

CONSTRUCTION REQUIREMENTS

Note: The buildings on the UCCS campus are divided into two categories: General Fund and Auxiliaries. General Fund Buildings include academic and administrative functions. Auxiliary buildings include residential housing, athletic, and dining facilities. In some cases, construction standards differ depending on the building category. Confirm building category with Facilities Services Project Manager.

- Hot Work Permitting
- Fire Suppression
- Access Panels

DIVISION TWENTY-ONE: FIRE SUPPRESSION

A. Hot Work Permitting

a. General Requirements

- i. Contractor should hold the responsibility for their own Hot Work Permit program during construction. Once the building is turned over to the university then the university's hot work permit program should be implemented. The university uses FM Global Hot Work Permit program as an essential tool in preventing fires in our buildings. The permit is just a tool and it does not disclose all precautions for every hot work application. All hot work on campus shall be strictly supervised while the work is being performed.
- ii. Hot Work Permit Procedure:
 1. Permits are required for all work involving open flames or producing heat and/or sparks, i.e. brazing, cutting, grinding, soldering, torch-applied roofing and welding
 2. Permits are required for all hot work in existing buildings, permits are not required for ground up construction
 3. Contact Public Safety to obtain a hot work permit 24 – hours (business hours) prior to your scheduled work – Ron 255-3201 rhonn@uccs.edu or Cindy 255-3212 cnorton@uccs.edu
 4. Permits will be picked up from the Public Safety parking and transportation front counter located on the first floor of the Public Safety building or may be dropped at your location
 5. Review your permit precautions checklist before proceeding with your work and display the permit in the work area
 6. Once the work is completed, complete the hot work permit process by signing off on who did the work and that the fire watch requirement was completed
 7. Please return the completed hot work permit to Public Safety for their recordkeeping

B. Fire Suppression

a. General Requirements

- i. All areas of each facility shall be protected by the automatic sprinkler system, unless specifically waived by NFPA-13 or otherwise approved, in writing, by the UCCS Project Manager.
- ii. All sprinkler and standpipe systems shall be hydraulically calculated to verify proper

- pipe sizes in strict accordance with NFPA #13.
 - iii. Each fire protection system shall be monitored by the building fire alarm system and the University central station (Public Safety). All buildings equipped with fire sprinkler systems shall be equipped with an exterior local alarm (horn and strobe) initiated by the system's main flow detection device.
 - iv. Sub-section zoning shall be accomplished by providing individual zone water flow detection, zone control valve, zone drain, gauge, and inspectors test connection.
 - v. When a building exceeds three (3) floor levels (including basement) the sprinkler system on each floor shall be a separate zone.
 - vi. When a floor area exceeds 10,000 square feet, it shall be on a separate zone.
 - vii. Test certificate(s) showing that pneumatic, hydrostatic and final tests were conducted in accordance with the applicable NFPA standards, shall be submitted to the UCCS Project Manager.
- b. Existing Equipment
- i. The use of existing features and equipment may be considered. All such equipment or systems shall be tested/inspected to assure their operational integrity and compliance with current codes.
- c. Wet Pipe Systems
- i. Wet pipe systems shall be used in the majority of system applications.
 - ii. Flow detection for wet pipe systems shall be by electronic vane type water flow detectors.
 - iii. Only the main water flow switch shall activate the exterior horn/strobe.
- d. Antifreeze Systems
- i. Antifreeze systems shall not be installed unless specifically approved, in writing, by the UCCS Project Manager. If these systems are proposed, they shall only be used for incidental areas susceptible to freezing.
- e. Dry Pipe Systems
- i. System shall be monitored for low gas pressure.
 - ii. System pressure shall be maintained by a nitrogen system determined by the Engineer.
- f. Preaction Systems
- i. Engineer to determine the appropriate type of preaction system, e.g., single- or double-interlock, and specify accordingly. Double-interlock shall be specified where accidental water damage is hazardous or highly undesirable.
 - ii. All preaction system piping shall be supervised by an approved method.
 - iii. For combined dry and preaction systems, the nitrogen supply shall meet the requirements for dry pipe systems.
 - iv. Activation shall be by means of automatic fire detection with manual release capability.
 - v. Automatic fire detection devices shall be spaced according to NFPA #72. Engineer shall determine whether additional devices are necessary in order to meet the client's objective.

