
SECTION 210000 – BASIC FIRE PROTECTION REQUIREMENTS

Latest Edition: 05-03-2023 See Underlined Text for Edits.

(Engineer shall edit specifications and blue text in header to meet project requirements. This includes but is not limited to updating Equipment and/or Material Model Numbers indicated in the specifications and adding any additional specifications that may be required by the project. Also turn off all “Underlines”)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section and all other sections of Division 21.

1.2 SUMMARY

- A. This Section includes the requirements for the following: **<Edit for particular project>**:
 - 1. Codes, standards, organizations, and abbreviations
 - 2. Fire protection design criteria and requirements
 - 3. Designer/installer qualifications
 - 4. Submittals
 - 5. Site Visit
 - 6. Outages
 - 7. Performance requirements
 - 8. Materials and equipment
 - 9. Coordination
 - 10. Demolition
 - 11. Fire safe materials
 - 12. UL requirements
 - 13. Warranty / Guarantee
 - 14. Listed manufacturers
 - 15. Approved equal equipment layouts
 - 16. Coordination drawings
 - 17. Construction record documents.
 - 18. Operation and maintenance manuals
 - 19. General requirements - Execution
 - 20. Existing fire protection system
 - 21. Equipment roughins
 - 22. Installation – fire protection
 - 23. Cutting and patching
 - 24. Cutting, welding and burning
 - 25. Erection of metal supports and anchorage
 - 26. Demolition
 - 27. Penetration of water proof construction
 - 28. Excavation and backfilling
 - 29. Cleaning and Finishes

30. Lintels
31. Electrical requirements
32. Provisions for access
33. Demonstration and instructions
34. Wall and floor penetrations
35. Construction record drawings
36. Final cleaning
37. Project punchout

1.3 CODES, STANDARDS, ORGANIZATIONS, AND ABBRIVIATIONS

- A. The following list of codes, standards, organizations, and abbreviations are utilized within Division 21 Specification Sections and are provided as a reference.
- B. Codes and Standards: All material and equipment provided and installed as part of these construction documents shall be in compliance with the edition of codes and standards which are applicable within the State of Maryland at the time of contract execution:
 1. IBC: International Building Code
 2. IMC: International Mechanical Code
 3. IECC: International Energy Conservation Code
 4. IPC: International Plumbing Code
 5. Maryland State Fire Prevention Code
 6. NFPA 1: Fire Code
 7. NFPA 13: Standard for the Installation of Sprinkler Systems
 8. NFPA 14: Standard for the Installation of Standpipes and Hose Systems
 9. NFPA 20: Standard for the Installation of Stationary Fire Pumps for Fire Protection
 10. NFPA 24: Standard for the Installation of Private Fire Service Mains and Their Appurtenances
 11. NFPA 70: National Electrical Code
 12. NFPA 72: National Fire Alarm Code and Signaling Code
 13. NFPA 101: Life Safety Code
 14. NFPA 241: Standard For Safeguarding Construction, Alteration, and Demolition Operations
 15. NFPA 1963: Standard for Fire Hose Connections
- C. Organizations: Referenced organizations are as follows:
 1. ANSI: American National Standards Institute
 2. ASME: American Society of Mechanical Engineers
 3. ASTM: American Society for Testing and Materials
 4. AWS: American Welding Society
 5. FM: Factory Mutual
 6. IEEE: Institute of Electrical and Electronic Engineers
 7. NFPA: National Fire Prevention Association

8. NRTL: Nationally Recognized Testing Laboratory
9. NPS: National Pipe Standard
10. OSHA: Occupational Safety and Health Administration
11. SAE: Society of Automotive Engineers
12. UL: Underwriters' Laboratories
13. UMB: University of Maryland, Baltimore
14. UMB-A/E: University of Maryland, Baltimore Architect/Engineer
15. UMB-PM: University of Maryland, Baltimore Project Manager

