

Section Title
Number

21 00 00 FIRE SUPPRESSION

21 05 00 Common Work Results for Fire Suppression

21 05 17 Sleeves and Sleeve Seals for Fire Suppression Piping

21 05 48 Vibration and Seismic Controls for Fire Suppression Piping and Equipment

21 10 00 WATER-BASED FIRE SUPPRESSION SYSTEMS

21 12 00 Fire Suppression Standpipes

21 13 13 Wet Pipe Sprinkler Systems

21 13 14 Kitchen Hood Chemical Fire Suppression Systems

21 13 16 Dry Pipe Sprinkler Systems

21 20 00 FIRE EXTINGUISHING SYSTEMS

21 22 00 Clean Agent Fire Extinguishing Systems

Section Title
Number

21 00 00 FIRE SUPPRESSION

Description

See Division 1 for code compliance documents.

New installations, remodel and renovations of all fire life safety systems, fire alarms systems, automatic suppression system, alternate fire suppressions systems, hydrants, fire mains and underground supply pipe shall be reviewed and approved by NAU Fire Marshal prior to any construction start.

NAU’s Fire Life Safety personnel shall be present during any shut down or activation of sprinkler or alarm systems. Notify NAU Fire Life Safety of shut down at least 48 hours in advance. Fire sprinkler system modification shall be done as specified in NFPA 13 in all respects and meet or exceed the most stringent applicable codes. The fire sprinkler system must not be left inoperative overnight. Therefore, all work shall be done in such a way that caps and plugs may be used to allow the contractor to reactivate the system each afternoon before leaving the premises. After all sprinkler work is completed, the sprinkler system shall be hydrostatic tested to 200 psi for two hours by the contractor, but with the appropriate NAU Fire Life Safety representative present.

Materials and equipment shall conform to the requirements of the Underwriter’s Laboratories, Inc. or the Factory Mutual Engineering Corporation for systems of the type indicated. The contractor shall submit proof that the items furnished under this specification conform to such requirements. The Underwriter’s Laboratories, Inc. label or seal, or listing in the Fire Protection Equipment List will be acceptable evidence that the items conform to the requirements of the Underwriter’s Laboratories, Inc.

The installation of the entire system shall be executed by a representative or licensee of a manufacturer of approved sprinklers and devices and that installer is now, and has been, engaged in the installation of automatic sprinkler systems and fire suppression devices.

Heat tracing for fire suppression piping exposed to freezing conditions will not be specified for new buildings and shall be replaced wherever possible in renovations.

Design wet pipe sprinkler systems, unless installed in areas subject to freezing. Dry pendant or sidewall sprinklers and dry pipe system shall be used in areas subject to freezing.

Provide system signage and identification in accordance with NFPA 13. Furnish appropriate signage for all post indicator valves, fire department connections, and sectional valves. Signage shall indicate specific building and/or zone/area served.

Section Title
Number

Construction Phase

Shop drawings shall incorporate all of the design features shown on the contract drawings. Any deviations deemed necessary by the designer shall be clearly identified on the shop drawings, ie: clouded.

Contractor shall submit shop drawings to the Design Professional (DP) and NAU project manager for review and approval, prior to submittal to the NAU Fire Marshal. Once approved by the DP, contractor shall submit to the NAU Fire Life Safety using the NAU Permit Request form.

All new construction shall be fully sprinklered. Existing buildings being altered, modified or renovated shall be updated to become fully sprinklered. The NAU Fire Marshall shall approve exceptions to this requirement.

Inspections and Final Acceptance:

At system acceptance the Contractor shall provide all relevant manual(s), Technical/Maintenance manual(s), and accurate map/plan indicating all system components, piping, control valves and sprinkler head location.

Provide an 8 ½" x 11" Map Key Plan for each floor of building, indicating the location of the following:

- Main Control Valves
- Fire Alarm Panel
- Fire Department Connection
- Back Flow Preventer (if provided)
- Fire Alarm Bell
- Auxiliary Drain Valves
- Inspectors Test Connections

Key Plan shall be provided at main control/zone valve location.

