DIVISION 21 - FIRE SUPPRESSION

Contents

21 05 00 Common Work Results for Fire Protection Systems

Design Standards

1. Specify a water-based fire suppression system in all buildings with sleeping quarters.

2. Except as allowed by the International Existing Building Code as adopted by Chapter 5 of OSE Manual, existing buildings at Clemson University that undergo renovations that exceed 50% of the building floor area shall be required to meet the same Fire Suppression Systems requirements as new construction.

3. Designer Qualifications: Fire Sprinkler System design shall be entrusted only to Professional Engineers with training and experience in fire sprinkler and fire alarm system designs that are listed in the SC State Board of Registration for Professional Engineers.

4. Provide an engineer-sealed Fire Protection System design that fulfills Clemson's Fire Suppression System Installations and Alterations Requirements. The design shall include all Underground and Above Ground components of Fire Sprinkler, Standpipe, Hose Station, Fire Hydrant, and Fire Pump Systems with a design for a complete system including specifications and drawings that show site plans, floor plans, piping schedules, area hazard classification, building cross sections, device types and locations, wiring diagrams, power requirements, back-up power supplies, including any necessary details to accurately depict the scope of work included in the project. Design must include all nozzles, piping, bracing, hangers, valves, tanks, and components necessary to furnish a complete system for the facility.

5. Risers shall be designed in accordance with University Facilities Domestic and Fire Riser Schematic.

6. For projects not on Clemson's main campus, consult with the responding Fire Department to coordinate the preferred type and location of hydrants and Fire Department Connections.

7. See Division 28, Section 28 30 00, for additional information and instructions concerning the design and installation of Fire Detection and Alarm Systems.

Submittals

1. Specify what submittals must be made to the appropriate AHJ's. Specify which approvals must be obtained before work may begin. Clemson University Fire Code Official and Life Safety Shop must approve all plans that include or affect any Fire Protection System.

Materials and Components

1. Specify that all materials and components be listed by an approved agency.

2. Specify that all materials and components used in any new Fire Protection system

must be new. Reused or refurbished materials are not acceptable. For upgraded and up-fitted systems, reuse of existing materials and/or components is acceptable only when approved approved by the designer of record, Fire Code Official and Life Safety Shop

3. Specify that all piping is labeled in accordance with Section 33 05 97.

Acceptance Testing

1. Specify that all systems be tested according to codes as adopted by Chapter 5 of OSE Manual and that all required documentation of testing and test results be submitted to the Owner and Engineer of Record.

2. Specify that the Contractor give the Owner and Engineer a minimum of two (2) working days' notice before conducting tests to allow the Owner and/or Engineer the opportunity to witness the testing.

3. The CU Fire Code Official, or his designee, shall be present to witness testing of all fire protection apparatus.

21 10 00 Water-Based Fire Suppression Systems

21 11 00 Fire Suppression Systems Water Piping

1. Specify that underground piping and fittings shall be Ductile Iron Minimum Pressure Class 51 with thrust resisting couplings at all fittings, and at least 10 linear feet beyond the fitting. Underground piping also must comply with Divisions 31 (Earthwork) and Division 33 (Utilities) and the Urban Forest and Landscape Management Policy.

2. Specify that above ground piping be steel and a minimum Schedule 40 with threaded fittings and connections for piping of nominal diameters up to 2.5". Piping of nominal diameters of 2.5" and above are to be a minimum of Schedule 10 and joined with roll grooved, welded, or flanged connections. At no time shall segmented welding or plain-end mechanical couplings/fittings be used that employ steel gripping devices to bite into the pipe as a means of joining.

3. Specify that drainage piping and dry piping must be galvanized, of the same minimum schedule and joined with the methods as listed directly above.

4. Specify that all system drains are connected to storm sewer outside of the building and constructed in such a way that landscaping, public ways, nor accessible routes are disturbed.

5. Specify that control valves for Fire Sprinkler System water supply be installed on each floor of the building and are readily accessible. These valves shall also have a tamper switch that must be monitored when a Fire Alarm System is provided.

6. Provide a hose valve on every intermittent landing when fire risers as installed in stairways.

7. Specify that all hangers must conform to NFPA 13. Powder-actuated fasteners are not permitted.

8. Specify that all water-based fire suppression systems on Clemson's Main Campus are designed to operate with 150 psi of delivery pressure at the FDC. For University buildings in other locations, contact the Fire Code Official.

9. Specify that any signage attached to fire suppression piping shall be done by external mechanical fasteners such as U-bolts, clamps, etc. that do not drill into or in any way compromise the structural integrity of the piping system.

10. Specify that fire sprinkler systems are to be protected from freezing and are not to be subjected to temperatures below 40ºF. Any alternate heat sources shall be approved by Fire Code Official.

11. Specify that all underground piping shall be flushed at a minimum of full system flow until the water runs clear before connecting the underground piping to the fire sprinkler system or fire pump if a pump is required.

12. Specify that all sprinkler piping that is concealed in locations such as above acoustical ceilings, in mechanical rooms, etc. is to be painted red.

21 11 16 Fire Hydrants

1. Specify that placement of all fire hydrants are to be pre-approved by the Fire Code Official.

21 11 19 Fire Department Connections

1. Specify that placement of all fire department connections are to be pre-approved by the Fire Code Official.

2. All FDC's installed on Clemson's Main Campus are to be designed to operate at 150 psi. For University buildings in other locations, contact the Fire Code Official.

3. Free standing FDC's are to be installed according to the CUFD Free Standing FDC Standard. Both the location and orientation of the connection shall be approved by the University Fire Code Official.

4. Specify that minimum Emergency Vehicle Turning Radius is to be per Clemson University Fire Department's Access Design Requirements. The Clemson University Fire Code Official must approve all proposed roadways, driveways, and parking lots to ensure adequate accessibility for firefighting apparatus.

21 13 16 Dry-Pipe Sprinkler System

1. Nitrogen generators shall be used on all new construction and new system installations.

2. If a compressed air system is allowed, all air compressors for fire service shall be UL listed and approved by the Fire Code Official.

21 22 00 Clean-Agent Fire Extinguishing Systems

1. When deemed appropriate by the Fire Code Official due to serving sensitive locations such as computer rooms, electronic systems, archives etc., the system shall be a clean-agent system in compliance with NFPA 2001 as referenced in the IBC as adopted by Chapter 5 of OSE Manual.

PRODUCTS AND MATERIALS- DIVISION 21 – FIRE SUPPRESSION

Fire Hydrants

- Mueller Super Centurion or approved equal

Emergency Access Key Cabinets

- Series 4400 Knox Box: Model 4443 (Recessed Mount, Dark Bronze)

Underground Piping

- AWWA C150/C151 ductile iron, thickness class 51, bituminous coated, cement lined, per ANSI A21.4, with UL approved thrust-restraint type couplings.

Above Ground Piping

- ASTM A795; ANSI/ASTM A53; ASTM A135.
- Piping less than or equal to 2.5” diameter shall be Schedule 40 with threaded couplings.
- Piping greater than 3” diameter shall be minimum Schedule 10, with roll grooved or welded couplings.