

SECTION 15300

FIRE PROTECTION

PART 1 – DESIGN DIRECTIVES

1.1 DESIGN CRITERIA

- A. Dartmouth College is currently insured by Factory Mutual. References to 'the owner's insurance company' in this specification refers to the aforementioned.
- B. Consultants and contractors shall obtain from the Town of Hanover Fire Department a copy of the Sprinkler System Guidelines and Regulations for the Installation or Modifications of Automatic Sprinkler and Standpipe Systems.
- C. The consultant is required to confer with the Town of Hanover Fire Department prior to designing to ascertain the design concept. Topics to be discussed are:
  - 1. Hazard group(s).
  - 2. Fire Department connection(s).
  - 3. General piping layout concept.
  - 4. The consultant shall document the decisions made during the meeting and copy Dartmouth College FO&M representative.
- D. The consultant shall provide an overview of the scope of work simply stating what the project consists of for the sprinkler contractor. The consultant shall indicate on the drawings the location of the water entrance, standpipe riser, all zone valves, and locations of major pipe routings.
- E. The contractor/designer shall coordinate with the Hanover Fire Department prior to designing the project to review the concepts documented by the consultant and to further elaborate on any special project considerations. A set of construction drawings shall be submitted to the Hanover Fire Department for approval prior to any installation work.
- F. A set of construction drawings & hydraulic calculations shall be submitted to the owner's insurance company for review. Submittal shall be made via the DC Project Manager via DC-Business Affairs.
- G. Main drains, gang drains, and inspector's tests shall drain to the exterior of the building in a location suitable to the owner. These drains can not be run to janitor or mop sinks. Auxiliary drains may be run to janitor or mop sinks provided there s a valve to throttle the flow rate.

1.2 SUBMITTALS

- A. Product Data for each type sprinkler head, valve, piping specialty, fire protection specialty, fire department connection, hose and rack, and hose cabinet specified.
- B. Shop Drawings prepared in accordance with NFPA 13 and owner's insurance company identified as "Working Plans," including hydraulic calculations.
- C. Maintenance Data for each type sprinkler head, valve, piping specialty, fire protection specialty, fire department connection, hose and rack, and hose cabinet specified, for inclusion in operating and maintenance manual.
- D. Welders' qualification certificates.
- E. Installer qualifications (refer to Quality Assurance).

- F. Test Reports and Certificates include "Contractor's Material & Test Certificate for Aboveground Piping" and "Contractor's Material & Test Certificate for Underground Piping" as described in NFPA 13.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Installation and alterations of fire protection piping, equipment, specialties, and accessories, and repair and servicing of equipment shall be performed only by a qualified installer. The term "qualified" is defined as being experienced in such work (experienced being a minimum of five previous projects similar in size and scope to this project), familiar with all precautions required, and has successfully completed the necessary examinations and courses required by the authorities having jurisdiction
- B. Project designer must be level 3 NICET (National Institute for Certification in Engineering Technologies) certified or pre-approved by Dartmouth College prior to bidding. Non level 3 pre-approved contractors are as follows:
  - 1. John L. Carter Sprinkler Co., Bow, NH
- C. Regulatory Requirements: Comply with the requirements of the following codes:
  - 1. NFPA 13 - Standard for the Installation of Sprinkler Systems.
  - 2. NFPA 14 - Standard for the Installation of Standpipe and Hose Systems.
  - 3. NFPA 1963 - Screw Threads and Gaskets for Fire Hose Connections.
  - 4. Fire protection system materials and components shall be Underwriter's Laboratories listed and labeled.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide fire protection system products from one of the following:
  - 1. Gate Valves:
    - a. Fairbanks
    - b. Jenkins
    - c. Kennedy Valve, Div of ITT Grinnell Valve Co., Inc.
    - d. Stockham
    - e. Viking Corp.
  - 2. Swing Check Valves:
    - a. Fairbanks
    - b. Jenkins
    - c. Kennedy Valve, Div of ITT Grinnell Valve Co., Inc.
    - d. Stockham
    - e. Viking Corp.
  - 3. Grooved Mechanical Couplings:
    - a. Grinnell Corporation
    - b. Victaulic Company of America

