WTA ARCHITECTS

100 S Jefferson Ave, Suite 601
Saginaw, Michigan 48607
989 752 8107 : p
989 752 3125 : f
WTAARCH.COM

ADDENDUM NO. 1

MIDLAND COUNTY ESA
MIDLAND, MICHIGAN

WTA Project No. 2022006.1
August 31st, 2023

The following clarifications, modifications and/or revisions to the above project shall be considered a part of the original drawings and specifications.

It shall be the responsibility of the contractor to notify their subcontractors and/or suppliers of the clarifications, modifications, and/or revisions included herein.

GENERAL

Item G1: Refer to Specification TABLE OF CONTENTS (attached):

a. New Specification Sections Added.

Item G1: Refer to Specification 21 05 00 (attached):

a. New Specification Section Added.
    a. Fire Protection Requirements.

Item G1: Refer to Specification 21 05 10 (attached):

a. New Specification Section Added.
    a. Fire Protection Testing, Cleaning, Water Treatment and Startup

Item G1: Refer to Specification 21 10 00 (attached):

a. New Specification Section Added.
    a. Fire Protection Piping

CIVIL

Item C1: Refer to Drawing C2.03 (attached):

a. Revisions to gate locations.

Item C1: Refer to Drawing C2.04 (attached):

a. Revisions to fence.

WIGEN
TINCKNELL
ASSOCIATES
ARCHITECTS
SPACE SOLVED.

Item C1: Refer to Drawing C2.05 (attached):

a. Revisions to concrete walks.

ARCHITECTURAL

Item A1: Refer to Drawing A1.01 (attached):

a. Note added for Monument Sign

Item A7: Refer to Drawing A1.10 (attached):

a. Section Reference Updated.
b. Detail 11/A1.10 added

Item A1: Refer to Drawing A1.11 (attached):

a. New Detail Added 3/A1.11.
b. Updated detail 2/A1.11.

Item A1: Refer to Drawing A2.12 (attached):

a. Door width Updates

Item A1: Refer to Drawing A2.31 (attached):

a. Updated plumbing equipment schedule.

Item A1: Refer to Drawing A2.32 (attached):

a. Updated plumbing equipment schedule.

Item A2: Refer to Drawing A3.00 (attached):

a. Removed WFT-9.
b. Updated to clarify WTF-10 tile installation pattern.
c. Added Plastic Laminate, Quartz Countertop, Resinous base and Solid Surface for Reception Desk.

Item A2: Refer to Drawing A3.01 (attached):

c. Revised flooring and base types in Room 002.
d. Added Finish information for Corridor 001 & 001A.

Item A3: Refer to Drawing A3.02 (attached):

a. Revised WFT in Room 104C/104D

b. Added FRP-1 to Room 113, 114, 115, & 116.
c. Clarified Paint and Tile accent in Vestibule 100.

Item A4: Refer to Drawing A3.03 (attached):

a. Revised WFT in Room 136.

Item A5: Refer to Drawing A3.04 (attached):

a. PLACE HOLDER

Item A6: Refer to Drawing A3.05 (attached):

a. Revised paint, flooring and base types in Room 300.
b. Included flooring pattern in Room 315.

Item A7: Refer to Drawing A3.10 (attached):

a. Door widths updated.
b. Detail 17/A3.10 updated.

Item A7: Refer to Drawing A3.11 (attached):

c. Frame detail bubbles updated.

Item A8: Refer to Drawing A3.12 (attached):

a. Detail drawings 3/A3.12 and 11/A3.12 added.

Item A9: Refer to Drawing A5.10 (attached):

a. New Material Keynotes added.
b. Material Keynotes Updated.
c. Window graphics clarified on elevation drawings.

Item A10: Refer to Drawing A5.11 (attached):

a. Sheet A5.11 added.
b. New Material Keynotes added.
c. Material Keynotes Updated.
d. Elevation views 1/A5.11 and 2/A5.11 added.

Item A11: Refer to Drawing A5.12 (attached):

a. New Material Keynotes added.

b. Material Keynotes Updated.

Item A12: Refer to Drawing A5.13 (attached):

a. New Material Keynotes added.
b. Material Keynotes Updated.

Item A13: Refer to Drawing A5.20 (attached):

a. New Material Keynotes added.
b. Material Keynotes Updated.

Item A14: Refer to Drawing A5.21 (attached):

a. New Material Keynotes added.
b. Material Keynotes Updated.

Item A15: Refer to Drawing A6.01 (attached):

a. View marker removed.

Item A16: Refer to Drawing A6.10 (attached):

a. Detail line removed from detail 7/A6.10 for clarity.
b. Detail drawing 11/A6.10 added.

Item A17: Refer to Drawing A6.11 (attached):

a. Detail drawing 7/A6.11 updated.
b. Detail drawing 8/A6.11 updated.
c. Detail drawing 10/A6.11 updated.

Item A18: Refer to Drawing A7.01 (attached):

a. New Material Keynotes added.
b. Material Keynotes Updated.

Item A19: Refer to Drawing A7.02 (attached):

a. New Material Keynotes added.
b. Material Keynotes Updated.

Item A20: Refer to Drawing A7.03 (attached):

a. New Material Keynotes added.
b. Material Keynotes Updated.

Item A21: Refer to Drawing A7.04 (attached):

a. New Material Keynotes added.
b. Material Keynotes Updated.
c. Wall Section 2/A7.04 added.

Item A22: Refer to Drawing A8.01 (attached):

a. Ref. Elevation 2: called out electrical fixture.
b. Specified cabinet types.
c. Ref. Elevation 4: added finishing detail for P.LAM. support.
d. Clarified elevation 6 direction.
e. Ref. Elevation 9: Called out P.LAM. apron.
f. Ref. Elevation 10: Made changes to counter, waterfall and base cabinet.
g. Ref. Elevation 11: added wall B/I oven and revised P.LAM. tall cabinet.
h. Ref. Elevation 13: Added detail 10 marker and clarified direction.

