

SECTION 21 13 13
WET-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Design, installation and testing shall be in accordance with NFPA 13 except for specified exceptions.
- B. Modification of the existing sprinkler system as indicated on the drawings and as further required by these specifications.

1.2 RELATED WORK

- A. Section 01 33 23, SHOP DRAWINGS AND PRODUCT DATA.
- B. Section 07 84 00, FIRESTOPPING, Treatment of penetrations through rated enclosures.
- C. Section 09 91 00, PAINTING.
- D. Section 21 05 11 COMMON WORK RESULTS FOR FIRE SUPPRESSION

1.3 QUALITY ASSURANCE

- A. Installer Reliability: The installer shall possess a valid State of Colorado fire sprinkler contractor's license. The installer shall have been actively and successfully engaged in the installation of commercial automatic sprinkler systems for the past ten years.
- B. 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.
- C. Submittals: Submit as one package in accordance with Section 01 33 23, SHOP DRAWINGS AND PRODUCT DATA. Prepare detailed working drawings that are signed by a NICET Level III or Level IV Sprinkler Technician or 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 shall 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. Qualifications:
 - a. Provide a copy of the installing contractor's fire sprinkler and state of Colorado contractor's license.

- b. Provide a copy of the NICET certification for the NICET Level III or Level IV Sprinkler Technician who prepared and signed the detailed working drawings unless the drawings are stamped by a Registered Professional Engineer practicing in the field of Fire Protection Engineering.
2. Drawings: Submit detailed 1:100 (1/8 inch) scale (minimum) working drawings conforming to NFPA 13.
3. Manufacturers Data Sheets:
 - 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.
4. Calculation Sheets: Submit hydraulic calculation sheets in tabular form conforming to the requirements and recommendations of NFPA 13.
5. Final Document Submittals: Provide as-built drawings, testing and maintenance instructions in accordance with the requirements in Section 01 33 23, SHOP DRAWINGS AND PRODUCT DATA. Submittals shall include the following:
 - a. One complete set of reproducible as-built drawings and a disk with an electronic copy showing the installed system with the specific interconnections between the waterflow switch or pressure switch and the fire alarm equipment.
 - b. 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. Material and Testing Certificate: Upon completion of the sprinkler system installation or any partial section of the system, including testing and flushing, provide a copy of a completed Material and Testing Certificate as indicated in NFPA 13.
 - d. Certificates shall document all parts of the installation.
 - e. 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.

D. Design Basis Information: Provide design, materials, equipment, installation, inspection, and testing of the automatic sprinkler system in accordance with the requirements of NFPA 13. Recommendations in appendices shall be treated as requirements.

1. Perform hydraulic calculations in accordance with NFPA 13 utilizing the Area/Density method. Do not restrict design area reductions permitted for using quick response sprinklers throughout by the required use of standard response sprinklers in the areas identified in this section.
2. Sprinkler Protection: To determining spacing and sizing, apply the following coverage classifications:
 - a. Light Hazard Occupancies: Patient care, treatment, and customary access areas.
 - b. Ordinary Hazard Group 1 Occupancies: Laboratories, Mechanical Equipment Rooms, Transformer Rooms, Electrical Switchgear Rooms, Electric Closets, Elevator Shafts, Elevator Machine Rooms, Refrigeration Service Rooms, Repair Shops.
 - c. Ordinary Hazard Group 2 Occupancies: Storage rooms, trash rooms, clean and soiled linen rooms, pharmacy and associated storage, laundry, kitchens, kitchen storage areas, retail stores, retail store storage rooms, storage areas, building management storage, boiler plants, energy centers, warehouse spaces, file storage areas for the entire area of the space up to 140 square meters (1500 square feet) and Supply Processing and Distribution (SPD).
 - d. Request clarification from the Government for any hazard classification not identified.
3. Hydraulic Calculations: Calculated demand including hose stream requirements shall fall no less than 10 percent below the available water supply curve.
4. Water Supply: Base water supply on a flow test of:
 - a. Location on site existing fire hydrants
 - b. Elevation Static Test Gauge (2'-0")
 - c. Elevation Residual Test Gauge (2'-0")
 - d. Static pressure: (72 psi)
 - e. Residual pressure: (62 psi)
 - f. Flow: (889 gpm)
 - g. Date: 03/17/2009

- h. Contractor shall obtain a new flow test prior to any design or installation of new work. Submit copies of test to Architect / Engineer.
- 5. Zoning:
 - a. Rework existing Sprinkler zones to accommodate building remodel.
 - b. Provide seismic protection in accordance with NFPA 13.

1.4 APPLICABLE PUBLICATIONS

- 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. National Fire Protection Association (NFPA):
 - 13-13.....Installation of Sprinkler Systems
 - 25-14.....Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems
 - 101-15.....Life Safety Code
 - 170-15.....Fire Safety Symbols
- C. Underwriters Laboratories, Inc. (UL):
 - Fire Protection Equipment Directory - 2011
- D. Factory Mutual Engineering Corporation (FM):
 - Approval Guide
- E.

PART 2 PRODUCTS

2.1 PIPING & FITTINGS

- A. Sprinkler system components in accordance with NFPA 13.
- B. Pipe materials shall be new and designed for not less than 175 psi working pressure conforming to ASTM standards. Piping shall have the manufacturers name brand along with the applicable ASTM standard marked on each length of pipe. Inner walls shall be coated by the manufacturer to provide resistance to Microbiologically Influenced Corrosion (MIC).
- C. Schedule 40, black steel pipe, ASTM A135 Or A53, joined by threaded joints, welded joints or by UL listed and approved mechanical grooved couplings Grooves shall be rolled (cut grooves are not acceptable) and shall be dimensionally compatible with the coupling.
- D. Light wall pipe shall NOT be used.
- E. CPVC pipe shall NOT be used.
- F. Cast Iron threaded flanges: ASME B16.1, Class 250, raised ground face, bolt holes spot faced.