4. Backflow Preventers
  - a. Watts
  - b. Ames
  
5. Water Flow Switches:
  - a. Potter Electric Signal Co.
  
6. Water-Motor Gongs:
  - a. Reliable Automatic Sprinkler Co., Inc.
  - b. Viking Corp.
  
7. Air-Pressure Maintenance Device, Dry-Pipe System:
  - a. Reliable Automatic Sprinkler Co., Inc.
  - b. Viking Corp.
  
8. Dry-Pipe Valves:
  - a. Reliable Automatic Sprinkler Co., Inc.
  - b. Viking Corp.
  
9. Alarm Check Valve:
  - a. Reliable Automatic Sprinkler Co., Inc.
  - b. Victaulic
  - c. Viking Corp.
  
10. Hose Outlet Valves:
  - a. Guardian Fire Equipment, Inc.
  - b. United Brass
  - c. Viking Corp.
  
11. Fire Department Connection Valve:
  - a. Guardian Fire Equipment, Inc.
  - b. United Brass
  - c. Viking Corp.
  
12. Sprinkler Heads:
  - a. Automatic Sprinkler Corp of America.
  - b. Firematic Sprinkler Devices, Inc.
  - c. Guardian Automatic Sprinkler Co., Inc.
  - d. Reliable Automatic Sprinkler Co., Inc.
  - e. Viking Corp.

**2.2 PIPE AND FITTING MATERIALS**

- A. The following schedule indicates the pipe and fittings to be used on this project:

ITEM	SIZE	ASTM SPEC NO.	MATERIAL WEIGHT & TYPE
Pipe	≤2"	A53, grade B, type S or E	Schedule 7, 10, or 40, ANSI B36.10
	>2"	A53, grade B, type S or E	Schedule 10, ANSI B36.10
Fittings	≤2"	A126, class B cast iron	Standard, threaded, B16.4
	All Sizes	A536, ductile Iron	synthetic rubber gaskets
Flanges	≤2"	A105, forged carbon steel	class 150, RF, threaded, ANSI B16.5
	>2"	A105, forged carbon steel	class 150, RF, weld neck or slip on, ANSI B16.5
Bolts		A193, grade B7 carbon steel	Hex head (ANSI B18.2.1), B1.1, class 2A course thread
Nuts		A194, Grade 2H, Carbon steel	Heavy hex (ANSI B18.2.2), B1.1, class 2B course thread
Gaskets	Per flange standard	A304, stainless steel, Grafoil filled, spiral wound	class 150, RF, ring style, ANSI B16.20

- B. Amend above piping systems, where required, to galvanized pipe where required by the owner's insurance carrier.
- C. Grooved mechanical couplings shall consist of ductile or malleable iron housing, a synthetic rubber gasket of a central cavity pressure-responsive design; with nuts, bolts, locking pin, locking toggle, or lugs to secure roll-grooved pipe and fittings. Grooved mechanical couplings including gaskets used on dry-pipe systems shall be listed for dry-pipe service.

**2.3 GENERAL DUTY VALVES**

- A. Gate Valves - 2 Inch and Smaller: body and bonnet of cast bronze, 175 pound cold water working pressure - non-shock, threaded ends, solid wedge, outside screw and yoke, rising stem, screw-in bonnet, and malleable iron handwheel. Valves shall be capable of being repacked under pressure, with valve wide open.
- B. Gate Valves - 2-1/2 Inch and Larger: iron body; bronze mounted, 175 pound cold water working pressure - non-shock. Valves shall have solid taper wedge; outside screw and yoke, rising stem; flanged bonnet, with body and bonnet conforming to ASTM A 126 Class B; replaceable bronze wedge facing rings; flanged ends; and a packing assembly consisting of a cast iron gland flange, brass gland, packing, bonnet, and bronze bonnet bushing. Valves shall be capable of being repacked under pressure, with valve wide open.
- C. Butterfly Valves: Class 300, ductile iron body and disk conforming to ASTM A-536, EPDM coated disk, hand wheel for slow acting applications, lever for quick acting applications.
- D. Swing Check Valves: MSS SP-71; Class 175, cast iron body and bolted cap conforming to ASTM A 126, Class B; horizontal swing, with a bronze disc or cast iron disc with bronze disc ring, and flanged ends. Valve shall be capable of being refitted while the valve remains in the line.
- E. Low Point Drain Valves: Refer to DC Standards, 'VALVES' for specifications.

