SECTION 21 12 00
FIRE-SUPPRESSION STANDPIPES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Fire-Suppression wet Mains and Standpipes.

1.2 SCOPE OF WORK

A. Design, installation and testing shall be in accordance with NFPA 14 except for specified exceptions.

B. Design, materials, equipment and installation, inspection and testing of a complete and ready for operation fire-suppression wet standpipe system as required by NFPA 14.

C. Replacement of the existing sprinkler mains, associated valves and supervisory flow and tamper devices serving the wet standpipe system as indicated on the drawing's and as further required by these specifications.

D. Painting and identification of exposed piping and supports to match surrounding background in rooms and stairways and red in all unfinished areas.

1.3 RELATED WORK

A. Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Section 07 84 00, FIRESTOPPING, Treatment of penetrations through rated enclosures.

C. Section 21 05 11 COMMON WORK RESULTS FOR FIRE SUPPRESSION for general mechanical requirements and items, which are common to more than one section.

D. Section 28 31 00, FIRE DETECTION AND ALARM, Connection to fire alarm of low switches, pressure switches and valve supervisory switches.

1.4 QUALITY ASSURANCE

A. Designer's Qualifications: Design work and shop drawings shall be prepared by a licensed engineer practicing in the field of Fire Protection Engineering.

B. Installer Reliability: The installer shall possess a valid State of New York contractor's license. The installer shall provide documentation of having successfully completed three projects of similar size and scope.

C. Materials and Equipment: All equipment and devices shall be of a make and type listed by UL and approved by FM, or other nationally recognized testing laboratory for the specific purpose for which it is used. All materials, devices, and equipment shall be approved by the VA.

D. Testing: Materials and Testing Certificate as per NFPA 14. Provide certificates for all parts of the system.

1.5 DESIGN CRITERIA

A. The design, materials, equipment, installation, and testing of the system shall be in accordance with NFPA 14 the latest edition.

B. For hydraulic calculations, calculated demand shall not fall less than 10 percent below the water supply curve.

C. Water Supply: Base water supply on a fire pumper truck being able to provide 3785 l/m (1000 gpm) at 1035 kPa (150 psig) and 2650 l/m (700 gpm) at 1380 kPa (200 psig) at the fire department connection.

D. Size standpipes to provide 690 kPa (100 psig) at the most remote connections.

E. Seismic Protection: Seismically brace all new and existing piping systems in accordance with Zone C of NFPA 13 latest edition.

1.6 SUBMITTALS

A. Submit as one package in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES. Prepare detailed working drawings that are stamped by a Registered Professional Engineer practicing in the field of Fire Protection Engineering. As Government review is for technical adequacy only, the installer remains responsible for correcting any conflicts with other trades and building construction that arise during installation. Partial submittals will not be accepted. Material submittals shall be approved prior to the purchase or delivery to the job site. Suitably bind submittals in notebooks or binders and provide index referencing the appropriate specification section. Submittals shall include, but not be limited to, the following:

1. Certificates:
   a. Materials and Testing certificates as specified.
2. Drawings: Submit detailed 1:100 (1/8 inch) scale (minimum) working drawings conforming to NFPA 14. Include a site plan showing the fire hydrant nearest the fire department connection.
3. Manufacturers Literature and Data Sheets: All pertinent literature and data for the materials and equipment proposed for the project. Include listing information and installation instructions in data sheets. Clearly identify the item to be used.
   a. Provide for materials and equipment proposed for use on the system. Include listing information and installation instructions in data sheets. Where data sheet describes items in addition to that item being submitted, clearly identify proposed item on the sheet. Submit literature and data for the following:

1. Pipe and Fittings.
2. Valves.
3. Pipe Hangers and supports.
4. Paint.
5.

4. Calculation Sheets: Submit hydraulic calculations in accordance with NFPA 14.
5. Final Document Submittals: Provide as-built drawings, testing and maintenance instructions in accordance with the requirements in Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES. Submittals shall include, but not be limited to, the following:
   a. One complete set of reproducible as-built drawings showing the installed system with the specific interconnections between the waterflow switch or pressure switch and the fire alarm equipment. One copy of final CADD drawing files shall be provided on diskettes that are compatible with the VAMC CAD system.
   b. Four sets of complete, simple, understandable, step-by-step, testing instructions giving recommended and required testing frequency of all equipment, methods for testing all equipment, and a complete trouble shooting manual. Provide maintenance instructions on replacing any components of the system including internal parts, periodic cleaning and adjustment of the equipment and components with information as to the address and telephone number of both the manufacturer and the local supplier of each item.
   c. Certificates shall document all parts of the installation.
      1. Designer’s and Installer’s qualifications and documentation of previous work.
      2. Materials and Testing certificates as specified.
   d. Instruction Manual: Provide one copy of the instruction manual covering the system in a flexible protective cover and mount in an accessible location adjacent to the riser.

