

A. Provide testable double check valve type, Watts model 709, or approved equal.

2.06 VALVE TAGS, IDENTIFYING SIGNS, ETC.

A. Provide and install at every valve an engraved brass or plastic valve tag (minimum 2" dia.) attached to the valve stem with a brass chain or plastic fastener, bearing the legend "FP #" (# shall be a series of discrete sequential numbers assigned to individual valves for identification). Acceptable Manufacturer: Seton Name Plate, Corp., or approved equal.

B. Valve identification numbers shall be indicated on the "As Built" plans and on a separate valve chart provided in the maintenance manual and adjacent to the spare sprinkler head cabinet in an aluminum frame, under shatter resistant glass.

C. In addition, identify the function of each valve and element by signage specifically manufactured for this purpose consisting of a pre-painted legend on aluminum sheet attached using aluminum wire as a fastener. Acceptable Manufacturer: Pasco Specialty & Mfg., Inc., or approved equal.

2.07 PIPE IDENTIFICATION

A. Identify piping as specified herein. Identification markers for piping ¾ inch up to and including 5 inch shall be Setmark Type SNA. Piping 5 inch and above shall be identified with Setmark Type STR laminated plastic marker.

B. Exposed piping and piping above removable ceiling shall be identified at intervals of 20'-0" and at each change of direction together with an arrow showing the direction of flow.

C. Fire Protection shall be red, with all lettering and arrows colored black. Legend shall read "FP".

PART 3: EXECUTION

3.01 SCOPE

A. It is the intent of these specifications that the Contractor design and install the fire protection systems to meet the specifications contained herein, including the various design and performance criteria delineated, and to be responsible for the actual performance of the system according to these criteria.

B. SPRINKLER DESIGN CRITERIA:

1. The automatic sprinkler system for the building including modified areas shall conform to the requirements of NFPA and BOCA.

2. Penetrations of rated assemblies shall be fire stopped.

3. Installation of the sprinkler system shall not be started until complete plans and specifications (including water supply information) have been approved.

4. At various stages and upon completion, the system must be tested in the presence of the enforcing agency.

5. In general, the system shall be a fully automatic wet pipe system with waterflow switches for main entrance and for each building zone and utilizing anti-freeze loops for unheated areas. This system shall provide full coverage in all rooms, corridors, chases, shafts, blind spaces, etc., for the entire building.

6. Occupancy Classification for submission (Note: All data marked with an asterisk (*) shall be filled in and approved by regulating agency).

   a. (*) Hazard, Groups (*) maximum area of (*) square foot area of application.

   b. Minimum discharge density of (*) gpm/sq. ft. over the most hydraulically remote (*) square foot area of application.

   c. Maximum average discharge density of (*) gym/sq. ft. over any (*) square foot area of application.

   d. The hydraulic data used in the hydraulic calculations. Data based on existing building service.

7. The actual layout is the responsibility of the Contractor.

8. The Contractor shall prepare system hydraulic calculations and submit them with the construction shop drawings. The calculations shall be prepared as indicated in NFPA Standard #13. Calculations shall be prepared for as many areas of

application as necessary to demonstrate to the satisfaction of the Architect/Engineer that the design meets the criteria as outlined herein.

9. No construction work shall be done without hydraulic calculations and working plans approved by the Architect/Engineer. No materials without the Architect/Engineer's approved submittals shall be installed.

3.02 SURFACE CONDITIONS

A. Inspection:

1. Prior to commencement of each stage of the fire sprinkler system installation, carefully inspect installed work of all other trades and verify that all such work is complete to the point where installation may properly commence.

2. Verify that fire sprinkler system may be installed in complete accordance with all pertinent codes and regulations and the approved shop drawings.

A. Discrepancies:

1. In the event of discrepancy, immediately notify the Architect/Engineer.

2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been completely resolved.

3.03 CUTTING AND PATCHING

A. All cutting and patching incidental to the installation of the apparatus and work shall be executed by this Contractor, who shall furnish the Owner with all locations and details as required.

3.04 INSTALLATION

A. Install the complete fire sprinkler system in strict accordance with all pertinent codes and regulations and the requirements of the Fire Rating Bureau having Jurisdiction.

B. No construction work shall be done without hydraulic calculations and working plans approved by the Architect/Engineer. No materials without the Architect/Engineer's approval submittals shall be installed.

C. Sprinkler Systems:

1. All piping shall be cut accurately to measurements obtained at the site of the system and shall be installed without springing, forcing, bending or crimping. All piping shall be protected against mechanical injury in a manner that is satisfactory to the authorities having jurisdiction.

2. All exposed and concealed horizontal lines of pipe shall be carried on specified hangers properly spaced and set to allow the pipe to adjust for expansion and contraction. Trapeze hangers shall be used for supporting groups of pipes. Piping in parallel shall be evenly spaced and supported.

3. All piping shall be concealed in ceilings, furred walls and partitions, and pipe spaces, except where specifically noted otherwise. All piping runs shall be checked before hand and with all other trades to ensure clearance. Provide maximum

headroom and run piping to maintain proper clearance for maintenance and to clear openings in exposed areas. Piping shall be run in strict coordination with mechanical ducts and equipment, structural, and architectural conditions. When other work prevents installation of the piping, the Contractor shall reroute piping as directed by the Architect/Engineer at no increase in contract price. The Contractor shall verify all inverts and pitched lines of other trades before starting work.

4. Piping shall be installed parallel to or at right angles with the building's walls and shall be tight to walls or columns wherever possible, except where otherwise shown on the drawings. Piping exposed on walls or columns shall be secured with Super Strut, Unistrut, or approved equal.

5. No valve and no piece of equipment or trim shall support the weight of any pipe. All valves and other trim shall be installed in accessible locations.

6. Coordination and Clearances: The installation shall fit into the spaces provided. It is the essence of this contract that all work be completely coordinated with other trades and that all lines, grades, slopes, and vertical and horizontal locations of pipes be exactly determined in the field and cleared with all other trades before installation of these items is begun. Install all piping and equipment allowing for work by other trades.

7. Identification: All valves and devices in sprinkler system shall have permanent tags indicating their purpose.

3.05 FLUSHING

A. Fire Protection Systems: After completions of all work in each section of the water-piping systems and prior to testing, thoroughly flush all piping to remove all foreign materials and to thoroughly clean the piping.

3.06 TESTING

A. Upon completion of the fire sprinkler system installation, furnish all personnel and equipment required and test and retest the complete system, making all adjustments necessary to secure the approval of the Fire Rating Bureau and Fire Marshal having jurisdiction. Report testing on the forms approved by NFPA Standard #13 for above ground piping.

B. Testing shall include all new sprinkler piping in the building.

3.07 ACCEPTANCE

A. After the fire sprinkler system has been completely approved, secure a letter of final acceptance from the Fire Rating Bureau having jurisdiction and deliver three copies of the letter to the Architect/Engineer.

3.08 CLEANING

A. Thoroughly clean all exposed portions of all equipment at conclusion of work.

B. Remove all shipping and other temporary labels from equipment.

****END OF SECTION****