D. Abbreviations: Referenced abbreviations are as follows:

1. AC: Alternating Current
2. A/E: Architect/Engineer
3. ATL: Across the Line
4. CAD: Computer Aided Design
5. CB: Change Bulletin
6. CD-ROM: Compact Disk – Read Only Material
7. CM: Construction Manager
8. CxA: Commissioning Agent
9. DOC: Document
10. Dwg: Drawing
11. EMT: Electrical Metallic Tubing
12. HOA: Hand Off Automatic
13. MC: Metal Clad
14. MG: Motor Generator
15. MPa: Megapascal
16. NBR: Acrylonitrile-Butadiene, Buna-N, or Nitrile Rubber
17. NPS: National Pipe Standard
18. NRTL: Nationally Recognized Testing Laboratory
19. pdf: Portable Document Format
20. PSI: Pounds per Square Inch
21. Psig: Pounds per Square Inch Gauge
22. PVC: Polyvinyl Chloride
23. RFI: Request For Information
24. RMS: Root Mean Square
25. RPM: Revolutions Per Minute
26. SAE: Society of Automotive Engineers
27. xl: Excel Spread Sheet

1.4 FIRE PROTECTION DESIGN CRITERIA AND REQUIREMENTS

- A. Fire Protection Design Criteria: Sprinkler design, installation, and water supply requirements shall be designed to a minimum hazard classification of Ordinary Hazard (Group 1), unless otherwise approved by the UMB Fire Marshal.

- B. New and Existing Work: All work, including both new construction and modifications to the existing sprinkler systems shall be performed in accordance with the edition of NFPA 13 which is applicable within the State of Maryland at the time of the contract execution and as approved by the UMB Fire Marshal.

1.5 DESIGNER/INSTALLER QUALIFICATIONS

- A. Designer: Field survey, design, and preparation of the submittals required by the specifications shall be performed and certified by an individual who is a registered professional engineer or who is certified as a Level III or IV Technician by NICET in Water-Based Systems Layout. The designer shall have a minimum of five (5) years' experience in the preparation of sprinkler shop drawings, hydraulic calculations, and field surveying. The system designer shall sign (with certification/license number) each sheet included in the set of drawings.
- B. Installer: The field sprinkler foreman shall hold a current valid certification from a nationally recognized sprinkler apprenticeship school or government agency, or be recognized as "Journey Level" by a local fire sprinkler labor union. The installing contractor shall be licensed in the State of Maryland.

1.6 SUBMITTALS

- A. General: For general requirements see Architectural Specification Division 01 Section "Submittal Procedures".
- B. In addition to the requirements identified in Architectural Specification Division 01 Section "Submittal Procedures" the fire protection contractor shall also comply with the following:
 - 1. UMB requires the Fire Protection Submittal to be submitted electronically as one (1) complete submission as a "pdf" file for review. Partial Submittals will be rejected.
 - a. The complete submittal must be reviewed and approved by the A/E and the UMB Fire Marshal before installation can take place.
 - b. The warranty information and maintenance manuals shall be included in the Division 21 Project O & M Manual. Do not include this data in the Fire Protection Submittal.
 - 2. Fire protection shop drawings (working plans) shall note ceiling heights and shall depict the ceiling grid, lighting fixtures, air devices, etc.
 - 3. Submittal approval does not relieve the contractor of their responsibility to provide a code compliant system. Any installation by the contractor that does not meet code or specification requirements shall be corrected to be in full-compliance at no cost to the University.

4. Fire protection shop drawings (working plans) must be developed by computer software. Fire protection shop drawings (working plans) submitted for review that are hand drawn or have hand written notes will be rejected.
 5. The sprinkler contractor shall not deviate from the approved sprinkler layout drawings unless written approval has been obtained from the UMB Fire Marshal.
 6. Where deviations are approved by the UMB Fire Marshall or as necessary by field conditions, the contractor shall record on one (1) set of prints, the installed locations, sizes, and depths of pipes, services, equipment, etc. which may differ from the approved fire protection shop drawings (working plans). When the sprinkler work has been completed and accepted by UMB and all deviations have been recorded the sprinkler contractor shall scan the prints as a color pdf file.
- C. Electronic Fire Protection Submittal: The fire protection submittal shall include the product data, material and equipment listed below, as specified in Division 21 and where indicated on the drawings and details For additional material and data submission requirements, see individual Division 21 Specification Sections. At a minimum, the following product data shall be provided as required by the project:
1. Product Data: **<Edit for project>**
 - a. Sleeves, sleeve seals, and escutcheons.
 - b. Labels and signs.
 - c. Pipe, fittings and joints.
 - d. Valves and inspectors test assembly.
 - e. Supervisory switches, flow detectors and pressure switches.
 - f. Cabinets.
 - g. Pressure gauges.
 - h. Hangers and supports.
 - i. Sprinklers.
 - j. Exterior fire department connection.
 - k. Wet pipe system and components.
 - l. Dry pipe system and components.
 - m. Pre-action system and components.
 - n. Nitrogen generator.
 - o. Fire pump.
 - p. Fire pump controller and transfer switch.
 - q. Fire pump test header.
 - r. Jockey pump.
 2. Additional Data: Subject to project requirements, in addition to the product data indicated in the paragraph above the following additional data may be required: **<Coordinate with UMB, delete if not required >**
 - a. Fire Protection Shop Drawings (working plans)
 - b. Hydraulic Calculations

