

Fire Suppression and Protection Systems

21.10.00

Description:

The purpose of the section is to highlight the current applicable UMD Design Standards for the selection, installation and expected performance of fire protection systems.

Related Sections:

- 28 31 00 Fire Alarm Systems

Effective Date:

January 1, 2023

Applicable Standards:

All requirements of State of Maryland and the Office of the State Fire Marshal shall apply to the specifications and design requirements, including the following:

- NFPA 1 National Fire Prevention Code
- Underwriters Laboratories Inc. (UL), Fire Protection equipment list
- Factory Mutual Approval Guide
- Maryland Occupational Safety and Health Act
- NFPA 13 - Standard for the Installation of Sprinkler Systems
- NFPA 13D - Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and manufactured Homes
- NFPA 13R - Standard for the Installation of Sprinkler Systems in Residential occupancies up to and Including Four Stories in Height
- NFPA 14 - Standard for the Installation of Standpipe and Hose Systems
- NFPA 15 - Standard for the Installation of Water Spray Fixed Systems
- NFPA 20 - Standard for the Installation of Centrifugal Fire Pumps
- NFPA 70 - National Electrical Code
- NFPA 72 - National Fire Alarm Code
- NFPA 101 - Life Safety Code
- NFPA 170 - Fire Safety Symbols
- NFPA 231 - General Storage
- NFPA 231C - Rack Storage of Materials
- NFPA 1963 - Fire Hose Connections
- UMCP Design Criteria Facilities Standards Manual for Architecture and Engineering Services (DCFS)
- Washington Suburban Sanitary Commission (WSSC) - Plumbing and Gas Fitting Regulations

General Requirements:

Piping

- Connection shall be made to the UMCP on-site water system. The connection between system piping and underground piping shall be made with a cast iron flanged piece, properly fastened.
- A backflow preventer shall be installed in accordance with WSSC regulations. The backflow preventer shall be listed by UL for fire protection use.
- All piping exposed installed outside, or otherwise exposed to weather, shall be externally galvanized.

Valves

All valves on connections to water supply to sprinklers shall be UL listed butterfly type indicating valves except for the following which shall be O.S. & Y:

- All indicating valves on the supply side of the backflow preventer.
- The indicating valve immediately adjacent to the backflow preventer on the system side.
- All indicating valves on the suction side of the fire pump.
- Where indicated on the contract drawings.

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21.10.00

- Post Indicator Valve - when indicated on the contract drawings, a gate valve on incoming water service shall be operable by a UL listed post indicator valve with tamper switch. Post indicator valve shall be installed a minimum of 40 feet from the building.

Piping Accessories

- No sprinkler piping is to be supported from any mechanical or electrical devices and/or equipment (ducts, lights, etc.). No chains, wire or perforated band iron will be permitted for hangers. Hanger assemblies installed outside, or otherwise exposed to weather, shall be externally galvanized.
- Install iron pipe sleeves of ample diameter at all points where pipes cut beams or floors or walls, so sized and installed that sprinkler pipes will not bend.
 - Install sleeve before walls or concrete work is built or poured, with sleeves being flush with wall surfaces.
 - Sleeves for underground pipes shall be caulked with oakum and molten lead and be watertight.

Sprinklers

- Sprinklers that may be subject to mechanical damage due to their location (under stairwells, low hanging sprinklers in corridors, storage rooms, under ducts, etc.) shall be provided with guards listed by UL for the model and type of sprinkler used.
- Sprinklers under open grating shall be provided with approved shields.

Fire Department Connections

- Each fire department connection shall be the flush type.
- Free standing type fire department connections shall only be installed when approved by the departments of Facilities Management and shall be located a minimum of 40 feet from the building.
- Each fire department connection shall have 2 (two) 2-1/2 inch inlets with threads conforming to the American National Fire Hose Connection Screw Thread as defined in NFPA 1963, equipped with UL listed screw caps with pin lugs and chains.
- The Fire Department connections shall be not less than two feet and not more than 3 feet 6 inches in elevation, measured from the ground level to the center line of the inlets.
- Two Fire Department connections are required when two or more risers are provided.
- Provide a standardized FDC sign at the FDC location. Reference NFPA 170, Table 5.2.

Drains and Test Piping

- All risers, including the alarm check valve, shall be equipped with drains with sizes as specified in NFPA 13. The alarm checkvalve drain ("main drain") shall be piped to the outside of the building at a point free from causing water damage. Where this arrangement is not practical, the drain shall be piped to a floor drain or sump approved for the purpose by the Departments of Facilities Management and the Department of Environmental Safety.
- All drains and test piping shall be piped to the outside of the building at a point free from causing water damage. Where this arrangement is not practical, the drain shall be piped to a floor drain or sump approved for the purpose by the Departments of Physical Plant and the UMCP/FM.

Dry Pipe System

- Dry systems shall only be installed when adequate heat or insulation cannot be provided to prevent sprinkler piping from freezing.
- An air compressor (Automatic Sprinkler Co. Inc., www.reliablesprinkler.com - Reliable Model A or equivalent) with an automatic air maintenance device (Automatic Sprinkler Co. Inc., www.reliablesprinkler.com - Reliable Model B-1 (or equivalent) shall be, installed and sized in accordance with NFPA 13.
- A separate test connection shall be provided in accordance with NFPA 13 to test the dry-pipe system alarms.

Pre-Action System

- Pre-action systems shall only be installed where required by UMCP/FM and the facility program.
- The pre-action valve shall be activated by rate compensated heat detectors or cross-zoned smoke detection as approved UMCP.

Fire Pump, Motor and Controller

- A fire pump shall only be installed when the existing water supply is not adequate to meet the required sprinkler demand.

Dry Standpipe System

- Dry standpipe systems shall be the manual dry type as defined by NFPA 14.
- Each standpipe riser shall be installed with a UL listed 2½ inch NST fire department hose valves with screw caps on each floor in an accessible, protected, and readily visible location in accordance with NFPA 14.
- Each dry standpipe riser shall have a drain sized and located in accordance with NFPA 14. Each drain shall be piped outside the building in accordance with the piping section which precedes this section.
- All dry piping shall be installed so that the entire system may be drained. The number of auxiliary drains shall be kept to a minimum.
- All dry piping, hangers and fittings shall be galvanized.
- Each dry standpipe shall be provided with an air and vacuum valve installed at the top of each riser. The air and vacuum valve shall be a 1 inch APCO Series 140 Air and Vacuum Valve, manufactured by Valve and Primer Corporation or approved equal.

Protection

- All exposed piping devices (non-brass and chrome) are to be painted with two coats of bright red paint. Painting to conform to the protective coating section of the specifications.

Qualifications

- System design and installation shall be supervised by an experienced sprinkler system technician or fire protection engineer with not less than five years of experience with sprinkler systems alarm systems.
- Shop drawings shall be prepared and signed by a Class III Sprinkler Contractor licensed in the State of Maryland or a registered fire protection engineer.
- The signature of the technician or engineer constitutes an affidavit that the statements, representations, and information presented in the submittal constitute a complete operational system conforming to applicable state codes and recognized engineering practices.
- All field installation work shall be performed by a Class III Sprinkler Contractor licensed in the State of Maryland.