Item A23: Refer to Drawing A8.02 (attached):

a. Ref. Elevation 4: revised SS countertop.
b. Ref. Elevation 9/10: clarified direction.
c. Ref. Elevation 10: revised two tall cabinet types.
d. Ref. Elevation 14: Revised title.
e. Added Elevation 16.

Item A24: Refer to Drawing A8.03 (attached):

a. Ref. Elevation 11: Revised WFT
b. Ref. Elevation 11: Added note for RB-1.
c. Ref. Elevation 11: Revised installation height of mirror.
d. Ref. Elevation 12/13/14/15/16: Added note for RB-1.
e. Ref. Elevation 12/13/14/15/16: Clarified tile installation pattern.

Item A25: Refer to Drawing A8.06 (attached):

a. Added Elevation 5/A8.06
b. Developed Detail 2,3,4
c. Clarification on direction of elevations 6/7/8/9/A8.06.

d. Renumbered Elevations/Details and removed one unnecessary elevation.

Item A26: Refer to Drawing A8.08 (attached):

a. Sheet A8.08 added.
b. Drawings 1/A8.08, 2/A8.08, 3/8.08 added.

Item A27: Refer to Drawing A9.10 (attached):

a. Room 005 and 005A ceiling updated.

STRUCTURAL

Item S1: Reference Drawing S2.01 (Re-Issued).
a. Foundation plan added for fleet canopy construction.

Item S2: Reference Drawing S2.02 and Drawing S7.01 (Re-Issued).
a. Framing plan added for fleet canopy construction.
b. Framing detail added (Detail 15/S7.01).

Item S3: Reference Drawing S2.02 and Drawing S7.01 (Re-Issued).
a. Detail added at metal roof deck direction change for clarification (Detail 14/S7.01).

Item S4: Reference Drawing S2.02 (Re-Issued).
a. Clarification: Section cuts added for metal roof deck support angles at masonry wall (Detail 3/S7.01).

Item S5: Reference Drawings S2.02 (Re-Issued), S2.03, S2.04.
a. BP1 note in legend should reference detail 1/S7.01.

MECHANICAL

Item M1: Reference Drawing M1.03 (Not Re-Issued).
a. Keyed Note Tag 15 should be labeled Tag 5.

Item M2: Reference Drawing M1.04 (Not Re-Issued).
a. Keyed Note Tag 12 on existing cabinet heater in Safe Room should be labeled Tag 3.
b. Keyed Note Tag 8 on shelving units in (2) offices and (2) classrooms should be labeled Tag 6.

Item M3: Reference Drawing M2.05 (Not Re-Issued).

a. Piping above Staff Toilet 136A, the hot water should be ¾" and the cold water should be 1", instead of hot water 1" and cold water ¾".

Item M4: Reference Drawing M3.02 (Not Re-Issued).
a. Omit sensor VB-17 in small room next to 101A.

Item M5: Reference Drawing M3.03 (Not Re-Issued).
a. Duct sizes on VB-22 should be 16x10 and 12x8, in lieu of 12x10 and 10x8.
b. Duct size on VB-21 should be 12x8, in lieu of 14x8.
c. Return Air CFM should be 175 CFM, in lieu of 250 CFM in Offices 211A and 212A.

Item M6: Reference Drawing M3.04 (Not Re-Issued).
a. VB-42 serving Office 319A should be labeled VB-41.
b. Omit sensor VB-43 by door in Room 319.
c. Provide VB-43 sensor next to door in Office 319B.
d. Sensor VB-42 in Office 319A should be labeled VB-41.
e. Sensor VB-47 in Office 318 should be labeled VB-46.

Item M7: Reference Drawing M3.05 (Not Re-Issued).
a. Sensor in Classroom 139 should be labeled VB-53, in lieu of VB-58.
b. Sensor outside of Staff Toilet 136A should be labeled VB-52, in lieu of VB-58.

ELECTRICAL

Item E1: Reference Drawing SE1.02 (Re-Issued).
a. Point by point has been updated with canopy lights and removed previous pole lights in west parking lot.

Item E2: Reference Drawing E1.01 (Re-Issued).
a. Devices changed from existing to demo.
b. Added Key Note 12 and used on certain devices.
c. See drawings for more details.

Item E3: Reference Drawing E1.02 (Re-Issued).
a. Added keynote on WAP in classroom and keynote on switch in mail room.
b. See drawings for more details.

Item E4: Reference Drawing E1.03 (Re-Issued).
a. Devices changed from existing to demo. See drawings for details.

Item E5: Reference Drawing E2.01 (Re-Issued).
a. Switches changed. See drawing for more details.

Item E6: Reference Drawing E2.02 (Re-Issued).
a. Classroom lights adjusted to remove downlights from upper cabinets. Shifted downlight above sink.
b. Removed keyed switch from corridor.
c. Fixture AA2 was missing circuit and controls.
d. Labeled emergency sign.
e. Labeled missing circuit in simulation room.
f. Shifted downlights in Life Skills Room 112.
g. Added powerpack in Classroom 114.

Item E7: Reference Drawing E2.03 (Re-Issued).
a. Showed connection from powerpack to light "G1" in Training Room.
b. Moved corridor occupancy sensor in office area.

Item E8: Reference Drawing E2.04 (Re-Issued).
a. Removed smoke detector off lighting plan.
b. Labeled emergency exit sign in corridor.

Item E9: Reference Drawing E2.05 (Re-Issued).
a. Added lighting control circuits to exterior wall packs "AA2".
b. Added Key Note "5".
c. Swapped keyed switches in janitor closet with low voltage dimmer switches. Tagged with Key Note 5.

Item E10: Reference Drawing E2.06 (Re-Issued).
a. Added Key Note "25".
b. Added receptacle and TV data in training room for TV. See drawings for more details.

