

## SECTION 211300 - BUILDING SPRINKLER SYSTEMS

### 1 GENERAL

- 1.1 Drawings and General provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- 1.2 Division-23 Basic Mechanical Requirements and Basic Mechanical Materials and Methods sections apply to work of this section.
- 1.3 Extent of fire protection work is indicated on drawings and schedules, and by requirements of this section.
- 1.4 Refer to Division-2 sections for site fire protection piping and appurtenances; not work of this section.
- 1.5 Refer to other Division-21 sections for site fire protection piping and appurtenances; not work of this section.
- 1.6 Refer to Division-9 sections for painting of fire protection piping; not work of this section.
- 1.7 Refer to Division-26 sections for the following work; not work of this section.
  - 1.7.1 Fire alarm connections for all flow switches, pressure switches, and supervisory (tamper) switches.
- 1.8 Codes and Standards:
  - 1.8.1 NFPA Compliance: Install fire protection systems in accordance with NFPA 13 "Standard for the Installation of Sprinkler Systems"
  - 1.8.2 UL Compliance: Provide fire protection products in accordance with UL standards; provide UL label on each product.
  - 1.8.3 Fire Department/Marshal Compliance: Install fire protection systems in accordance with local regulations of fire department or fire marshal.
  - 1.8.4 Screw Thread Connections: Comply with local Fire Department/Fire Marshal regulations for sizes, threading and arrangement of connections for fire department equipment to sprinkler systems.
- 1.9 Experience: Contractor shall have a minimum of ten years continuous experience under their current operating name and license number.
  - 1.9.1 Home Office: The home office for the contractor shall be located within 125 miles of the project site.
- 1.10 Approval Submittals:
  - 1.10.1 Product Data: Submit manufacturer's technical product data and installation instructions for:
    - Pipe and fittings
    - Basic pipe supports and hangers
    - Basic valves
    - Special valves
    - Pressure gauges
    - Automatic sprinklers
    - Cabinets

- 1.10.2 Working (Shop) Drawings: Prepare working (shop) drawings of fire protection systems indicating pipe sizes, pipe locations, pipe elevations, fittings, shutoffs, hangers, equipment, and coordination with other building systems. Submittal shall show all requirements per NFPA-13.
- 1.11 Test Reports and Verification Submittals:
- 1.11.1 Certificate: Submit certificate of Aboveground Installation upon completion of fire protection piping work which indicates that work has been tested in accordance with NFPA 13 and that system is operational, complete, and has no defects.
- 1.11.2 Tag: Submit a copy of the sprinkler system tag. The installing fire sprinkler contractor shall be licensed in accordance with State Fire Marshal (SFM) Rule 4A-46. At the conclusion of the project and prior to the final inspection by the SFM the Contractor shall tag the fire sprinkler system in accordance with 4A-46.041.
- 1.12 O&M Data Submittals:
- 1.12.1 Record Drawings: At project closeout, submit record drawings of installed fire protection piping and products.
- 1.12.2 Maintenance Data: Submit a copy of all approval submittals. Submit maintenance data and parts lists for basic valves and special valves. Include these data in O&M manual.
- 1.12.3 NFPA 25: Provide a copy of NFPA 25 in each O&M Manual.

## 2 PRODUCTS

- 2.1 General: Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, temperature ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in fire protection systems. Where more than one type of material or products are indicated, selection is Installer's option.
- 2.2 Basic Identification: Provide identification complying with Division-23 Basic Mechanical Materials and Methods section "Mechanical Identification", in accordance with the following listing:

Fire Protection Piping: Plastic pipe markers. Fire piping exposed in mechanical and electrical rooms shall be painted red.

Fire Protection Valves: Plastic or brass valve tags

Fire Protection Signs: Provide the following signs:

At each sprinkler valve, sign indicating what portion of system valve controls and hydraulic design data.

At each auxiliary drain, a sign indicating location.

- 2.3 Basic Pipes and Pipe Fittings: Provide pipes and pipe fittings complying with Division-23 Basic Mechanical Materials and Methods section "Pipes and Pipe Fittings", in accordance with the following listing. Where multiple listings are made for a particular type system, the material is the Installer's option.
- 2.4 Wet Pipe: Black steel pipe; Schedule 40 for less than 8"; Schedule 30 for 8" and larger. Fittings and joints shall be as follows.

- 1 Class 125, cast-iron threaded fittings with threaded joints.

- 2 Mechanical grooved pipe coupling and fittings; cut-groove type with mechanical joints.
- 3 Wrought steel butt welding fittings with welded joints.