Provide an additional copy of system “as-built” drawings for use of NAU Fire Marshal.

Contractor shall complete and provide: Contractor’s material and test certificate for underground, and above ground piping. NAU Fire Marshal shall witness/inspect piping installation, and system flushing and hydrostatic testing.

Sprinkler piping installation shall be visually inspected by NAU Fire Marshal and witness a 200 psi hydro-test on a “completed” floor by floor basis. All piping, hangers and fittings shall be exposed during the inspection.

NAU Fire Marshal to be notified 48 hours in advance of all system tests, e.g. underground flushing, hydrostatic test, flow alarm test, fire pump test (if applicable),

Section Title
Number

fire alarm/final acceptance test.

Contractor shall provide two (2) year warranty on all system equipment and installation.

21 05 00 Common Work Results for Fire Suppression

21 05 17 Sleeves and Sleeve Seals for Fire Suppression Piping

Part 1 – General

Part 2 - Products

Sleeves

Cast-Iron Wall Pipes: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.

Galvanized-Steel-Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint

Sleeve Seal Systems

Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.

Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.

Pressure Plates: Carbon steel.

Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, of length required to secure pressure plates to sealing elements.

Part 3 - Execution

For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.

Sleeves are not required for core-drilled holes.

Section Title
Number

Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials.

Sleeve and Sleeve Seal Schedule

Exterior Concrete Walls above Grade:

- Piping Smaller Than 6": Cast-iron wall sleeves.
- Piping 6" and Larger: Cast-iron wall sleeves

Exterior Concrete Walls below Grade:

- Piping Smaller Than 6": Cast-iron wall sleeves with sleeve-seal system
- Piping 6" and Larger: Cast-iron wall sleeves with sleeve-seal system

Concrete Slabs-on-Grade:

- Piping Smaller Than 6": Cast-iron wall sleeves with sleeve-seal system
- Piping 6" and Larger: Cast-iron wall sleeves with sleeve-seal system

Concrete Slabs above Grade:

- Piping Smaller Than 6": Galvanized-steel-pipe sleeves
- Piping 6" and Larger: Galvanized-steel-pipe sleeves

Interior Partitions:

- Piping Smaller Than 6": Galvanized-steel-pipe sleeves
- Piping 6" and Larger: Galvanized-steel-sheet sleeves

21 05 48 Vibration and Seismic Controls for Fire Suppression Piping and Equipment

Part 1 – General

Flagstaff Seismic Design Category is "C"

Quality Assurance

Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.

Part 2 – Products

Vibration Isolators

Pads: Oil- and water-resistant resilient material

Section Title
Number

Mounts

Cast-ductile-iron or welded steel housing containing two separate and opposing, oil-resistant rubber or neoprene elements that prevent central threaded element and attachment hardware from contacting the housing during normal operation.

Restrained Mounts

Cast-ductile-iron or welded steel housing containing two separate and opposing, oil-resistant rubber or neoprene elements that prevent central threaded element and attachment hardware from contacting the housing during normal operation.

Seismic Restraint Devices

Rated strengths, features, and applications shall be as defined in reports by an evaluation service member of an agency acceptable to authorities having jurisdiction.

Structural Safety Factor

Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.

Part 3 – Execution

****END OF SECTION****

Section Title
Number

21 00 00 WATER-BASED FIRE SUPPRESSION SYSTEMS

21 12 00 Fire Suppression Standpipes

Part 1 – General

Part 2 – Products

Fire Department Connection (FDC)

Siamese Polished brass

Threaded to match those of local fire protection service

Identified with plate having integral raised letters

NAU Standard for Wet Standpipes

Class I, manual

Part 3 – Execution

Check valves, sprinkler valves and flow switches and main drain valve shall be readily accessible.

At check valves, support piping independent of valve to allow for service removal without additional pipe support.

FDC shall be wall mounted to the building structure.

Locate the inspector’s test ports at the most hydraulically remote points in the system.

Inspector’s Test Connections and main drain shall be piped to a suitable location outside of building (confirm location with NAU Fire Marshal). Do not pipe to a floor drain, janitor’s mop sink or similar. Design exterior drains to prevent flooding or damage to landscaping, and to prevent wetting of walkways. Provide concrete splash block.