Item E11: Reference Drawing E2.08 (Re-Issued).
a. Added receptacle and TV data in Conference Room 215B for TV. See drawings for more details.

Item E12: Reference Drawing E4.01 (Re-Issued).
a. Changed LCP circuit 11. See drawings for details.

Item E13: Reference Drawing E4.04 (Re-Issued).
a. Changed circuits from blank/spare to TV for panel LP3 and RP2A. See drawings for more details.

END OF ADDENDUM NO. 1

WTA Architects

YOUR NAME

Cc: LIST OF NAMES

INDEX OF SPECIFICATION SECTIONS

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MAI: 2022-1558

SECTION 21 05 00

FIRE PROTECTION REQUIREMENTS

PART 1 GENERAL

1.1 RELATED SPECIFICATIONS AND DOCUMENTS

A. Drawings and related specifications for this project including General and Supplementary Conditions, Division 1, General Requirements, Instructions to Bidders, Addenda's, etc. apply to and are considered a part of Division 21 – Fire Suppression Work.

B. Information in this division is intended to clarify or make additions to the requirements set forth in the General Conditions, Supplementary Conditions, and Division I of these specifications. Any conflict between this Division 21 and other sections or divisions of the specifications or drawings shall be brought to the attention of the Architect/Engineer in writing as a request for addendum prior to the bid opening.

C. Furnish all equipment, materials, articles, items, operations or methods listed, mentioned or scheduled on drawings, these specifications, manufacturer's installation instructions and include all labor, materials, equipment and incidentals necessary for their complete installation and operation.

D. All information contained in this section applies to all sections within Division 21 as if it was part of each section.

1.2 DRAWINGS AND SPECIFICATIONS

A. The drawings and these specifications are intended to supplement each other and any material or labor called for in one shall be furnished even if not specifically mentioned in both. Any material or labor which is neither shown on the drawings nor listed in this specification, but is normally incurred or required for completion of work shall be furnished. If there is a discrepancy between the drawings and specifications, the more stringent of the two shall be followed.

B. Drawings are diagrammatic and are intended to show approximate location and general arrangement of systems and equipment. No attempt has been made to show every ell, tee, etc. Drawings shall not be scaled for location of systems, equipment, etc. All dimensions whether given on drawings or scaled shall be verified in field and coordinated with all other trades and existing field conditions. Some ductwork, piping, equipment, etc. locations may require changes in location due to field conditions and coordination with other trades will be made with no additional cost to the Owner. Failure to check will be no reason for additional compensation.

C. These drawings and the associated specifications are intended to provide a complete furnishing, installation and operational fire protection systems. If these drawings and associated specifications have information omitted that would not allow a completely operational system as is the intent of the Engineer, the bidder shall notify the Engineer a minimum one week prior to the bid date to allow for addenda. Once bids have been received, the Contractor shall be responsible for material, labor, etc., to furnish and install a completely operational mechanical system as is the intent of these drawings and associated specification.

D. The installation of all systems, equipment, etc., is subject to clarification with submitted shop drawings and field coordination requirements. Equipment outlines shown on drawings or dimensioned on drawings are limiting dimensions. Any equipment that reduces the indicated clearances or exceeds specified or scheduled equipment dimensions shall not be used.

E. All sprinkler system pipe routing, sprinkler head locations, etc. shall be approved by the Architect in a schematic layout prior to starting shop drawings. The Architect/Engineer and Owner reserve the right to make minor changes in the location of equipment, piping, ductwork, etc. at the time of rough-in without additional cost to the Owner.

F. The Fire Protection Contractor shall have completed for his portion of work, at least one installation of size and type comparable to this project and has been in satisfactory operation for at least two complete years. The Fire Protection Contractor shall also have a developed service department capable of negotiating service contracts with the Owner for systems herein specified.

1.3 AUTOCAD BACKGROUND FILES

A. The Contractor shall include in their bid any cost for requesting AutoCAD backgrounds for their use from the Architect or Engineer. The cost will be $150.00 for the first plan, and $50.00 for each additional plan that may be requested for AutoCAD use. A waiver of responsibility for the Architect and Engineer related to Contractor use of the CAD files shall be signed by the Contractor.

1.4 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F. The following are industry abbreviations for plastic materials:
1. ABS: Acrylonitrile-butadiene-styrene plastic.
2. CPVC: Chlorinated polyvinyl chloride plastic.
3. PE: Polyethylene plastic.
4. PVC: Polyvinyl chloride plastic.

G. The following are industry abbreviations for rubber materials:
1. EPDM: Ethylene-propylene-diene terpolymer rubber.

2. NBR: Acrylonitrile-butadiene rubber.

1.5 LOCAL CONDITIONS

A. Before submitting proposals, each contractor shall examine these specifications and associated drawings, addenda, etc. and shall examine the site of the project. The bidder shall fully investigate the site of this project, investigate coordination of his work with all other trades and existing conditions and completely satisfy himself as to the conditions to which the work is to be performed before submitting his/her bid. No allowances or considerations will be given at a later date for alleged misunderstanding as to the requirements of the work, materials to be furnished, or conditions required by the nature of this project site and coordination by the neglect on the bidder's part to make such an examination and coordination.

B. Drawings may show approximate location of existing services. The Fire Protection Contractor shall check with local utility companies or municipal agencies for exact location of services which they expect to encounter. The Fire Protection Contractor shall be responsible for hiring a company such as "Miss Dig" to stake out and locate all utilities in areas of excavation before commencing any work. The Fire Protection Contractor shall verify all elevations and locations of existing underground lines which are to be connected into or routed over or under. This verification shall be done prior to beginning work at this project.

1.6 QUALITY ASSURANCE

A. Sprinkler Systems: Perform work to NFPA 13.

B. Standpipe and Hose Systems: Perform to NFPA 14.

C. Welding Materials and Procedures: Perform to ASME Code.

D. Valves: Bear UL label or marking. Provide manufacturer's name and pressure rating marked on valve body.

1.7 SUBMITTALS

A. Furnish electronic sets of complete detailed Computer Aided Design (CAD) working drawings, hydraulic calculations, equipment shop drawings and product data of the system.

