

SECTION 21 13 16
DRY-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Design, installation and testing shall be in accordance with NFPA 13.
- B. The design and installation of a hydraulically calculated automatic dry-pipe sprinkler system complete and ready for operation, for those locations as shown on the contract drawings.
- C. Modification of the existing dry-pipe sprinkler system as indicated on the drawings and as further required by these specifications.

1.2 DESIGN CRITERIA

- A. Design Basis Information: Provide design, materials, equipment, installation, inspection, and testing of the automatic sprinkler system in accordance with the requirements of NFPA 13.

1.3 SUBMITTALS

- A. Submit as one package. Prepare detailed working drawings that are signed by a NICET Level III or Level IV Sprinkler Technician or stamped by a Registered Professional Engineer licensed in the field of Fire Protection Engineering. As the 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 an 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 contractors fire sprinkler and state 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 licensed in the field of Fire Protection Engineering.

- 2. Drawings: Submit detailed 1:100 (1/8 inch) scale (minimum) working drawings conforming to the Plans and Calculations chapter of NFPA 13. Drawings shall include graphical scales that allow the user to

- determine lengths when the drawings are reduced in size. Include a plan showing the piping to the water supply test location.
3. **Manufacturer's Data Sheets:** Provide data sheets for all materials and equipment proposed for use on the system. Include listing information and installation instructions in data sheets. Where data sheets describe items in addition to those proposed to be used for the system, clearly identify the proposed items on the sheet.
 4. **Final Document Submittals:** Provide as-built drawings, testing and maintenance instructions. In addition, submittals shall include, but not be limited to, the following:
 - a. A complete set of as-built drawings showing the installed system with the specific interconnections between the system switches and the fire alarm equipment.
 - 1) One full size (or size as directed by the COR) printed copy.
 - 2) One complete set in electronic pdf format.
 - b. **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. Certificates shall be provided to document all parts of the installation.

1.4 QUALITY ASSURANCE

- A. **Installer Reliability:** The installer shall possess a valid State of Minnesota 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 three years.
- B. **Materials and Equipment:** All equipment and devices shall be of a make and type listed by UL or 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. All materials and equipment shall be free from defect. All materials and equipment shall be new unless specifically indicated otherwise on the contract drawings.

1.5 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):
 - 13-2016Installation of Sprinkler Systems
 - 25-2014Inspection, Testing, and Maintenance of Water-
Based Fire Protection Systems
 - 101-2015Life Safety Code
 - 170-2015Fire Safety Symbols
- C. Underwriters Laboratories, Inc. (UL):
 - Fire Protection Equipment Directory 2015
- D. Factory Mutual Engineering Corporation (FM):
 - Approval Guid-Latest

PART 2 PRODUCTS

2.1 GENERAL

Dry-pipe sprinkler systems shall comply with the requirements of NFPA 13.

2.2 PIPING & FITTINGS

- A. Piping and fittings for sprinkler systems shall be in accordance with NFPA 13.
 - 1. Plain-end pipe fittings with locking lugs or shear bolts are not permitted.
 - 2. All piping sizes shall be black steel Schedule 40 with threaded and screwed end connections. No Grooved Couplings.

2.3 VALVES

- A. General:
 - 1. Valves shall be in accordance with NFPA 13.
 - 2. Do not use quarter turn ball valves for 50 mm (2 inch) or larger drain valves.
- B. Control Valve:
 - 1. Shall be a manually operated outside stem and yoke (OS&Y) type.
- C. Dry-pipe Valve:
 - 1. Shall be a latching differential type.
 - 2. Shall be complete with trim piping, valves, fittings, pressure gauges, priming water fill cup, velocity drip check, drip cup, and other ancillary components as required for proper operation.
 - 3. For dry-pipe sprinkler systems with volumes more than 1893 L (500 gal), provide a quick opening device unless water delivery time calculations have proven no quick opening device is required.
 - 4. Shall be capable of external reset.

2.4 SPRINKLER SYSTEM SIGNAGE

Rigid plastic, steel or aluminum signs with white lettering on a red background with holes for easy attachment. Sprinkler system signage shall be attached to the valve or piping with chain.

2.5 PIPE HANGERS, SUPPORTS AND RESTRAINT OF SYSTEM PIPING

Pipe hangers, supports, and restraint of system piping shall be in accordance with NFPA 13.

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. Conceal piping in spaces that have finished ceilings. In stairways, locate piping 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). Piping shall not obstruct the minimum means of egress clearances required by NFPA 101. Pipe hangers, supports, and restraint of system piping shall be installed accordance with NFPA 13.
- C. Pitching of Pipe: Conform to the requirements of NFPA 13.
- D. Drains: Provide drips and drains, including low point drains, in accordance with NFPA 13. Pipe drains to discharge at safe points outside of the building. Do not provide a direct drain connection to sewer system or discharge into sinks.
- E. Inspector's Test Connection: Install and supply in conformance with NFPA 13, and discharge to the exterior of the building. Locate test connection in an area not susceptible to mechanical damage. For dry-pipe sprinkler systems more than 2800 L (750 gal), provide the number of equivalent sprinkler outlets as calculated for water delivery time in accordance with NFPA 13.
- F. Provide escutcheon plates for exposed piping passing through walls, floors or ceilings.
- G. 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. Where core drilling is used in lieu of sleeves, also seal space around penetrations. Seal penetrations of walls, floors and ceilings of other types of construction.

- H. Painting of Pipe: In finished areas where walls and ceilings have been painted, paint primed surfaces with two coats of paint to match adjacent surfaces, except paint valves and operating accessories with two coats of gloss red enamel. Exercise care to avoid painting sprinklers. Painting of sprinkler systems above suspended ceilings and in crawl spaces is not required. Any painted sprinkler shall be replaced with a new sprinkler.
- I. Sprinkler System Signage: Provide rigid sprinkler system signage in accordance with NFPA 13 and NFPA 25.
- 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.

3.2 INSPECTION AND TEST

- A. Preliminary Testing: Flush newly installed systems prior to performing 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, pneumatically test system, test air compressor fill time to operating pressure within 30 minutes, and trip test system as specified in NFPA 13, in the presence of the Contracting Officers Representative (COR) or their designated representative. For dry-pipe sprinkler systems with a quick-opening device, the system shall be trip tested with the quick-opening device functioning and with the quick-opening device disabled. Record the time to water delivery for each test. Demonstrate pitch of pipe is in compliance with NFPA 13.
- 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 inspection and testing. Include the operation of all features of the systems under normal operations in test. At the conclusion of final inspection and testing, blow out dry-pipe system piping using compressed air. Verify piping is fully drained, including low point drains.

3.3 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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