**2.4 SPECIALTY VALVES AND MANIFOLDS**

- A. Alarm Check Valve: 175 psig working pressure, designed for horizontal or vertical installations, and have cast iron, flanged inlet and outlet, bronze grooved seat with "O" ring seals, single hinge pin and latch design. Provide trim sets for bypass, drain, electric sprinkler alarm switch, pressure gages, precision retarding chamber, drip cup assembly piped with check valve to main drain line, and fill line attachment with strainer.
- B. Dry-Pipe Valves: Differential type, 175 psig working pressure, and have cast iron, inlet and outlet to suit project piping system, bronze seat with "O" ring seals, single hinge pin and latch design. Provide trim sets for air supply, drain, priming level, alarm connections, ball drip valves, pressure gages, priming chamber attachment, and fill line attachment.
- C. Air-Pressure Maintenance Device, Dry-Pipe System: An automatic device to maintain the correct air pressure in a dry-pipe system or deluge system. System shall have shut-off valves to permit servicing without shutting down the sprinkler system, pressure regulator or switch to maintain system pressure, strainer; pressure ratings 14 to 60 psig adjustable range, and 175 psig maximum inlet pressure. Pressure ratings for quick opening systems shall be 5 psig. Electrical ratings shall match compressor ratings.
- D. Detector Check Valves: Galvanized cast iron body, with a bolted cover with air bleed device for access to internal parts; 175 psig working pressure. One piece bronze disc with bronze bushings, pivot and replaceable seat. Provide threaded bypass taps in the inlet and outlet for bypass meter connection. Valve shall be set to allow minimal water flow through the bypass meter; when major water flow is required, the water pressure will fully open the clapper.
- E. Flow Switch Riser Manifold: Factory assembled unit consisting of flow switch, pressure gauge, sight glass on test & drain connection, and relief valve where required for grid systems. Assembly shall be U. L. tested and listed, and painted red with white identification markings indicating flow direction and tapping uses.
- F. Double check valve assembly consisting of shutoff valves on the inlet and outlet and a strainer on the inlet. The assembly shall consist of two positive seating check modules with captured springs and rubber seat discs. Seats and discs shall be replaceable. Include four resilient seated test cocks.
  - 1. Ames 2000ss
  - 2. Watts 007 series.

**2.5 AUTOMATIC SPRINKLERS**

- A. Sprinkler Heads: Glass bulb type as indicated or required by the application. Unless otherwise indicated, provide heads with a minimum nominal 1/2" discharge orifice.
- B. Sprinkler Head Finishes: Provide heads with the following finishes:
  - 1. Upright, Pendent, and Sidewall Styles: White in finish spaces, exposed to view; rough bronze finish for heads in unfinished spaces and not exposed to view. Heads shall be wax-coated where installed exposed to acids, chemicals, or other corrosive fumes.
  - 2. Concealed Style: Rough brass, with painted white cover plate.
- C. Sprinkler head cabinet and wrench shall be a wall mounted finished steel cabinet with hinged cover and space for 6 spare sprinkler heads plus sprinkler head wrench. Provide a separate cabinet for each style sprinkler head on the project.

**2.6 FIRE DEPARTMENT CONNECTIONS**

- A. Chrome, flush wall type, with wall escutcheon. Connection size shall be 4 inch Storz. Unit shall have wall escutcheon with words "STANDPIPE - FIRE DEPT CONNECTION" or "AUTO SPKR - FIRE DEPT CONNECTION," or "AUTO SPKR & STANDPIPE - FIRE DEPT CONNECTION" in raised letters.

**2.7 ALARM DEVICES**

- A. Cast aluminum water-motor gong with factory-finish; Pelton Wheel type operator with nylon shaft bearings, and shaft length and sleeve to suit wall thickness and construction.