B. Preliminary Shop Drawings: Prior to detailed submission, submit preliminary layout of finished ceiling areas indicating only head locations coordinated with ceiling installation on a Computer Aided Design (CAD) background. In areas of exposed piping, submit a preliminary layout showing pipe routing. Preliminary layouts shall be approved by the Architect prior to detailed shop drawing submission.

C. Shop Drawings: Indicate hydraulic calculations, detailed pipe layout, hangers and supports, components and accessories. Indicate system controls. Submit actual flow test results, with name of witness from proper local authorities attending, on shop drawings. Hydraulic calculations must be based on actual flow test results.

D. Product Data: Provide data on sprinkler heads, valves and specialties, including manufacturers catalog information. Submit performance ratings rough-in details, weights, support requirements, and piping connections.

E. Samples: Submit two of each style of sprinkler head specified.

F. Provide tests and documentation as required by the Fire Marshal

G. Manufacturer's Certificate: Certify that system has been tested and meets or exceeds code requirements.

H. The Fire Protection Contractor shall include in their bid any cost for requesting AutoCAD backgrounds for their use from the Architect or Engineer. At a minimum $100.00 for the first plan, and $50.00 for each additional plan that may be requested for AutoCAD use.

1.8 SCOPE OF WORK

A. Design and provide an automatic sprinkler and standpipe system for all portions of the building. Furnish and install all piping from city service valve to fire service area including service tee, domestic curb valve, hydrant curb valve, fire hydrant post indicator valve, detector check valve, alarm check valve with retarding chamber and pressure switch, OS & Y valves with supervisor switches, check valves, pump test connection, fire department connection, jockey pump, fire pump, air compressor, controllers, interior piping, sprinkler and accessories and appurtenances for complete systems as shown on drawings and hereinafter specified. Also furnish and install double check valve back-flow prevention assembly. See drawings. (Some items mentioned in this section may not be required for this project - coordinate required equipment with drawings and NFPA Codes and regulations).

B. The entire installation shall be strictly in accordance with NFPA Standard No. 13, Sprinkler Systems, NFPA Standard No. 14 installation of standpipe and hose systems, NFPA Standard No. 20, installation of centrifugal fire pumps, and NFPA Standard No. 24 installation of private fire service mains, NFPA 70 National Electric Code, and shall meet the requirements of the Owners insurance carrier, governing Fire Marshal and all other authorities having jurisdiction. Note: extended coverage sprinkler head system will not be accepted without written approval from the Engineer.

C. Systems shall be hydraulically designed, detailed, furnished and installed by a competent, experienced and licensed Fire Protection Contractor regularly engaged in furnishing and installing fire protection systems.

D. Contractor shall furnish preliminary system layout drawings and after approval, complete detailed Computer Aided Design (CAD) working drawings, hydraulic calculations and equipment shop drawings of the system and shall submit them to the Owners insurance carrier and governing Fire Marshal for their review and approval. Shop drawings shall bear designers/installers State of Michigan License number and Certification number, and have approval of Fire Marshall before being submitted to the Engineer. Eight copies of approved drawings, calculations, shop drawings and product data shall be submitted to Architect/Engineer for review. No work shall be commenced before shop drawings are reviewed by Architect/Engineer.

E. Contractor shall examine the drawings to determine building construction which would affect location of mains and heads.

F. All permits, licenses, fees, inspections and arrangements required for the work under this contract shall be obtained and paid for by the contractor. Documentation shall be provided as required by the State Fire Marshal.

G. At completion of the project, the Fire Protection Contractor shall clean, lubricate and operate all control valves, alarms and devices. Provide Owner with two copies of NFPA Standard No. 25 on inspection, testing and maintenance of water based fire protection systems and maintenance and parts lists for all equipment installed. Install hydraulic design plate on sprinkler riser as per Section 10-5 and provide spare sprinkler heads with wrenches in wall mounted box near riser as per Section 3-2.9 in the 1999 edition of NFPA 13.

H. Contractor shall be responsible for total system design and layout of sprinkler heads and piping.

I. Contractor shall be responsible for obtaining all volume, pressure and flow test data from local water supply system necessary to allow a complete bid price and approved final design and installation.

J. It shall be the responsibility of the Fire Protection Contractor to verify the fire protection water service size noted on the drawings and shall be responsible for notification of any changes in pipe size to the General Contractor (or Owner) prior to the bid date, that is required to accomplish a complete, operational and code approved system.

1.9 OPERATION AND MAINTENANCE DATA

A. Submit Maintenance Instructions: Include installation instructions, spare parts lists, procedures, and treatment programs.

1.10 QUALITY ASSURANCE

A. Sprinkler Systems: Perform work to NFPA 13.

B. Standpipe and Hose Systems: Perform to NFPA 14.

C. Welding Materials and Procedures: Perform to ASME Code.

D. Valves: Bear UL label or marking. Provide manufacturer's name and pressure rating marked on valve body.

E. Fire Protection Contractor shall be licensed and certified by the State of Michigan for the design and installation of fire protection standpipe, hose and sprinkler systems.

1.11 RECORD DRAWINGS

A. Maintain an up-to-date set of "record" drawings showing actual piping, sprinkler heads, etc. installation locations. Exact dimensions from column lines for all concealed work and tie-ins with elevations noted shall be included.

B. Include a set of reproducible drawings and a set of prints in each Operation and Maintenance Manual.

C. The Engineer reserves the right to request and be furnished any additional information he deems necessary to be shown on the record drawings.

1.12 OWNER'S INSTRUCTIONS

A. Upon completion of the project, the contractor shall be responsible for instructing the Owner's operating staff, in the presence of the Architect/Engineer's representative, in the proper operation and maintenance of the mechanical systems and equipment. Include a statement signed by the Owner that instructions have been given for proper operation and maintenance of the mechanical systems and equipment.