- c. Water Flow Test Report
- d. Samples (only when requested by the A/E or UMB)

D. Submittal File Formats: File formats for each submittal shall be electronically as follows:

1. File Formats:

- a. Product Data: “pdf” file format.
- b. Shop Drawings: “pdf” and “dwg” file formats.
- c. Coordinated Drawings: “pdf” or “dwg” file formats.
- d. Schedules: “xl” file format.

E. Aside from the electronic submission, fire protection shop drawings (working plans) must also be submitted as a full size hard copy to the UMB Fire Marshal. All requirements from the “Working Plans” Section of NFPA 13 must be met.

1.7 SITE VISIT

A. Prior to preparing the bid, the fire protection contractor shall visit the site and become familiar with all existing conditions. The fire protection contractor shall make all necessary investigations as to locations of utilities and all other matters which can affect the work. No additional compensation will be made to the contractor as a result of their failure to familiarize themselves with the existing conditions under which the work will be performed.

1.8 OUTAGES

A. For all work requiring an outage, the fire protection contractor shall submit an outage request to the UMB Project Manager, using the UMB Standard Request for Outage Form which is available through the UMB Design and Construction Web Site at <https://www.umaryland.edu/designandconstruction/design-and-construction-documents/umb-standard-project-forms---current-editions/>

B. The existing fire protection systems shall remain operational unless turned off by University personnel during the construction of the project.

C. Unless otherwise specified, outages of any services required for the performance of this contract and affecting areas other than the immediate work area shall be scheduled at least ten business days (10) days in advance with the UMB Design and Construction Department. Outages shall be performed during normal duty hours. If necessary some outage work may be performed outside normal hours if approved by UMB.

D. All fire protection outages which will interfere with the normal use of the building in any manner shall be done at such times as shall be mutually agreed upon by the contractor, the UMB Fire Marshal and the UMB Design and Construction Department.

- E. The fire protection contractor shall include in his price the cost of all premium time required for outages and other work which interferes with the normal use of the building, which will be performed during other than normal work time and at the convenience of the University.
- F. The operation of fire protection valves required to achieve an outage must be operated by University personnel only. Unauthorized operation of fire protection valves or other control devices by contractors and their personnel will result in extremely serious consequences for which the contractor will be held accountable.

1.9 PERFORMANCE REQUIREMENTS

- A. Contract drawings are generally diagrammatic and do not indicate all offsets, fittings, transitions, access panels and other specialties required.
- B. Furnish and install all items as may be required to fit the work to the conditions encountered.
- C. Arrange piping, equipment and other work generally as shown on the contract drawings, and fire protection shop drawings providing proper clearances and access.
- D. Where departures are proposed because of field conditions or other causes, prepare and submit detailed shop drawing submittal for approval.
- E. The A/E may make reasonable changes in location of equipment piping and ductwork up to the time of rough-in or fabrication.