All FDC, stand pipe hose connections shall be provided with approved locking fire department connection caps. NAU Fire Marshal will provide appropriate manufacture order form.

21 13 00 Fire Suppression Sprinkler Systems

21 13 13 Wet Pipe Sprinkler Systems

Part 1 – General

Section Title
Number

Part 2 – Products

Sprinkler Heads

Viking and Tyco (or approved equal)

Sprinkler Types

Rooms without Ceilings: Upright sprinklers

Rooms with Suspended Ceilings: Recessed sprinklers.

Wall Mounting: Sidewall sprinklers.

Spaces Subject to Freezing: Upright, pendent, dry sprinklers; and sidewall, dry sprinklers.

Sprinkler Finishes

Recessed Sprinklers: White or chrome, with factory applied white escutcheon.

Upright, Pendent and Sidewall Sprinklers: Brass or rough bronze in finished spaces exposed to view; and in unfinished spaces not exposed to view.

Sprinkler System Piping

Piping between Fire-Department Connections and Check Valves: Galvanized, standard-weight steel pipe with cast-iron threaded fittings.

Standard weight black steel pipe with grooved ends; uncoated, grooved end fittings for steel piping; grooved end pipe couplings for steel piping and grooved joints.

Standard weight black steel pipe with plain ends steel welding fittings; and welded joints.

Part 3 – Execution

Sprinkler protection shall be provided in all spaces including, but not limited to, elevator machine rooms, computer rooms, telephone switch rooms, loading docks, plumbing or utility closets, and generator rooms. Exception: Sprinklers are not required where specifically exempted by NFPA 13.

Install quick response sprinklers (QRS) in all areas using 286°F intermediate temperature rating. On retrofit projects, replace existing standard sprinklers with QRS type sprinklers.

Install quick response sprinklers with high temperature rating of 286°F or higher in elevator shafts, elevator pits, and elevator machine rooms. Install sprinklers in elevator shafts and pits only where required by NFPA 13.

Hydraulic calculations and design shall be prepared and sealed by a registered professional engineer in the State of Arizona, and Sprinkler System Shop drawings to be submitted to the NAU Fire Marshal for approval.

Section Title
Number

Hydraulic design calculations shall include an allowance for a 10PSI pressure drop for the future installation of a back-flow preventer.

Provide fire flow information on shop drawings and hydraulic calculations.

Sprinkler heads shall be located in the center of individual ceiling tiles.

Sprinkler piping installation shall be visually inspected by NAU Fire Marshal and witness a 200 psi hydro-test on a “completed” floor by floor basis. No piping, hangers and fittings shall be covered prior to the inspection.

System installer

Installation personnel shall be supervised by persons who are qualified and experienced in the installation, inspection and testing of automatic building fire suppression systems. Company shall be licensed or certified by the State or local authority.

21 13 14 Kitchen Hood Chemical Fire Suppression Systems

Part 1 – General

Part 2 – Products

Restaurant hood suppression systems shall be new Ansul R102 wet chemical suppression systems.

All exposed piping, fittings and conduit shall be chrome or chrome sleeved.

Part 3 – Execution

Installation contractor shall be a factory certified authorized Ansul distributor.

System Designer

Fire suppression system plans and specifications shall be developed in accordance with NFPA 17A by persons who are experienced in the proper design, application, installation, and testing of wet chemical fire suppression systems.

System Installer

Installation personnel shall be supervised by persons who are qualified and experienced in the installation, inspection and testing of fire alarm systems. Qualified personnel shall include, but not limited to, the following:

- Factory trained and certified personnel
- National Institute of Certified in Engineering Technologies – NICET –Fire alarm level II
- Personnel licensed or certified by a State or local authority

Section Title
Number

It is the responsibility of the fire suppression Contractor to provide a complete set of the installation plans, specifications and equipment submittals.