1.13 GUARANTEES

A. Furnish a written guarantee, to the Architect/Engineer, that will make the contractor responsible at his own expense for any imperfections in material and/or workmanship which may develop under ordinary use within a period of one (1) year from final Owner's acceptance of the work.

B. Furnish all written guarantees from equipment and/or material manufacturers which shall include the operating and performance conditions and capabilities upon which they are based.

C. Permanent equipment that is used for temporary heat or cooling shall be guaranteed for one (1) year from the date of final acceptance of the project.

1.14 PORTABLE AND DETACHABLE PARTS

A. Retain all portable and detachable parts of installation such as keys, spare accessories, operating manuals, etc. include in the Operation and Maintenance Manual.

1.15 OPERATION AND MAINTENANCE MANUALS

A. Furnish to the Architect/Engineer two (2) copies of an approved bound (3 ring binder) book with tabs for sections covering each item of equipment. These notebooks shall include shop drawings, maintenance manuals, operating manuals and parts lists to instruct the Owner on proper operation and use as well as maintenance for each piece of equipment. These books shall also include contractors', subcontractors' and manufacturers' names, telephone numbers and addresses.

B. Manuals shall also include sequence of operation, control equipment literature, wiring and control diagrams, certificates of guarantees, certificates of inspection, mechanical system test and balancing reports. The contractor shall accumulate and summarize the control and maintenance sequence in a typewritten sheet to be included in the report.

C. The manuals must be approved by the Architect/Engineer before final payment to the contractor. The Engineer reserves the right to request and be furnished any additional information that he deems necessary to be included in the manuals.

1.16 RESPONSIBILITIES FOR USE OF SUBSTITUTE MATERIALS

A. Contractor shall notify Architect/Engineer in writing at least ten (10) calendar days before bids are due for approval to use materials and/or equipment other than that which has been specified or scheduled. If substitute materials and/or equipment are approved and used, it will be this contractor's responsibility to guarantee that the items will function as the specified equipment or materials, will in no way alter the design of the structure or system, and will not require any additional mechanical work such as piping, ductwork, etc. Any additional cost required by substitute materials will be the responsibility of the contractor.

B. It will be the contractor's responsibility, at his own expense, to remove or replace any non-approved equipment or material or any approved equipment or materials not originally specified or scheduled if equipment and materials do not meet with the satisfaction of the Architect/Engineer.

C. It shall be the Fire Protection Contractor's responsibility to coordinate and pay for any Electrical Contractor costs due to any changes in substitute materials and/or equipment's power requirements, which differ from that shown on the design documents.

D. No consideration will be given to requests for substitute materials because of delivery problems unless the contractor can prove that orders were placed as soon as possible after contract was awarded and that delays were not caused by submittal of unscheduled or unspecified (substituted) materials to the Architect/Engineer.

1.17 COST BREAKDOWN AND EQUIPMENT LIST

A. The successful bidder shall be responsible for submitting a cost breakdown to the Architect/Engineer and Owner within ten (10) calendar days after date of request of the breakdown. During progress of the work, if changes occur which cause additional cost, the price on such items shall be broken down in accordance with the items listed in the breakdown.

B. The bidders shall be responsible for submitting a complete list of all equipment manufacturers, makes, models, etc. that will be used for this project with their proposal. The equipment list shall be typed on the contractor's letterhead and shall be signed by the authorized officer.

1.18 MATERIALS AND EQUIPMENT

A. Materials and equipment furnished under this project shall have a minimum warrantee of one (1) year. All materials and equipment shall be new, of first class quality and shall be furnished, delivered, erected, installed and finished in every detail and shall be so selected and arranged as to fit into the building space. All material or equipment that is not specified but necessary for this project shall be subject to the approval of the Architect/Engineer.

B. The contractor shall be required to remove and replace at his/her expense any non-approved materials or equipment installed by him as directed by the Architect/Engineer.

C. Any materials or equipment not specified or scheduled but similar to that which has had prior approval shall be listed as a substitution and noted on the proposal form as such.

D. The contractor shall include all miscellaneous materials and labor required to completely install and operate the mechanical systems as is intended by these drawings and specification.

1.19 SCHEDULE, COORDINATION AND INSTALLATION OF WORK

A. The contractor shall carry on work in such a manner as to meet the dates as scheduled by the General Contractor and shall work overtime at no expense to the Owner as required to comply with this schedule. This contractor shall schedule all work with Owner and Architect/Engineer and schedule shut down of systems with Owner.

B. Examine the site and all drawings and specifications and coordinate work with all other trades before commencing work for this project. Arrange work essentially as shown with the exact layout to be made on the job to suit actual conditions. Precise locations of equipment and materials shall be coordinated and shall be the responsibility of this contractor. Should any conflicts in location occur, and necessary deviations from drawings are required as determined by the Architect/Engineer, the contractor shall make necessary adjustments without additional cost to the Owner.

C. Drawings are diagrammatic with no attempt made to show and precisely locate every tee, ell, fitting, valve, etc. All equipment, piping, ductwork, etc. shall be located and/or routed to allow for the most convenient access for servicing.

D. Arrange for necessary access doors, panels, etc. to allow servicing of equipment, piping, valves, fire dampers, etc. Perform any cutting and patching as required, made necessary by failure to make proper arrangements.

E. Indicated equipment connections, sizes and locations shall be verified and connected according to manufacturer's shop drawings and installation instructions. Thoroughly investigate the space provided for equipment and connections before ordering equipment. All equipment shall be selected to fit into the space allowed, including connections with adequate space allowed for operation and maintenance.

F. All work shall be installed in a neat and workmanlike manner, using skilled personnel thoroughly qualified in the trade or duties that they are to perform. Rough work will be rejected.

G. Coordinate all equipment deliveries and schedules to allow timely installation. Contractor shall separate equipment into sections and reassemble in building if required by the installation at no extra cost to the Owner.