1.10 MATERIALS AND EQUIPMENT

- A. The contract drawings and system performances have been designed on the basis of using the particular manufacturer's products specified or scheduled on the contract drawings.
- B. Products of other manufacturer's listed in the specification shall be permitted provided as follows:
 - 1. Products meet all of the requirements of the specifications.
 - 2. Make, without additional cost to the Owner, all adjustments for deviations, such that the final installation is complete and functions as the basis of design product is intended.
- C. Products with dimensions or other characteristics different from the basis of design product that render their use impractical or cause functional fit, access, or connection problems, shall not be acceptable.
- D. Each item of equipment shall be capable of performing its function over an extended period of time with minimum attention and maintenance. All equipment and material

shall be constructed using new materials designed and built in accordance with the best practices of the industry. Each item of equipment shall be listed in the Underwriters Laboratories Fire Protection Equipment List or Factory Mutual Approval Guide. Each major item of equipment shall bear the manufacturer's name or trademark; serial number; UL or FM label; operating instructions and hydraulic characteristic conditions, etc., where applicable.

1.11 COORDINATION

- A. Coordination: Coordinate fire protection systems, equipment, and material installation with all other building components.
- B. Utilities: Coordinate connection of fire protection systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.
- C. Chases: Arrange for chases, slots, and openings in building structure during progress of construction to allow for fire protection installations.
- D. Sleeves: Coordinate the installation of required supporting devices and set sleeves in poured in place concrete and other structural components as they are constructed.
- E. Sequencing: Sequence, coordinate, and integrate installations of fire protection material and equipment for efficient flow of the work. Give particular attention to large equipment requiring positioning prior to closing in the building.
- F. Electrical Services: Coordinate connection of electrical services.
- G. Access: Coordinate requirements for access panels and doors where fire protection items requiring access are concealed behind finished surfaces. Access panels and doors are specified in Architectural Specification Section "Access Doors."
- H. Scheduling: Schedule and coordinate the delivery of material and equipment with other trades to avoid delivery conflicts.
- I. New Construction: For new construction, sprinkler system piping and equipment cannot be used to support any other non-system components. Any other building element resting on sprinkler piping is assumed to be supported by the sprinkler system. No contact is permitted between sprinkler systems and non-system components. Existing systems will be evaluated on a case-by-case basis.
- J. Do not install sprinkler valves or controls partially in walls. The entire assembly must be accessible.

1.12 DEMOLITION <Delete if not Required>

- A. Fire Protection Demolition: Cut, remove and legally dispose of fire protection piping, equipment, components, and materials as indicated.

1.13 FIRE SAFE MATERIALS

- A. Unless otherwise indicated, materials shall conform to UL, NFPA or ASTM standards for fire safety with smoke and fire hazard rating not exceeding flame spread of twenty five (25) and smoke development of fifty (50).

1.14 UL REQUIREMENTS

- A. All equipment containing electrical components and provided as part of the fire protection specifications shall bear the UL label, as a complete packaged system.
 - 1. Equipment not provided with a UL label shall be tested in the field, certified and provided with a UL label at the installer's expense.
 - 2. Field testing shall be performed by a testing agency approved by the UMB Fire Marshal.

1.15 WARRANTY/GUARANTEE

- A. All materials, equipment, etc. provided by the general contractor and/or his subcontractors shall be warranted and guaranteed to be free from defects in workmanship and materials for a period of two (2) years from the date of substantial completion and acceptance of work by UMB. Any defects in workmanship, materials, or performance which appear within the guarantee period shall be corrected by the contractor without cost to the owner, within a reasonable time, to be specified by UMB. In default thereof, owner may have such work done and charge the cost of same to the contractor. In addition to the above statement the Warranty/Guarantee Period shall also include all labor cost related to all warranty work. For compressorized equipment, include an additional three (3) year Warranty/Guarantee Period.

PART 2 – PRODUCTS

2.1 LISTED MANUFACTURERS:

- A. Listed Manufacturers: The manufacturers indicated in Part 2 represent the basis for design and identify the minimum level of quality for materials and equipment, specified in this Division, that are acceptable to UMB. Unless “or equal” is included as an option, substitutions are not allowed, except under the following condition. During bid phase, contractors may submit material and equipment by non-listed manufacturers provided said submittals meet the requirements of these specifications. All submitted materials and equipment are subject to approval by the A/E and UMB. Reference: Division 1 Substitution Section.