i. Nitrogen Pressure System

- i. In order to reduce the likelihood of microbiologically induced corrosion (MIC), nitrogen is to be used in place of air for all preaction and dry systems.
- ii. Provide a minimum of two nitrogen tanks of adequate size, e.g., size "Q" or larger, to supply supervisory pressure to preaction systems. A larger number of tanks may be necessary depending on the system volume.
- iii. Nitrogen tanks shall be positioned to discourage accidental damage to the tanks, valves, and regulators. Secure tanks to walls or provide freestanding rakes to securely restrain tanks. Coordinate tank location with Engineer and Owner.
- iv. Provide Nitrogen Regulating Device (Reliable or approved equal) to reduce the pressure from 2200 psi to approximately 50 psi. Nitrogen Regulating Device shall be located as close to tanks as possible to minimize high-pressure piping. Provide rigid pipe from the Nitrogen Regulating Device to each preaction system.
- v. Provide a low pressure supervisory switch to monitor the pressure within the pipe between the Nitrogen Regulating Device and each Pressure Maintenance Device for each preaction system. This low pressure supervisory switch shall be set to provide a supervisory signal if the pipe pressure is less than 20 psi below the normal operating pressure.
- vi. For each preaction system, provide an approved pressure maintenance device, e.g., Reliable Model C Pressure Maintenance Device, or approved equal, to reduce the pressure from 50 psi to approximately 30 oz/in². Pressure Maintenance Devices shall be adequately supported. Contractor is to construct rack or similar system to support these and other devices as necessary. Configure Pressure Maintenance Device as required by manufacturer's data sheets.
- vii. Provide a low-pressure switch, Reliable or approved equal, which is factory set to 11 oz/in² to supervise pressure within the preaction system.
- viii. Provide gauge on each preaction system that is listed to monitor oz/in². Provide second gauge on each preaction system for water pressure.
- ix. For each preaction and dry system zone, provide one cylinder and a back-up cylinder. For very small systems and zones, and upon written approval by the owner project manager, multiple zones/systems can be served by the same cylinder plus back-up.

j. Installation

- i. In the preaction systems, all piping shall be sloped to facilitate drainage toward the point of the supply. Slope shall be provided as required for dry systems per NFPA 13. All trapped sections of piping shall be provided with auxiliary drains as required by NFPA 13. Drum drips shall not be required. However, all drains shall be a minimum of 1" valves with plug at all low points. This requirement exceeds the provisions of NFPA 13.
- ii. For the preaction system, use upright sprinklers. Pendent sprinklers shall not be used with the preaction system. Where pendent sprinklers are required due to suspended ceilings, Contractor shall provide dry pendent sprinklers installed in manner that no trapped water will result. Sidewall sprinklers may be used on the preaction system as long as they are installed so that no trapped water will occur.

k. Deluge Systems

- i. The deluge valve assembly, including the valve, trim packages and actuation system, shall be UL listed or approved by Factory Mutual, as a complete assembly.
 - ii. Fire detection devices or systems shall be automatically supervised in all areas.
 - iii. Detection systems can be pilot line or electronic as determined by the Engineer for the specific project.
 - iv. If pneumatic detection is incorporated into the design, a dedicated air supply system meeting the requirements for dry pipe systems shall be provided.
 - v. Hydraulic or pneumatic heat detectors shall be spaced according to NFPA #13 and manufacturer's requirements.
 - vi. Fire detection spacing shall be in accordance with NFPA #72 including its Appendix-C. These items shall be coordinated with the fire alarm Contractor.
 - vii. Deluge valve actuation by electronic means shall be through an approved agent releasing panel.
- I. Exposure Protection Systems
 - i. The exposure sprinkler system shall have an independent supply from the vertical or main riser, prior to any other sectional controls, with a supervised control valve and distinctive flow detection.
 - ii. Where needed, systems incorporating open sprinklers shall be controlled by the operation of detection devices designed for the specific application.
 - iii. If the systems incorporate dry pipe, deluge or preaction valves, the requirements for each type of system in applicable codes and these standards shall apply.
- m. Standpipe Systems
 - i. The system shall be designed as required by NFPA-14 and IBC.
 - ii. Hose valves shall be located within the building stairway enclosures per NFPA-14, with additional corridor locations as required, unless alternative locations are approved by the Owner in writing.
 - iii. Approved roof manifolds shall be provided where required by the IBC, NFPA-14 or by the Owner.
- n. Backflow Preventers
 - i. Reduced Pressure Backflow Preventer
 - ii. Reduced pressure backflow preventers shall be used for fire suppression systems only when chemical additives such as antifreeze are present or when untreated water may be pumped into the system. Use Febco models acceptable to Owner.
- o. Double Check Valve Assembly
 - i. Provide an approved double check valve backflow prevention assembly on each new automatic sprinkler and standpipe system, at the base of the system riser downstream of the domestic water supply tap. Approved manufacturers are Febco and other manufacturers determined by the Engineer and approved by the Owner.
- p. Hangers and Supports
 - i. Provide pipe hangers of the design required for the specific installation and location.