H. Furnish a superintendent approved by the Architect/Engineer to oversee and coordinate the work to be performed with all other trades.

I. Coordinate location of pipes, sprinkler heads, etc. with other building components such as structural components (beams, joists, columns, etc.), electrical components (lighting, conduits, etc.) and architectural components (walls, ceilings, floors, pipe chases, roof, etc.).

J. Before starting work, Contractor shall verify that available space for proposed pipes, ducts, equipment etc. is adequate for the intended purpose and will result in a first class installation. Irregardless of drawings, responsibility for first class operating systems rests with the Contractor.

K. Arrange for chases, slots, openings, etc. and other building components to allow for mechanical systems installation. Coordinate cutting and patching of these components to accommodate installation. This contractor shall be responsible for accurately locating for the general trades all chases, shafts, etc. and shall be responsible for all cutting and patching if these chases were not accurate or not coordinated in time with the general trades. Coordinate installation of all sleeves in walls, on floors or other structural or architectural components.

L. Sequence, coordinate and integrate installation of equipment and materials for efficient work flow during the project. Particular attention should be spent on larger pieces of equipment.

M. Install equipment and materials with provisions for necessary access for service and maintenance. Allow space for removal of all parts that may require replacement or servicing.

N. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

O. Coordinate requirements for access panels and doors for fire protection items requiring access that are concealed behind finished surfaces with the General Trades. Access panels and doors are to be furnished and installed by the Architectural Trades unless otherwise noted. When access panels are required, valves and equipment components requiring access shall be located to minimize the number of panels.

P. Examine the work as it progresses and alert the Architect/Engineer in writing of any instances or obstructions that will prevent this contractor from performing his/her work.

1.20 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

C. Furnish and maintain a weatherproof storage facility on the site of adequate size to store miscellaneous equipment and/or materials to prevent exposure to the weather. Location of shed shall be determined by the Owner and

Architect/Engineer. The Owner reserves the right to deny storage of materials or equipment in any existing or new buildings.

1.21 PLACEMENT OF ORDERS

A. No consideration will be given to requests for substitute materials because of delivery problems unless the contractor can prove that orders were placed as soon as possible after contract was awarded and that delays were not caused by submittal of unscheduled or unspecified (substituted) materials to the Architect/Engineer.

1.22 COOPERATION WITH ARCHITECT/ENGINEER AND OTHERS

A. Coordinate all aspects of the fire protection system installation with all other trades, existing conditions, etc.

B. If the bidder believes that changes in design are required to meet intended design capacities and operation or material and/or equipment is obviously omitted from these specifications and drawings, the bidder shall contact the Architect/Engineer in writing at least ten (10) days before bid date. The acceptance of a bid by the Owner shall be binding and shall indicate that the bidder does not require any changes in design nor additional costs in order to meet the design and performance of the mechanical system as indicated in these specifications and drawings.

C. Examine the work as it progresses and alert the Architect/Engineer in writing of any instances or obstructions that will prevent this contractor from performing his/her work.

1.23 WORK INVOLVING OTHER TRADES

A. Equipment or materials specified may have to be installed by other trades (such as electrical trades or architectural trades) due to code requirements or union jurisdictional requirements. Where this occurs, this contractor shall include all costs required by other trades to complete the work and hire the respective trade to perform this work.

1.24 PERFORMANCE DATA AND ACCESSIBILITY

A. All performance data specified in this specification or scheduled on drawings shall be considered actual performance of the equipment after installation. The supplier and installer shall be responsible for suitable allowances to adjust equipment to design capacities when actual operating and installation conditions differ from drawings.

B. All equipment and materials shall be installed to allow access for servicing and maintenance. Coordinate final location of such equipment and materials that are concealed with required access doors on panels. Allow ample space for replacement or servicing. Extend all grease fittings to an accessible location.

1.25 CUTTING AND PATCHING

A. Unless noted otherwise, the Mechanical Trades shall be responsible for all cutting, patching and associated work required. This work shall be performed by trades normally performing this type of work except drilling of holes shall be done by the

contractor requiring same. This includes replacing areas of cutting required by this work with proper reinforcing, termite shielding, materials, finishing, etc. to restore the areas to their original condition, and filling all openings around ducts, piping, etc. with approved fire retardant materials. Irregardless, all drilling of holes shall be the responsibility of the Contractor requiring same.

B. If noted on drawings that the General Trades will be responsible for all cutting and patching, it will be the Mechanical Trades responsibility to notify all General Trades during bidding of all areas requiring cutting and patching. Irregardless, all drilling of holes shall be the responsibility of the contractor requiring same.

1.26 WORK IN EXISTING BUILDINGS

A. Coordinate and schedule all work in existing building with Owner and Architect/Engineer. Systems shall be kept in operation at all times if at all possible. If a system shut-down is required, the contractor shall schedule with the Owner, the time and length of shut-down. A system shall not be shut down without written permission from the Owner.

B. All existing fire protection equipment, piping, etc. that is to be removed shall remain the property of the Owner. The contractor shall remove and locate this material that remains the property of the Owner to a location determined by the Owner somewhere on site. If the Owner does not want to maintain possession of the removed material, the contractor shall be responsible for removing material from the site and disposing of this material as necessary to meet all codes and requirements and shall pay all costs as required for any disposal fees, inspections, permits, etc.

C. All existing fire protection piping, equipment, etc. whether shown on drawings or not that is to be removed and/or abandoned and does not remain property of the Owner shall be removed from site.

D. Any existing fire protection piping, valves, equipment, etc. serving the existing building which are shown or not shown on drawings and are required for systems operation shall remain in use. If these systems require relocation to allow installation of new systems, the contractor shall be responsible for relocating to an Owner and Architect/Engineer approved location. The contractor shall pay all cost for this work and include such cost in his/her bid. (As specified previously, contractor shall be responsible for examining site and include all cost for work required to complete this project.)