2.2 APPROVED EQUAL EQUIPMENT LAYOUTS <Delete if not Required>

- A. Approved Equal Equipment Layouts: The equipment layouts and the related mechanical and electrical service connections, access space and supports indicated on the construction documents represents the specified equipment. If the successful contractor chooses to provide “or approved equal” equipment by one (1) of the other listed manufacturers in the specifications, the contractor shall be responsible for providing all adjustments and modifications to the services necessary to make connections to the equipment. The contractor shall be responsible for installing the equipment such that all required clear access space is maintained, and for providing all adjustments and modifications to the equipment mounting and supports. All adjustments and modifications shall be provided by the contractors at no additional cost to the project.

2.3 COORDINATION DRAWINGS <Delete if size of project does not warrant.>

- A. Coordination Drawings: In addition to the requirements outlined in Division 01, prepare the fire protection part for the coordination drawing effort. Work with all other trades to ensure the material and equipment installed as part on the fire protection system will not be in conflict with the installation of material and equipment by other contractors. Unless otherwise indicated, the coordination drawings, including plans, sections, and elevations shall be prepared at a scale of not less than one quarter (1/4) inch = one (1) foot- zero (0) inches. At a minimum, prepare coordination drawings for all mechanical rooms, electrical rooms and substation rooms.

- B. File Format: Coordination drawings shall be in a layered structure form as CAD Files or PDF Files for each floor with searchable text as follows:

1. File Structure: The “pdf” or “dwg” files shall have separate layered structure for:
 - a. Building Elements: Indicate each building element on separate layers, such as:
 - 1) Walls.
 - 2) Reflected ceiling plan.
 - 3) Room numbers.
 - b. Systems and Sub Systems: Indicate each system or sub system as warranted by congestion or complexity on separate layers such as:
 - 1) Examples of Systems:
 - a) Wet Sprinkler System.
 - b) Dry Sprinkler System.
 - c) Pre Action Sprinkler System.

2. The layered electronic files shall allow building elements, building systems and sub systems to be viewed in isolation or in combinations that are user selectable when the drawing files are being displayed.

- C. Coordination Effort: This coordination effort shall include detailing major elements, components, and systems of fire protection equipment and materials in relationship with other systems, installations, and building components. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow of the work, including (but not necessarily limited to) the following:

1. Indicate the proposed locations of fire protection piping, valves, equipment, and materials. Include the following:
 - a. Clearances for servicing and maintaining equipment, including, the space for equipment disassembly required for periodic maintenance.
 - b. Exterior wall and foundation penetrations.
 - c. Sizes and location of required concrete pads and bases.
 - d. Size and location of pipe hangers and other components for pipe supports.
 - e. Access doors.
2. Indicate scheduling, sequencing, movement, and positioning of large equipment into the building during construction.
3. Prepare floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations. Show all wall mounted access doors for mechanical devices.
4. Prepare reflected ceiling plans to coordinate and integrate installations, air outlets and inlets, light fixtures, communication systems components, cable trays, sprinklers, access doors and other ceiling mounted items.

2.4 CONSTRUCTION RECORD DOCUMENTS

- A. The sprinkler contractor shall maintain a set of construction record documents during the construction period in accordance with Specification Division 01 Section "Contract Closeout."

2.5 PROJECT OPERATION AND MAINTENANCE MANUAL – ELECTRONIC FILES

- A. Project O & M Manual File: The project OM Manual shall include one (1) electronic copy of each approved submittal and any manufacturer's maintenance manuals, and all warranty certificates included in Division 21. Also include the address, phone number and contact person for each supplier. Using the UMB Standard O&M Manual Template referenced in Division 01 Closeout Procedures insert the submittal files include both a book mark and tree structure for accessing each submittal file in the manual.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS – EXECUTION

- A. All construction work that creates excessive noise will not be permitted during normal business hours. See Division 01 Specification Section 01045 “Cutting and Patching” for requirements.