The plans shall include the following:

- Pipe size, length and arrangement of connected piping
- Description and location of nozzles
- The location and function of detection devices
- Operating devices
- Auxiliary equipment
- Electrical circuitry

All new distribution piping shall be flushed during final inspection. Ansul flushing compound shall be used and the flushing shall be witnessed by NAU Fire Marshal. A complete functional test shall be performed during the final acceptance inspection. This test will include a “puff” test with all nozzles installed. Contractor shall provide two (2) year warranty on all system equipment and installation.

21 13 16 Dry Pipe Sprinkler Systems

Part 1 – General

Part 2 – Products

Piping between Fire-Department Connections and Check Valves: Galvanized, standard-weight steel pipe with cast-iron threaded fittings

Sprinkler Heads

Sprinkler Types:

Rooms without Ceilings: Upright sprinklers.

Rooms with Suspended Ceilings: Dry recess sprinklers

Wall Mounting: Dry sidewall sprinklers.

Spaces Subject to Freezing: Upright, dry pendent sprinklers; and dry sidewall sprinklers as indicated.

Sprinkler Finishes

Dry Recess Sprinklers: White, with factory applied white escutcheon.

Upright, Pendent, and Sidewall Sprinklers: Brass or rough bronze in finished spaces exposed to view and unfinished spaces not exposed to view; wax coated where exposed to acids, chemicals, or other corrosive fumes.

Part 3 – Execution

****END OF SECTION****

Section Title
Number

21 20 00 FIRE EXTINGUISHING SYSTEMS

21 22 00 Clean Agent Fire Extinguishing Systems

Part 1 – General

System Description: Discharge and total flooding of hazard areas with fire-extinguishing clean agent.

Discharge within 10 seconds and maintain concentration by volume for 10-minute holding time.

Quality Assurance

FMG-approved and NRTL-listed components.

Part 2 – Products

Part 3 – Execution

Installation contractor shall be a factory certified authorized distributor.

System Designer

Fire alarm system plans and specifications shall be developed in accordance with NFPA 72, NFPA 2001, by persons who are experienced in the proper design, application, installation, and testing of clean agent fire suppression systems.

System Installer

Installation personnel shall be supervised (to include conduit, boxes and wiring installation) by persons who are qualified and experienced in the installation, inspection and testing of clean agent fire suppression systems. Qualified personnel shall include, but not limited to, the following:

- Factory trained and certified personnel
- National Institute of Certified in Engineering Technologies – NICET, Fire alarm level II
- Personnel licensed or certified by a State or local authority

System Requirements

System to be prior approved by NAU Fire Marshall.

Clean Agent shall be designed as total flooding application for normally occupied areas.

Section Title
Number

Each area protected by an alternate automatic fire suppression system shall be protected with a dry pipe pre-action sprinkler system.

Multiple protected hazards shall be independently detected and released.

Each protected hazard shall be provided with standard U.L.-type delay discharge abort.

System shall release with cross zone detection and include pre-discharge warning.

All Detection and Control/Release system junction boxes shall be painted red and “J” box covers shall be labeled in bold 1” black decal letters “F/P”.

Signal line circuit wiring shall comply with the NFPA Style “6” requirements.

Notification circuit wiring shall comply with the NFPA Style “Z” requirements.

Inspections and Final Acceptance

All distribution, actuation piping, conduit, boxes, fittings and equipment back boxes shall be inspected by NAU Fire Life Safety. No work can be covered up prior to installation inspection. Inspection request shall be in accordance with Division 1.

Contractor shall perform piping network flow test (puff test) and enclosure integrity test.

At system acceptance the Contractor shall provide all relevant manual(s), Technical/Maintenance manual(s), and accurate map and AutoCAD/DOS compatible file on system component location along with device identification and address. The Contractor shall provide Certificate of completion and provide two (2) copies of the complete system programming disc and sequence of events.

After the completion of the acceptance test the Contractor shall perform for a period of two (2) years the semi - annual inspection test of the fire system.

Contractor shall provide three (3) year warranty on all system components, programming and installation.

Contractor shall have an in-place support facility with technical staff, spare parts inventory, and all necessary test and diagnostic equipment. Contractor shall provide 4 hour emergency response time.

****END OF SECTION****