2.4.1 Wet Pipe: Black steel pipe; Schedule 10 for 5" and smaller; 0.134" wall thickness for 6"; and 0.188" wall thickness for 8" and 10".

- 1 Class 125, cast-iron threaded fittings with threaded joints, sizes 2½" and larger.
- 2 Mechanical grooved pipe couplings and fittings; roll-groove or mechanical locking type with mechanical joints.
- 3 Wrought steel butt welding fittings with welded joints.

2.5 Basic Piping Specialties: Provide piping specialties complying with Division-23 Basic Mechanical Materials and Methods section "Piping Specialties".

2.6 Basic Supports and Anchors: Provide supports and anchors complying with Division-23 Basic Mechanical Materials and Methods section "Supports and Anchors", in accordance with the following listing:

Adjustable steel clevis hangers or adjustable steel band hangers for horizontal-piping hangers and supports.

Two-bolt riser clamps for vertical piping supports.

Steel turnbuckles and malleable iron sockets for hanger-rod attachments.

Concrete inserts, top-beam C-clamps, side beam or channel clamps or center beam clamps for building attachments.

2.7 Basic Valves: Provide interior valves complying with Division-23 Basic Mechanical Materials and Methods section "Valves", in accordance with the following listing:

2.7.1 Standard Service Code-Required OS&Y Valves: GA-6, GA-7.

2.7.2 Standard Service Sectional Valves: GA-6, GA-7. BF-6, BF-7.

2.7.3 Standard Service Indicating Valves: GA-6, GA-7, BA-6.

2.7.4 Standard Service Trim Valves: GA-6, BA-4.

2.7.5 Standard Service Check Valves: CK-4, CK-5.

2.8 Special Valves:

2.8.1 General: Provide valves, UL listed, in accordance with the following listing. Provide sizes and types which mate and match piping and equipment connections.

2.8.2 Alarm Check Valve: Provide cast-iron water flow alarm check valve, 175 psi working pressure, with retard chamber.

2.8.3 Hose Outlet Valves: Provide angle hose valves, 2-1/2" size where not otherwise indicated. Provide chrome plated with escutcheons where mounted in cabinet. Provide chain and cap.

2.8.4 Ball Drip Check Valve: Provide fire department connection iron swing check valve, 175 psi rated working pressure, of size and end type indicated, with ball drip.

- 2.9 Basic Meters and Gauges: Provide meters and gauges complying with Division-23 Basic Mechanical Materials and Methods section "Meters and Gauges", in accordance with the following listing:
- 2.9.1 Pressure gauges, 0-250 psi range.
- 2.10 Fire Protection Specialties: Provide fire protection specialties, UL listed, in accordance with the following listing. Provide sizes and types which mate and match piping and equipment connections.
- 2.10.1 Water Flow Indicators: Provide vane type water flow switches, with adjustable retard.
- 2.10.2 Supervisory Switches: Provide products recommended by manufacturer for use in service indicated.
- 2.10.3 Maintenance Air Compressor, Dry Pipe System: Provide independent air compressor as shown on the drawings. The compressor shall have an oil-less motor and sealed compressor. Dry pipe system with a capacity of up to 150 gallons may use strap-on riser mounting. Dry pipe systems with a capacity of 150 gallons or more shall use a tank-mounted compressor.
- 2.10.4 Acceptable Manufacturers: Subject to compliance with requirements, provide fire protection specialties of one of the following:
- Grinnell Fire Protection Systems Co., Inc.  
Grunau Sprinkler Mfr. Co., Inc.  
Guardian Fire Equipment, Inc.  
Potter Roemer, Inc.  
Reliable  
Viking Corporation
- 2.11 Automatic Sprinklers: Provide automatic sprinklers and escutcheons of type indicated on drawings, and in accordance with the following listing. Provide quick response type automatic sprinklers. Provide fusible links for 165°F unless otherwise indicated.
- 2.11.1 Sprinkler Types
- Upright.  
Pendant.  
Concealed pendent.  
Extended Coverage Pendent-20x20 Maximum Coverage Area (Classrooms Only)  
Horizontal sidewall.
- 2.11.2 Finish: White for concealed heads in occupied areas. Chrome-plated for pendant heads in exposed occupied areas. Cast brass for unoccupied areas.
- 2.11.3 Sprinkler Cabinet and Wrench: Furnish steel, baked red enameled, sprinkler box with capacity to store 10 sprinklers and wrench sized to sprinklers.
- 2.11.4 Acceptable Manufacturers: Subject to compliance with requirements, provide automatic sprinklers of one of the following:
- Central Sprinkler Corp.  
Grinnell Fire Protection Systems Co., Inc.  
Star Sprinkler Mfg. Co. Inc.  
Reliable  
Viking Corp.