3.2 EXISTING FIRE PROTECTION SYSTEM <Delete for New Construction> <Retain for Renovation Projects>

- A. Building System: In no case shall any portion of a buildings fire protection system be taken out of service for more than eight (8) hours in a twenty four (24) hour period without the written approval of the UMB Fire Marshal.
- B. Project Area: The parts of the fire protection system serving the project area can be placed out of service for periods of construction not exceeding eight (8) hours. Coordination of the outage must be made with the project manager. When the construction is completed the fire protection system serving the project area shall be placed back in service. The operation of existing fire protection system valves to isolate the project area shall be accomplished by University personnel only. Submit an outage request for this work as specified above.

3.3 EQUIPMENT ROUGH INS

- A. Verify final locations for rough in’s with field measurements and with the requirements of the actual equipment to be connected.
- B. Refer to approved equipment submittals for actual rough in requirements.

3.4 INSTALLATION - FIRE PROTECTION

- A. Verify all dimensions by field measurements.
- B. Where fire protection systems, materials and equipment are intended for overhead installation, and where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible. Notify UMB - PM prior to installation of sprinkler system components when headroom is less than 7'-6" and/or where existing system components will be below the new finished ceiling height. Notification shall be through the “RFI” process.
- C. Install fire protection systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, identify the conflict and submit and “RFI” for each conflict to the Architect.

- D. Install fire protection systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components. Unnecessary fittings and non-approved fittings shall not be installed.
- E. Install fire protection equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
- F. Install fire protection systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.

3.5 CUTTING AND PATCHING

- A. General: Perform cutting and patching in accordance with Specification Division 01 Section "Cutting and Patching" In addition to the requirements specified in Specification Division 01, the following requirements apply:
 - 1. Patch Materials: Patch finished surfaces and building components using new materials specified for the original installation and using experienced installers.
- B. Cut, remove and legally dispose of selected fire protection equipment, components, and materials as indicated, including but not limited to removal of fire protection piping, sprinklers and trim made obsolete by the new work. Plug and remove existing piping at the last active sprinkler.

3.6 CUTTING, WELDING, BURNING

- A. Before the contractor and/or any sub-contractor commences any cutting, welding, burning or other type of hot work at UMB, the contractor shall contact the UMB Fire Marshal's Office on the First Floor of the Pine Street Station located @ 214 N. Pine Street, or by phone @ 1-410-706-3494 to obtain a hot work permit. Office Hours are Monday – Friday.
- B. The hot work permit copy shall remain on the job site at the hot work location until such work is completed at which time the permit shall be returned to the UMB Fire Marshal.

3.7 ERECTION OF METAL SUPPORTS AND ANCHORAGE

- A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.
- B. Field Welding: Comply with AWS D1.1 "Structural Welding Code--Steel."

3.8 DEMOLITION <Delete if project does not include removal work>

- A. Disconnect, demolish, and remove work specified as part of the fire protection specifications and as indicated. Remove pipes back to the active pipe to remain and cap.
- B. Accessible Work: Remove indicated exposed pipe in its entirety.
- C. Removal: Remove indicated equipment from the Project site.

3.9 PENETRATION OF WATERPROOF CONSTRUCTION

- A. Coordinate the work to minimize penetration of waterproof construction, including roofs, exterior walls and interior waterproof construction.
- B. Furnish and install drains, curbs, vent assemblies, sleeves, flashing, etc. specifically designed for application to the particular construction. Install system in accordance with the roofing manufacturer's instructions.

3.10 EXCAVATION AND BACKFILLING

- A. General: Perform all necessary excavation and backfilling necessary for the installation of underground fire protection work as part of the Division 21 in accordance with the requirements of the architectural specifications.

3.11 CLEANING AND FINISHES

- A. Clean surfaces prior to application of insulation, adhesives, coating, and paint.
- B. Provide factory applied finish where specified.
- C. Protect all finishes and restore all finishes to their original condition if damaged as a result of work installed as part of the mechanical specifications.
- D. Remove all construction marking and writing from exposed equipment, piping and building surfaces.

3.12 LINTELS

- A. Lintels shall be provided for openings in masonry, brick, concrete, etc. walls to accommodate work of this division.
 - 1. Lintels shall be provided under this division when not being provided under other divisions. Lintels shall be approved by the Architect.

