

Division 21 | Fire Suppression

Section includes various guidelines for Water-Based Fire-Suppression Systems including Fire Hydrants, locking Fire Department Connection Plugs for Fire Department Connections (FDC'S), Fire Sprinkler Systems, and Clean Agent Fire-Suppression Systems.

This design guideline is written to the designer of record (DOR). This guideline is written to document UA standards of work, assist the designers in ensuring UA standards are incorporated into the contract documents and provide a resource to facilitate the design process. It is the designer of record's responsibility to coordinate the criteria set forth in these design guidelines and in conjunction with the manufacturer requirements and use the most stringent standard.

Section 21 10 00 – Water-Based Fire-Suppression Systems

Underground Piping

A. Lead-In Visual inspection/Hydrostatic test

1. The lead-In shall be visually inspected by the UA Inspector before being covered or the slab is poured. See Fire Main Underground Inspection checklist for details.
 - a. If the lead-In is not a listed one piece factory tested riser, the contractor shall complete a hydrostatic test before the slab is poured. The hydrostatic test of the lead-in shall be witnessed by the UA Inspector and documented by the contractor on the *Contractor's Material and Test Certificate for Underground Piping*.
 - b. The lead-in shall be tested at 200 psi or 50 psi in excess of normal system pressure, whichever is greater, and shall maintain that pressure at ± 5 psi for 2 hours.

B. Fire Main Underground Piping Visual Inspection/Hydrostatic Test

1. Visual inspection - All underground piping, joints, restraints, thrust blocks, etc. shall be visually inspected by the UA Inspector before the trench is backfilled. All underground pipe connections from the water supply to the lead-in shall be completed before calling for this inspection. After the visual inspection is passed, the trench can be backfilled, provided the installing contractor takes responsibility for locating and correcting leakage. If the contractor wishes to complete the hydrostatic test in conjunction with the visual inspection, it is permissible and required to backfill the trench between joints, so long as all joints and thrust blocks remain exposed for the visual inspection. See Fire Main Underground Inspection checklist for details.

C. Fire Main Underground Piping Hydrostatic Test and Flushing

1. Hydrostatic test - The trench shall be backfilled between joints to prevent movement of pipe before the hydrostatic test is conducted. All fittings, restraints, and thrust blocks shall be exposed if a visual inspection has not been completed by the UA Inspector prior to the hydrostatic test. Where required for safety measures, the trench is permitted to be completely backfilled after the visual inspection and before the hydrostatic test, provided the installing contractor takes the responsibility for locating and correcting leakage.
 - a. All piping and attached appurtenances(including FDC) subjected to system working pressure shall be hydrostatically tested at 200 psi or 50 psi in excess of normal

- system pressure, whichever is greater, and shall maintain that pressure at ± 5 psi for 2 hours.
2. Flushing of underground piping - Underground piping, from the water supply to the system riser, and the lead in connection to the system riser shall be completely flushed before the connection is made to aboveground sprinkler system piping. Flushing should be witnessed by the UA Inspector. The contractor should be prepared to complete the required flush procedure at the conclusion of the hydrostatic test.
 - a. Flushing procedures are detailed on the *Contractor's Material and Test Certificate for Underground Piping* (NFPA 24).
 3. After the visual inspection, hydrostatic test, and required flushing is completed, the contractor shall produce the *Contractor's Material and Test Certificate for Underground Piping*. The certificate shall be completely filled out and signed by the installing contractor and general contractor before it will be signed or accepted by the UA Inspector. A copy of the certificate shall be provided to the sprinkler installer. The installer shall not stack the sprinkler riser until he has a copy of the signed certificate and is sure that the underground flush has been completed.