E. When active services, etc. are encountered in this project, the contractor shall furnish and install bracing, support, etc. as required to protect and keep these services active. (As specified previously, these drawings are diagrammatical. The contractor shall be responsible for verification of all existing services, piping, equipment, etc.).

1.27 EQUIPMENT GUARDS

A. All rotating or moving parts of equipment that are located so as to be a hazard shall be fully enclosed or properly guarded as to meet or exceed all regulations and OSHA requirements.

1.28 ELECTRICAL CONNECTIONS

A. The Electrical Trades shall be responsible for furnishing and installing all electrical equipment, wiring, etc. required for operation of the fire protection equipment unless otherwise noted on the drawings. The Fire Protection Contractor shall furnish detailed information and wiring diagrams to the Electrical Trades for all equipment specified and/or scheduled for this project. In the event that the Fire Protection Contractor furnishes an "approved equal" or "alternate" that require changes in the original electrical design, the Fire Protection Contractor shall pay all costs to the Electrical Trades as required to make satisfactory adjustments. All electrical work shall be done in accordance with the latest edition of the National Electric Code.

1.29 MOTORS, MOTOR STARTERS AND DISCONNECTS

A. Unless otherwise noted on drawings, motors shall be of constant speed 1750 rpm, new NEMA Design B, 40ºC rise, horse power rated, open drip-proof except TEFC in dirty atmosphere, induction type motor with service factor of 1.15 and be of sufficient capacity to continuously operate the apparatus to which it is connected under all conditions of operation without exceeding nameplate ratings.

B. Motors shall be premium efficiency as calculated using IEEE test method 112B.

C. Motors ½ Hp. or larger shall be three phase; motors under ½ Hp. shall be 115 volt, 60 cycle, single phase. Before ordering the motors, the contractor shall verify correct motor voltage with the Electrical Trades and field conditions.

D. The Mechanical Trades shall furnish, for equipment under Division 21, all special switches, disconnects, starters, alternators, etc. as specified or scheduled to be factory furnished and/or factory installed with the equipment including wiring diagrams, etc. whether it is to be factory installed or field wired. All other motor starters, disconnects, etc. not noted as factory furnished shall be furnished and installed by the Electrical Trades as specified in Division 26 - Electrical.

E. Starters that are to be factory furnished with equipment shall be of the combination type and shall be as specified under Division 26 - Electrical Trades Division. Furnish overload protection for each phase.

F. All wiring methods and materials shall meet NEMA, National Electric Code and State of Michigan Code requirements.

G. All displays on control panels shall be on face of the panels.

H. Motors having V-belt shall be furnished with base slide rails or other form of adjustment.

1.30 LUBRICATION AND MAINTENANCE

A. Contractor shall maintain, oil, lubricate, etc. all equipment furnished under Division 21 until final acceptance by the Owner. Protect all bearings and shafts during installation and thoroughly grease the steel shafts to prevent corrosion. The contractor shall be responsible for any and all damage to bearings, shaft, etc. of Division 21 equipment operated or not until final acceptance by the Owner.

1.31 EXCAVATION AND BACKFILLING

A. Furnish all excavation, backfilling and removal of excess dirt to accomplish installation of the fire protection system unless otherwise noted on drawings.

B. All excavation shall be by open cut from the surface. Contractor shall determine whether excavation shall be by machine or by hand except where existing utilities may be located where excavation shall be by hand. Contractor shall be responsible for all damage to existing facilities and services. Excavation shall be to a depth of at least 6″ to allow granular bedding below pipe or duct.

C. If for any reason the work is suspended, the contractor shall properly protect the excavation and leave the areas unobstructed.

D. Trench width shall allow sufficient width at centerline of pipe to allow at all times a first class construction/installation method but in no case should be less than 12″ larger than the nominal pipe or duct size. This shall especially be true in areas that joints must be connected. Joint holes may have to be made with overhanging sides to make installation safe for workmen.

E. The excavation shall be at all times finished and backfilled to the required grade after completion and approval of work. Not more than 100 feet of trench shall be excavated and open unless written approval is given by the Architect/Engineer.

F. The subgrade shall be 4″ to 6″ below the pipe of granular bedding graded and tamped by hand or mechanical means to the exact elevation required at the bottom of the pipe. Granular materials shall be approved fine aggregate meeting MDOT #2NS specifications. This material shall pass a ½″ sieve but will be retained on a #4 sieve. If poor soil conditions exist which will not give proper support to the pipe, duct or structure, furnish granular fill as required to remedy this situation and give proper support.

G. Furnish and install properly sloped sheet piled, shored and braced in areas that the soil requires this to maintain a proper excavation and prevent any movement of earth which could in any way damage the work under construction. When removing the sheeting and bracing, special care should be taken to prevent any caving of the sides of the excavation and injury to the completed work or adjacent property.

H. Take all necessary action to keep trenches and other excavation areas free from water at all times. Use such methods as pumping, ditching, well pointing, etc. to prevent water in trench or excavation. Dewatering of trench shall have constant supervision.

I. Backfill excavation and trenches with approved granular material around sides of pipe and at least 12 inches above the top of the pipe laid not more than in 6 inch layers that are thoroughly tamped to 95% of its maximum density. There shall be no backfilling by any mechanical means until the granular material has been firmly tamped around the entire pipe to 12 inches above the pipe. All material used for backfilling shall be approved by the Architect/Engineer. Wherever trenching crosses walks or roadways or isolated inside of building, backfill top 6′-0″ of trench with sand or bank run gravel in layers not to exceed 6 inches in depth and carefully compact by hand or machine. Do not backfill with frozen materials.

J. No piping shall be covered until it has been tested, inspected and approved. Upon completion of backfilling, grade shall be restored in indicated elevation and left in reasonable condition for finish grade by others unless otherwise noted on drawings.