3 EXECUTION

- 3.1 General: Examine areas and conditions under which fire protection materials and products are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer. Any installation, modification, or alteration of the sprinkler system shall be performed only by a person under a certificate of competency issued by the State Fire Marshal.
- 3.2 Installation of Basic Identification: Install mechanical identification in accordance with Division-23 Basic Mechanical Materials and Methods section "Mechanical Identification." Install fire protection signs on piping in accordance with NFPA 13 requirements. Continuously paint exposed fire piping red in mechanical and electrical rooms.
- 3.3 Installation of Pipes and Pipe Fittings:
- 3.3.1 General: Install pipes and pipe fittings in accordance with Division-23 Basic Mechanical Materials and Methods section "Pipes and Pipe Fittings."
- 3.3.2 Comply with requirements of NFPA 13 for installation of fire protection piping materials. Install piping products where indicated, in accordance with manufacturer's written instructions, and in accordance with recognized industry practices to ensure that piping systems comply with requirements and serve intended purposes.
- 3.3.3 Coordinate with other work as necessary to interface components of fire protection piping properly with other work.
- 3.3.4 Install drain piping at low points of piping system. Provide dry drum drips where indicated.
- 3.3.5 Install sectional valves in inlet piping, at bottom of each riser, and in loops as indicated.
- 3.3.6 Install fire department connection valves in piping where fire department connections are indicated.
- 3.3.7 Install water flow indicators where indicated.
- 3.3.8 Mount supervisory switches on each sectional valve.
- 3.3.9 Install manual shutoff at each audible alarm station.
- 3.3.10 Install valved hose connections of sizes indicated, or ¾" size if not otherwise indicated, on sprinkler at ends of branch lines and cross mains and at locations where indicated. The intent is to meet the requirements of NFPA 13 and to achieve a fully drainable system.
- 3.3.13 Install Inspector's test connection where indicated, or at most remote point from riser.
- 3.4 Installation of Piping Specialties: Install piping specialties in accordance with Division-23 Basic Mechanical Materials and Methods section "Piping Specialties."
- 3.5 Installation of Supports and Anchors: Install supports and anchors, in accordance with Division-23 Basic Mechanical Materials and Methods section, "Supports and Anchors."
- 3.6 Installation of Valves: Install valves in accordance with Division-23 Basic Materials and Methods section "Valves." Provide valves to isolate each riser and elsewhere as required by NFPA 13 .

- 3.7 Installation of Meters and Gauges: Install meters and gauges in accordance with Division-23 Basic Mechanical Materials and Methods section "Meters and Gauges."
- 3.8 Installation of Fire Protection Specialties: Install fire protection specialties as indicated, and in accordance with NFPA 13. Furnish wiring requirements to electrical Installer for electrical wiring of supervisory switches.
- 3.9 Field Quality Control:
- 3.9.1 Sprinkler Piping Flushing: Prior to connecting sprinkler risers for flushing, flush feed mains, lead-in connections and control portions of sprinkler piping. After fire sprinkler piping installation has been completed and before piping is placed in service, flush entire sprinkler system, as required to remove foreign substances, under pressure as specified in NFPA 13. Continue flushing until water is clear, and check to ensure that debris has not clogged sprinklers.
- 3.9.2 Hydrostatic Testing: After flushing system, test fire sprinkler piping hydrostatically, for period of 24 hours, at not less than 200 psi or at 50 psi in excess of maximum static pressure when maximum static pressure is in excess of 150 psi. Check system for leakage of joints. Measure hydrostatic pressure at low point of each system or zone being tested.
- 3.9.3 Repair or replace piping system as required to eliminate leakage in accordance with NFPA standards for "little or no leakage" and retest as specified to demonstrate compliance.
- 3.10 Cleaning and Inspecting: Clean and inspect fire protection systems in accordance with requirements of Division-23 Basic Mechanical Materials and Methods section "Testing, Cleaning, and Sterilization of Piping Systems".
- 3.11 Extra Stock:
- 3.11.1 Heads: For each style and temperature range required, furnish additional sprinkler heads, amounting to one unit for every 100 installed units, but not less than 5 units of each.
- 3.11.2 Wrenches: Furnish 2 spanner wrenches for each type and size of valve connection and fire hose coupling. Obtain receipt from Owner that extra stock has been received.
- 3.12 Owner Instruction: Provide technical services for one 4-hour period to instruct Owner's personnel in operation and maintenance of building sprinkler systems. Schedule training date with Owner. Provide at least 7-day notice to                    Engineer                    and                    Owner                    of                    training                    date.