**2.8 DOMESTIC RANGE HOOD FIRE SUPPRESSION SYSTEMS**

- A. Fire suppression systems installed over residential type ranges shall be liquid potassium carbonate acetate product. Two nozzles shall be magnetically adhered to the underside of the hood and shall have integral heat sensors. A hard wired device, located in the cabinet above the hood adjacent to the fire suppression enclosure, will disconnect the electricity to the range. Sonic actuated devices are not allowed. Refer to DC Standards 16721, FIRE ALARM SYSTEMS, for written instructions and wiring diagram. Manufacturer shall be Guardian III, model G300, as manufactured by Twenty First Century, Irving Texas.

**PART 3 – EXECUTION**

**3.1 PIPE APPLICATIONS**

- A. Install systems using schedule 40 threaded or welded, schedule 10 grooved, or combination thereof as allowed by NFPA 13 and the owner's insurance carrier.

**3.2 PIPING INSTALLATIONS**

- A. Deviations from approved "Working Plans" for sprinkler piping, require written approval of the authority having jurisdiction. Written approval shall be on file with the Architect prior to deviating for the approved "Working Plans."
- B. Install sprinkler piping to provide for system drainage in accordance with NFPA-13.
- C. Install adapters on valves, apparatus, and equipment having dissimilar connections.
- D. Hangers and Supports: Comply with the requirements of NFPA 13, NFPA 14 and owner's insurance carrier. Hanger and support spacing and locations for piping joined with grooved mechanical couplings shall be in accordance with the grooved mechanical coupling manufacturer's written instructions, for rigid systems. Provide protection from damage where subject to earthquake in accordance with NFPA 13.
- E. Make connections between underground and above-ground piping using an approved transition piece strapped or fastened to prevent separation.
- F. Install test connections sized and located in accordance with NFPA 13, owner's insurance carrier, and with DC-FO&M approved location, complete with shutoff valve. Test connections may also serve as drain pipes.

**3.3 PIPE JOINT CONSTRUCTION**

- A. Refer to Division 15 Specification section, "BASIC PIPING MATERIALS AND METHODS".

**3.4 VALVE INSTALLATIONS**

- A. Control Valves: Install supervised-open control valves so located to control all sources of water supply except fire department connections. Where there is more than one control valve, provide permanently marked identification signs indicating the portion of the system controlled by each valve. Refer to Division-15 Section "Mechanical Identification" for valve tags and signs.
- B. Install back flow preventers in each water supply connection.
- C. Install alarm check valves in the vertical position, in proper direction of flow including the bypass check valve and retard chamber drain line connection. Install valve trim in accordance with the valve manufacturer's appropriate trim diagram. Test valve for proper operation.
- D. Install dry-pipe valves in the vertical position, in proper direction of flow, in the main supply to the dry-pipe system. Install the basic trim set, priming chamber attachment and fill line attachment in accordance with the manufacturer's written instructions. During hydrostatic test of system piping at pressures in excess of 50 psi, position the clapper in latched wide open position or removed from valve, to prevent injury to the valve. Test valve for proper operation.
- E. Install 2-1/2 inch hose outlet valves with threaded 2-1/2 hose to 1-1/2 inch NPT reducing coupling and cap at each standpipe outlet for hose connections.
- F. Install ball valves for all sprinkler drains.

**3.5 SPRINKLER HEAD INSTALLATIONS**

- A. Provide high temperature heads for all attics, mechanical rooms, and generator rooms.
- B. Runouts to all sprinkler heads shall be off the top or side of the main. Heads may not be located off the bottom of the main.

**3.6 FIRE DEPARTMENT CONNECTION INSTALLATIONS**

- A. Install automatic drip valves at the check valve on the fire department connection to the mains.
- B. Install mechanical sleeve seal at pipe penetration in outside walls.

**3.7 FIELD QUALITY CONTROL**

- A. Flush, test, and inspect sprinkler piping systems in accordance with NFPA 13 and Factory Mutual.
- B. Flush, test, and inspect standpipe systems in accordance with NFPA 14 and Factory Mutual.
- C. Replace piping system components which do not pass the test procedures specified, and retest repaired portion of the system.

END OF SECTION 15300