- G. Cast-Iron threaded fittings: ASME B16.4, Class 250, standard pattern with threads according to ASME B1.20.1
- H. Malleable-Iron threaded fittings: ASME B16.3, Class 300, standard pattern with threads according to ASME B1.20.1
- I. Steel fittings: ASTM A234 / A 234M, seamless or welded; ASME B16.9, butt welding; or ASME B16.11, socket-welding type for welded joints.
- J. Steel flanges and flanged fittings: ASME B16.5
- K. Grooved-End fittings for steel pipe: UL-listed and FM-approved, ASTM A 536, grade 65-45-12 ductile iron or ASTM A 47 grade 32510 malleable iron with grooves or shoulders designed to accept grooved couplings.

2.2 VALVES

- A. Valves in accordance with NFPA 13.
- B. Do not use quarter turn ball valves for 50 mm (2 inch) or larger drain valves.

2.3 SPRINKLERS

- A. All sprinklers shall be FM approved. Provide quick response sprinklers in all areas, except where specifically prohibited by their listing or approval.
 - 1. Cold storage rooms: Standard response dry pendant sprinklers or sidewall.
 - 2. Rooms without ceilings: Upright sprinklers
 - 3. Rooms with suspended ceilings: Semi-recessed chrome sprinkler with chrome escutcheon.

2.4 SPRINKLER CABINET

Provide sprinkler cabinet with the required number of sprinkler heads of all ratings and types installed, and a sprinkler wrench for each system. Locate adjacent to the riser. Sprinkler heads shall be installed in center of tile.

2.5 IDENTIFICATION SIGNS/HYDRAULIC PLACARDS

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.

2.6 GAUGES

Provide gauges as required by NFPA 13.

2.7 PIPE HANGERS AND SUPPORTS

Supports, hangers, etc., of an approved pattern placement to conform to NFPA 13. System piping shall be substantially supported to the building structure. The installation of hangers and supports shall adhere to the requirements set forth in NFPA 13, Standard for Installation of Sprinkler Systems. 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.

2.8 WALL, FLOOR AND CEILING PLATES

Provide chrome plated steel escutcheon plates for exposed piping passing through walls, floors or ceilings.

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. Where ceiling mounted equipment exists, such as in operating and radiology rooms, install sprinklers so as not to obstruct the movement or operation of the equipment. 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. Welding: Conform to the requirements and recommendations of NFPA 13.
- D. 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 13.
- E. Inspector's Test Connection: Install and supply in conformance with NFPA 13, locate in a secured area, and discharge to the exterior of the building.
- F. Sleeves: Provide for pipes passing through masonry or concrete. Provide space between the pipe and the sleeve in accordance with NFPA 13. Seal this space with a UL Listed through penetration fire stop material in accordance with Section 07 84 00, FIRESTOPPING. Where core drilling is used in lieu of sleeves, also seal space. Seal penetrations of walls, floors and ceilings of other types of construction, in accordance with Section 07 84 00, FIRESTOPPING.

- G. Provide pressure gauge at each water flow alarm switch location and at each main drain connection.
- H. Firestopping shall comply with Section 07 84 00, FIRESTOPPING.
- I. 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.
- J. Repairs: Repair damage to the building or equipment resulting from the installation of the sprinkler system by the installer at no additional expense to the Government.
- 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's Representative (COR). Contractor shall develop an interim fire protection program where interruptions involve in occupied spaces. Request in writing at least one week prior to the planned interruption.

3.2 PIPING SCHEDULE

- A. Sizes 2" (50mm) and smaller: ASTM A53, A 135; Schedule 40 steel pipe with threaded ends, cast iron or malleable-iron threaded fittings and thread joints.
- B. Sizes 2" (50mm) and smaller: ASTM A53, A 135; Schedule 40 steel pipe With rolled-groove ends, grooved-end steel pipe fittings and grooved-coupling joints.
- C. Sizes 2 1/2" (65mm) to 6" (150mm): ASTM A53, A 135; Schedule 40 steel pipe with threaded ends, cast iron or malleable-iron threaded fittings and thread joints.
- D. Sizes 2 1/2" (65mm) to 6" (150mm): ASTM A53, A 135; Schedule 40 steel pipe Welding type schedule 40 steel fittings and welded joints.
- E. Sizes 2 1/2" (65mm) to 6" (150mm): ASTM A53, A 135; Schedule 40 steel pipe With rolled-groove ends, grooved-end steel pipe fittings and grooved-coupling joints.

3.3 INSPECTION AND TEST

- A. Preliminary Testing: 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. Hydrostatically test system, including the fire department connections, as specified in NFPA 13, in the presence of the COR or his designated representative. Test and flush underground water line prior to performing these hydrostatic tests.
- B. Final Inspection and Testing: Subject system to tests in accordance with NFPA 13, and when all necessary corrections have been accomplished, advise COR to schedule a final inspection and test. Connection to the fire alarm system shall have been in service for at least ten days prior

to the final inspection, with adjustments made to prevent false alarms. 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 deficiencies and retest system as necessary, prior to the final acceptance. Include the operation of all features of the systems under normal operations in test.

3.4 INSTRUCTIONS

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 COR.

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