Aboveground Piping

A. Fire Sprinkler Overhead Inspection/ Hydrostatic Test

1. All overhead piping and joints must be uncovered and exposed. All hangers must be uncovered and exposed. See Sprinkler Overhead Inspection checklist for details.
2. Hydrostatic testing should be conducted concurrently with the overhead inspection in most cases. Generally, overhead inspections and hydrostatic tests are completed floor by floor. In cases of very large buildings, it may become necessary to test each floor in sections. A plan should be developed to ensure that the entirety of the system is tested as required by NFPA 13.
 - a. Overhead piping will be visually inspected for leaks. The test will be at 200 psi or 50 psi in excess of system operating pressure, whichever is greater. The piping shall hold the pressure for two hours with no pressure drop.
 - b. Upon completion of the hydrostatic test, the overhead piping shall be drained in the presence of the UA Inspector.
3. Standpipe systems shall be visually inspected and hydrostatically tested as complete systems, rather than on a floor or sectional basis.
4. After the overhead inspections and hydrostatic tests are completed for a floor or section of a floor, the contractor shall produce the *Contractor's Material and Test Certificate for Aboveground Piping*. The certificate shall be completely filled out and signed by the installing contractor and general contractor before it will be signed or accepted by the UA Inspector.



Fire Pumps

- A. Fire Pump Visual Inspection, Hydrostatic Testing, and Certification testing
 - 1. Suction piping shall be flushed in accordance with 2013 NFPA 20, Chapter 14.
 - 2. Suction and discharge piping shall be hydrostatically tested to the same standards as aboveground piping.
 - a. The contractor shall produce a *Contractor's Material and Test Certificate for Aboveground Piping* for the pump piping.
 - 3. A visual inspection of the fire pump and related components and the fire pump room shall be conducted before the Field Acceptance Test is completed.
 - 4. Field Acceptance Testing shall be conducted in the presence of the pump, engine, controller, ATS manufacturer(s) or their factory authorized representative. The UA Inspector shall be present for the acceptance testing and presented with a copy of the completed test report.

Sprinkler System Final Acceptance Testing and Inspection

- A. A final fire protection system final inspection shall be conducted prior to the CO when all components of the fire protection system and fire alarm system are fully operational and ready to be placed into service. See Sprinkler System Final Inspection checklist for details.

Section 21 11 19 – Fire Department Connections (FDC) & Locking FDC Plugs

A fire department connection (FDC) is required as part of a water-based suppression system as the auxiliary water supply. These connections give the fire department the capability of supplying the necessary water to the automatic sprinkler or standpipe system at a sufficient pressure without pressurizing the underground supply. The FDC also serves as an alternative source of water should a valve in the primary water supply be closed. A fire department connection does not, however, constitute an automatic water source.

General

Fire department connections shall be installed in accordance with the NFPA standard applicable to the system design and shall comply with Sections 912.2 through 912.6.

Newly installed FDC's are required to be equipped with locking Knox® Brand FDC plugs. This is a requirement of the City of Tuscaloosa, which provides fire department response to the University of Alabama Campus.

Product

Acceptable product is Model 3041 Knox® Brand 2.5" FDC plug in bright stainless finish with Swivel Guard™.

Execution

The FDC plugs shall be installed as soon as the FDC is in place to prevent entry of debris into the system. Contact the project Field Coordinator to make arrangements for the installation of the plugs.

Section 21 22 00 – Clean Agent Fire Extinguishing Systems

When protecting critical assets such as IT systems, data storage rooms, or irreplaceable items like customer/client records, intellectual property, art, antiques and artifacts, and other archived documents – using water will just compound the damage. Using a Clean Agent fire suppression system in this case is the best solution.

General

The design, installation, testing and maintenance of the Clean Agent Extinguishing System shall be in accordance with the applicable requirements set forth in the latest edition of the following codes, standards, and third party approval agencies:

1. NFPA 2001: Standard on Clean Agent Fire Extinguishing Systems
2. NFPA 70: National Electrical Code
3. NFPA 72: National Fire Alarm and Signaling Code
4. Factory Mutual (FM)
5. Underwriters Laboratories (UL)
6. Requirements of the local Authority Having Jurisdiction (AHJ)

System requirements to include Clean-Agent Fire-Suppression with addressable control panel. System to also include outputs for future connection to the buildings fire alarm system. All Clean-Agent Fire-Suppression Systems to be fully compliant with NFPA 2001 Standard on Clean Agent Fire Extinguishing Systems.

Products

Materials and equipment shall be of a single manufacturer. Any alternates must be approved by The University of Alabama Mechanical Engineer and/or the UA Building Life Safety Inspector.

Acceptable Manufacturers:

1. Ansul Sapphire System
2. Fike Ecaro-25 System
3. Amerex IS System

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