- ii. Install retaining clips/clamps in locations where vibration may be a concern.
- q. Sprinkler Heads
- i. Provide concealed heads at all pedestrian access, housing, and drywall soffit locations.
 - ii. All other locations use semi-recessed white colored heads unless matching existing construction.
- r. Fire Sprinkler Contractor and Staff Qualifications
- i. The design of the fire protection systems shall be performed by or under the direction and control of a Colorado registered P.E. or a NICET level IV, unless otherwise advised by the Owner during the Design Document phase in which case, an individual with NICET, level III or higher may be accepted. Said professionals shall be experienced in fire protection, thoroughly familiar with and experienced in this type of installation. Colorado registered professional engineers or the NICET level III (or higher) professionals who are "Members" in the national organization of the Society of Fire Protection Engineers (SFPE) or meet the qualifications for the grade of "Member" in the national organization of the SFPE are preferred.
 - ii. The owner's representative, Engineer, and AHJ reserve the right to request proof of qualifications.
 - iii. No design related work shall be subcontracted or performed by persons other than bona fide employees working solely for the contractor. Any exception shall be pre-approved by the owner, in writing.
 - iv. Installer shall be pre-qualified to work on any major projects. Major projects shall be identified by Facilities Services project manager. As a rule of thumb, projects involving more than 50,000 square feet of sprinkler protection should be considered major.
 - v. The entire fire protection system project including design, calculation, installation and testing, excluding prefabrication, shall be bid by a single firm which has the capabilities to perform all of the work required under this standard. No installation work shall be sub-contracted without prior permission in writing from the Owner.
 - vi. Fire Protection Contractor, individually shall be able to prove bonding capacity equal to the total amount of the fire protection portion of the contract, for the specific project.
 - vii. Shall be registered for the design and installation for fire protection systems in the State of Colorado.
 - viii. Shall have a minimum of five (5) years of experience in the design and installation of similar projects of comparable size and value.
 - ix. Shall have the capability of providing a full service maintenance, testing and inspection program in accordance with NFPA standards and where applicable, be certified to perform these services.
 - x. Shall have an emergency service capability for response to emergency conditions.
 - xi. Shall have an established office within one hundred (100) miles of the campus, which maintains a full complement of spare parts, tools and equipment for the specific project and type of system.
 - xii. Welders shall comply with the requirements identified in NFPA-13.
 - xiii. Job foremen shall be trained for the installation and operation of each type of system and possess documentation of qualifications and training. Foremen shall

have a minimum of three (3) years of successful installation experience on projects with fire protection systems similar in scope and nature to that required for the project.

- s. Warranty
 - i. All material and workmanship shall be warranted for a minimum period of one (1) year beginning with the date of final acceptance by the University.
 - ii. The Contractor shall be responsible during the design, installation, testing and guarantee periods for any damage caused by contractors or by defective work, materials or equipment.
- t. Emergency Services
 - i. During the installation and warranty period, the Contractor shall provide emergency repair service for the sprinkler system within four (4) hours of a request by the University.
 - ii. Service shall be available twenty-four (24) hours per day, seven (7) days per week.
- u. Electrical Equipment – Compatible with Fire Alarm System
 - a. Supervisory Switches
 - i. Shall have automatic reset capabilities. Capable of being wired in normally open/closed position. Cover shall have tamper resistant screws.
 - b. Automatic Water Flow Detectors
 - i. Electronic vane type or pressure activated. Compatible with the type of pipe and equipment used. Built-in retard device, field adjustable from 0-70 seconds. Set for a time delay of thirty (30) seconds. Exception: pressure switches. Automatic self-reset capabilities. Capable of being wired in normally open position. Tamper proof. All parts in contact with water shall be corrosion resistant. Shall initiate a distinct water flow alarm signal at the Fire Alarm Control Panel (FACP) by zone.
 - c. Low Pressure Supervisory Switches
 - i. A low pressure alarm switch shall be provided for dry pipe sprinkler systems and supervised preaction sprinkler systems. The switches shall meet the following requirements: Compatible with the equipment used. 1/2" NPT enclosure. NEMA I enclosure. Capable of detecting a ten (10) psi decrease in normal pressure and be adjustable. Tamper proof. Capable of operating at 24 VDC or as specified by the manufacturer.
 - d. Exterior Alarm Signals
 - i. Shall mount above the fire department connection at a height of ten (10) to fifteen (15) feet above adjacent grade.
 - ii. Where a FACP is available, an exterior electric horn with flashing strobe, minimum six (6) inch diameter powered by the FACP having a minimum audible level of 85 dBA at ten (10) feet. This work shall be coordinated with Fire Alarm contractor.
 - e. Air Compressor
 - i. The air compressor shall be UL listed and sized to be capable of replenishing the system within thirty (30) minutes. Airline piping shall be galvanized or copper. System piping

components such as check and shut-off valves shall be brass. Power shall be obtained from a dedicated circuit wired to the buildings emergency power system. Air Maintenance Device shall be: Listed/approved for fire protection service. If used with tankless compressors, shall be specifically listed for such use. Automatic and field adjustable with an integral unloading valve. For shop air or cylinders with single stage pressure regulators, the device shall also be of the pressure reducing type.

- f. Nitrogen Maintenance Device
 - i. Listed/approved for the service intended.
 - ii. Automatic and field adjustable.
 - iii. Shall be of the high pressure reducing type.

C. Access Panels

- a. Provide locking powder coated access panels at ALL locations.
- b. Key should be standard among all access panels throughout building. Confirm key type with UCCS Project Manager.