1.7 APPLICABLE PUIBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. American Society of Mechanical Engineers (ASME):
B16.3-99.....Malleable Iron Threaded Fittings

C. Factory Mutual Engineering Corporation (FM):
Approval Guide – 2001

D. National Fire Protection Association (NFPA):

14-2003.....Installation of Standpipe, Private Hydrant and Hose Systems

101-2003.....Safety to Life from Fire in Buildings and Structures (Life Safety Code)

170-1999.....Fire Safety Symbols

E. Underwriters Laboratories, Inc. (UL):

Fire Protection Equipment Directory (Latest edition).

F. Uniform Building Code (Latest edition).

PART 2 PRODUCTS

2.1 GENERAL

All devises and equipment shall be Underwriters Laboratories listed for their intended purpose.

2.2 PIPING & FITTINGS

A. Shall be in accordance with NFPA 14. Base bid: Schedule 40 galvanized steel minimum. Deduct Alternate: Schedule 40 black steel minimum.

B. Threaded or flanged fittings shall be ANSI B 16.3 cast iron, class 125 minimum. Threaded fitting are not permitted on pipe with wall thickness less than Schedule 40.

C. Clamp-on fittings with rubber gaskets shall be listed for the piping application.

D. Plain end pipe, fittings with locking lugs or shear bolts are not permitted.

E. Pipe Identification – All pipe including specially listed pipe allowed by NFPA 13, shall be marked continuously along its length by the manufacturer in such a way as to properly identify the type of pipe. Pipe identification shall include the manufacturer’s name, model designation, or schedule.

2.3 VALVES

A. Do not use quarter turn ball valves for 50 mm (2 inch) or larger drain valves.

B. The wet system control valve shall be a listed indicating type valve. Control valve shall be UL Listed and FM Approved for fire protection installations. System control valve shall be rated for normal system pressure but in no case less than 175 PSI. (No Substitutions Allowed).

C. Listed Indicating Valves:

1. Gate: OS&Y, 1200kPa (175 psig) WOG.
2. Butterfly: Gear operated, indicating type, 1200 kPa (175 psig) WOG.

E. Check Valves: Swing type, rubber faced or wafer type spring loaded butterfly check valve, 1200 kPa (175 psig) WOG.

F. Drain Valves: Threaded bronze angle, globe, ball or butterfly, 1000 kPa (150 psig.) WOG equipped with reducer and hose connection with cap or connected to a drain line.

2.4 IDENTIFICATION SIGNS/HYDRAULIC PLACARDS

A. Provide for all new and existing sectional valves, riser control valves, drain valves and alarm devises. The signs shall be in accordance with NFPA 14 and attached securely to each item.

B. Plastic, steel or aluminum signs with white lettering on a red background with holes for easy attachment. Enter pertinent data for each system on the hydraulic placard.

2.5 PIPING IDENTIFICATION

A. Piping with an outside diameter of 5 7/8 inches and less: Provide acrylic plastic snap-on wrap-around type pipe markers with directional flow arrows, UV resistance and legend printed four (4) times for 360 degree visibility.

B. Piping with an outside diameter of 6 inches and greater: Provide acrylic plastic strap-on type markers with directional flow arrows, UV resistance and legend printed two (2) times minimum. Make: Seton "Setmark" strap-on wrap around type pipe markers.

C. Pipe label shall conform to the following:
   1. Fire Protection Mains = FIRE PROTECTION WATER.
   2. Fire Protection Drains = FIRE PROTECTION DRAIN.

2.6 VALVE SUPERVISORY SWITCHES:

A. Provide each indicating standpipe and control valve with adequate means for mounting a valve supervisory switch.

B. Mount switch so as not to interfere with normal operation of the valve and adjust to operate within two revolutions toward the closed position of the valve control, or when the stem is moved no more than one fifth of the distance from its normal position.

C. The mechanism shall be contained in a weatherproof die cast aluminum housing, which shall provide a 20 mm (3/4 in.) tapped conduit entrance and incorporate the necessary facilities for attachment to the valves.

D. Switch housing to be finished in red baked enamel.

E. Water flow Alarm Switches: Mechanical, non-coded, non-accumulative retard and adjustable from 0 to 60 seconds minimum. Set flow switches at an initial setting between 20 and 30 seconds.

F. Valve Supervisory Switches for Ball and Butterfly Valves: May be integral with the valve.

G. All conduit and wiring connected thereto shall be provided in Section 28 31 00, FIRE DETECTION AND ALARM.

2.7 GAUGES

A. Provide gauges as required by NFPA 14.

2.8 PIPE HANGERS AND SUPPORTS

A. Supports, hangers, etc., of an approved pattern placement to conform to NFPA 14. System piping shall be substantially supported to the building structure. Materials used in the installation or construction of hangers and supports shall be listed and approved for such application. Hangers or supports not specifically listed for service shall be designed and bear the seal of a professional engineer.