3.13 ELECTRICAL REQUIREMENTS

- A. Unless otherwise indicated, furnish and install control and interlock wiring for the equipment furnished under this division. In general, power wiring and motor starting equipment will be provided as specified in the Division 26 Specifications.
 - 1. Where the electrical requirements of the equipment furnished differ from the provisions made in the Division 26 Specifications, make the necessary allowances as part of the Mechanical Specifications.
 - 2. Where no electrical provisions are included in the Division 26 Specifications, include all necessary electrical work as part of the Mechanical Specifications.
- B. All electrical work performed as part of the mechanical specifications shall be provided in accordance with the Division 26 Specifications.

3.14 PROVISIONS FOR ACCESS

- A. Ensure adequate access is provided to all fire protection system components. The following list shall be used as a guide only:
 - 1. Equipment.
 - 2. Valves.
 - 3. Drain points.
- B. Access shall be adequate as determined by the A/E and the University.
- C. Refer to contract drawings where access panels have been specifically located.
- D. Where access is by means of lift out ceiling tiles or panels mark each access panel using small color coded or numbered tabs. Provide an index chart for identification. Place markers in corner of tile.

3.15 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of equipment and systems to Owner's personnel a minimum two (2) weeks prior to date of final inspection.
 - 1. For equipment requiring seasonal operation, perform instructions for other seasons at the same time.
 - 2. Training period shall be performed within one (1), two (2) week period.
- B. Use operation and maintenance manuals and video as basis of instruction. Review contents of manual and video with personnel in detail to explain all aspects of operation and maintenance.
- C. Demonstrate the following:
 - 1. Start up.

2. Operation.
3. Control.
4. Servicing.
5. Maintenance.
6. Shutdown.

D. Provide at least forty (40) hours straight time instruction to the operating personnel.

1. This instruction period shall consist of not less than five (5) eight (8) hour days.
2. Time of instruction shall be designated by the Owner.
3. This instruction shall be in addition to instructional requirements of specific equipment specified elsewhere in the mechanical specifications.

3.16 WALL AND FLOOR PENETRATION

A. All penetrations of partitions, walls and floors by sprinkler piping and/or conduit installed under Division 21 shall be sealed and caulked. Provide UL listed fire stopping systems at penetrations through fire walls as specified in the Architectural Specifications.

3.17 CONSTRUCTION RECORD DOCUMENTS

A. Upon completion of the work, the sprinkler contractor shall transmit to the CM one (1) set of marked up prints as a colored pdf file and one (1) electronic CAD file in the latest Auto Cad Release used by UMB with All "As Built Drawing" information neatly recorded thereon in red. The CM shall transmit the marked-up pdf and CAD files to the A/E who shall verify that all "Record Drawing" information has been recorded on the electronic CAD file. The electronic CAD file and mark up pdf file shall be transmitted to UMB by the A/E.

B. At a minimum include the following installed conditions shall be recorded:

1. Location of all low point drain valves with assigned valve tag numbers.

3.18 CLEAN UP

A. Excessive debris and dirt, such as occurs from cutting through masonry or plaster walls shall be cleaned up from the equipment and removed immediately after the work of cutting through the walls.

B. Debris shall be removed from UMB property.

C. Ceiling panels shall be replaced as soon as work is finished in the area, and shall be kept free of dirty finger prints. Where work is being done in corridors used by patients and ceiling panels shall be replaced at the close of the day's work even if work is at the particular location is incomplete.

- D. All areas shall be left broom-clean at the end of the work period.
- E. Remove all mechanical clipping, wiring, nuts, bolts, etc. left on top of ceilings and ceiling tiles.

3.19 PROJECT PUNCH OUT

- A. Architect/Engineer will perform punch out reviews and will provide the Contractor with a list of punch list items to be completed before contract close out. Each and every punch list item shall be initialed and dated by the Contractor when the work is complete. The Architect/Engineer will not perform any punch list verification until all items have been completed, initialed, dated and the list returned to the Architect/Engineer. If any items have been initialed as being completed by the Contractor and the Architect/Engineer determines that the work is not complete, the Architect/Engineer shall be reimbursed by the Contractor at his regular hourly rate for any and all items requiring revisiting of the site by the Architect/Engineer. Reimbursement shall be made by deducting the Architect/Engineer fee from the Contractor's final payment.

END OF SECTION 210000