B. Hangers shall be designed to support five times the weight of the water filled pipe pluse 250 Lb (114Kg) at each point of piping support.

C. These points of support shall be adequate to support the system.

D. The spacing between hangers shall not exceed the value given for the type of pipe as indicated in NFPA 13 tables.

E. Hanger components shall be ferrous.

F. Detailed calculations shall be submitted, when required by the reviewing Authority, showing stress developed in hangers, piping, fittings and safety factors allowed.

2.9 WALL, FLOOR AND CEILING PLATES

A. Exposed piping passing through walls, floors or ceilings shall be provided with chrome colored escutcheon plates.

B. Comply with NFPA 101 Fire Barrier Penetration codes.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation shall be accomplished by the licensed contractor. Provide a qualified technician, experienced in the installation and operation of the type of system being installed, to supervise the installation and testing of the system.

B. Installation of Piping: Accurately cut pipe to measurements established by the installer and work into place without springing or forcing. In any situation where bending of the pipe is required, use a standard pipe-bending template. Install concealed piping in spaces that have finished ceilings. Sidewall heads may need to be utilized. Locate piping in stairways as near to the ceiling as possible to prevent tampering by unauthorized personnel, and to provide a minimum headroom clearance of 2250 mm (seven feet six inches). To prevent an obstruction to egress, provide piping clearances in accordance with NFPA 101.

C. Painting of exposed sprinkler main, branch and drain piping: For steel pipe, one coat of alkyd primer and two coats of exterior acrylic latex gloss enamel paint. Color shall be red. Apply paint in accordance with manufacturer's directions. Remove spilled and splattered paint from all surfaces. Submit paint sample to owner for prior approval prior to commencement of painting.

D. Installation of Piping Identification: Provide piping identification with directional flow arrows for all piping on project. Provide labels on straight runs of piping at 10'-0" intervals, minimum. Provide labels where piping enters and leaves a partition, wall, floor or ceiling.

E. Drains: Pipe drains to discharge at safe points outside of the building or to sight cones attached to drains of adequate size to readily carry the full flow from each drain under maximum pressure. Do not provide a direct drain connection to sewer system or discharge into sinks. Install drips and drains where necessary and required by NFPA 14.

F. Valve Supervisory Switches: Provide supervisory switches for standpipe control valves. Do not provide standpipe hose valves and test and drain valves with supervisory switches. Do not provide valve supervisory switches on standpipe hose valves, test or drain valves. See Section 28 31 00, FIRE DETECTION AND ALARM for connections.

G. Waterflow Alarm Switches: Install waterflow switch and adjacent valves in easily accessible locations.

H. Provide pressure gauge at each water flow alarm switch location and at each main drain connection.

I. Penetrations: Sleeve or core drill concrete and masonry. Provide clearance between pipe and openings as required by NFPA 14. Seal penetrations and clearances in fire rated wall and floor assemblies with listed through-penetration firestop materials in accordance with Section 07 84 00, FIRESTOPPING.

J. Securely attach identification signs to control valves, drain valves, and test valves. Locate hydraulic placard information signs at each sectional control valve where there is a zone water flow switch.

K. Interruption of Service: There shall be no interruption of the existing sprinkler protection, water, electric, or fire alarm services without prior permission of the Contracting Officer. Contractor shall develop an interim fire protection program where interruptions involve in occupied spaces. Request in writing, at least one (1) week prior to the planned interruption. Any interruption shall be limited to 8 hours for final connections or repairs.

3.2 INSPECTION AND TEST

A. Flushing: Flush newly installed systems prior to performing hydrostatic tests in order to remove any debris which may have been left as well as ensuring piping is unobstructed.

B. Hydrostatic Testing: Hydrostatically test the system including the fire department connections, as specified in NFPA 14, NFPA-25 and NFPA 13 latest edition, in the presence of the Authority Having Jurisdiction or his designated representative.

C. Final Inspection and Testing: Test the system in accordance with NFPA 14, NFPA 13 and NFPA 25, latest editions after all necessary corrections have been accomplished. Advise the Authority Having Jurisdiction who will then schedule the final inspection and test. Furnish all instruments, labor and materials required for the tests and provide the services of the installation foreman or other competent representative of the installer to perform the tests. Correct any deficiencies found and retest the system. Include the operation of all features of the systems under normal conditions in the test.

3.3 INSTRUCTIONS

A. Furnish the services of a competent instructor for not less than two hours for instructing personnel in the operation and maintenance of the system, on the dates requested by the COTR/Resident Engineer.

3.4 WARRANTY

A. All work performed and materials and equipment furnished under this contract shall be free from defects for a period of one year from date of acceptance by the government.

B. All new piping and equipment incorporated into the new system shall be hydrostatically tested and warranted as new.

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