K. Before final acceptance of work, all disturbed streets, drives, curbs, walks, parking areas, etc. shall be paved, graveled or other to as near their original condition as possible. All unused excavated material shall be removed from site if directed by the Architect/Engineer.

1.32 BASES AND SUPPORTS

A. This contractor shall be responsible for furnishing all equipment pads and supports for the fire protection equipment and materials, unless otherwise noted on drawings.

B. All floor mounted fire protection equipment shall have a reinforced concrete pad furnished unless otherwise noted on drawings. The concrete pads shall be tied to the building floor with expansion bolts located maximum of 4'-0" on centers with a minimum of four (4) bolts, set before pouring and concealed within the pad. The Mechanical Trades shall verify exact pad or support size with the equipment manufacturer and shall size pad with adequate area to allow sufficient room for installation of vibration isolators, equipment mounting hardware, etc. Concrete pads shall have a 45 degree bevel at the top edge. The contractor shall verify exact location of concrete pads.

C. Furnish all steel, hanging material, rods, etc. for suspending equipment off floor unless otherwise noted on drawings for equipment to be furnished under Division 21. This includes all structural steel for supporting between beams.

D. All support structure shall be of strength to safely withstand all stresses and loads to which they will be subjected and shall distribute load properly over the building area. Supports shall be designed to avoid undue strain to equipment and to avoid interference with piping, pipe connections, service and maintenance clearances, etc.

E. Where equipment is to be floor mounted and requires legs, this contractor shall furnish and install structural steel members or steel pipe and fittings for legs. Fasten and brace to equipment and furnish flange at base to allow bolting to floor.

F. Where equipment is to be ceiling or wall mounted, furnish necessary platform, structural steel, hardware, etc. as is most suitable for support of this equipment.

G. All supports shall be approved by the Architect/Engineer.

H. All piping shall be suspended from structural steel members utilizing rods and approved hanger devices. Do not use metal deck for support. Beam clamps such as the Grinnell Fig. 260 or approved equal shall be used. Sheet metal "straps" shall <u>not</u> be used in place of rods.

1.33 SLEEVES, PLATES AND COLLARS

A. Furnish all sleeves, plates and collars for piping, ductwork, etc. passing through walls, floor ceilings, foundations, etc. Coordinate with the General Contractor the exact location and size of required openings. No pipe or duct shall pass through a

wall, floor ceiling, etc. without a sleeve. This contractor shall be responsible for sleeve locations and securing sleeves before concrete is formed.

B. Sleeves for steel pipe shall be standard weight black steel pipe. For walls, foundations and ceilings, sleeve shall be kept flush with finished surfaces. For floors, the sleeve shall be set flush with bottom of concrete construction and be extended up ¼" above concrete floor. Sleeves shall be set in place before construction of walls, floors, ceilings, etc.

C. Sleeves for copper pipe shall be type "M" hard copper tubing installed typical to that of steel pipe sleeves.

D. Sleeves for piping shall be sized to allow insulation to run continuous through sleeve whenever possible and to allow not less than ¼" all around bare pipe or insulation.

G. All penetration voids shall be sealed smoke tight with non-combustible materials similar to 3M or Hilti firestop systems to maintain the integrity of the fire rated structure.

H. Where bare piping 2" and smaller pass through wall or floors, furnish polished chrome plated brass escutcheons, split type. Bare piping 2½" and larger that pass through walls or floor, furnish 22 gauge galvanized steel metal collars so as to cover opening.

1.34 RIGGING AND HOISTING

A. Perform all required rigging, hoisting, transportation, moving, etc. of all equipment, materials, etc. to be furnished and/or installed under Division 21 whether furnished by this contractor or by the Owner or other trades.

1.35 STORAGE FACILITY

A. Furnish and maintain a weatherproof storage facility on the site of adequate size to store miscellaneous equipment and/or materials to prevent exposure to the weather. Location of shed shall be determined by the Owner and Architect/Engineer. The Owner reserves the right to deny storage of materials or equipment in any existing or new buildings.

1.36 PROTECTION FROM DAMAGE

A. The contractor shall be responsible for all materials, equipment, etc. and all work installed by himself and shall protect it from damage until final acceptance of this project by the Owner.

B. Furnish all coverings and protection from dirt, dust, rain, storm, heat, traffic, wear, etc. and all possible injury including that by other workmen. Any equipment, workmanship, materials, etc. damaged prior to final acceptance by the Owner of this project shall be properly repaired at no expense to the Owner.

C. Protect all equipment, materials, etc. from freezing.

1.37 COMMON PIPE MATERIALS AND INSTALLATION INSTRUCTIONS

A. Refer to individual piping Sections for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

C. Refer to individual piping Sections for special joining materials not listed below.

1. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

a. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated.
1) Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
2) Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
b. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

2. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

3. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

4. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

5. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.

6. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

7. Solvent Cements for Joining Plastic Piping:
a. ABS Piping: ASTM D 2235.
b. CPVC Piping: ASTM F 493.
c. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
d. PVC to ABS Piping Transition: ASTM D 3138.

8. Fiberglass Pipe Adhesive: As furnished or recommended by pipe manufacturer.

1.38 PIPE HANGERS AND SUPPORTS

A. Hangers and saddles shall be Modern Hanger Corp., Grinnel/Elcen, Autogrip, or M-CO. Inserts shall be of the type to receive a machine bolt head or nut after installation, permit horizontal adjustment, and shall be flush with the surface. For copper pipe with steel hangers, clean and wrap pipe with two layers of plastic

insulating tape at point of contact. Roller supports shall be adjustable type with insulated standoff. Rods shall be used for suspended installation. Sheet metal “straps” shall not be used in place of rods.

B. Hangers for piping with vapor barrier sealed insulation shall be multipurpose pipe saddles fitting over the insulation. Wire or perforated strap iron will not be permitted for pipe supports. Do not support hangers from roof deck. Furnish and install all support steel as required to suspend from structural steel joist or beams. Hangers shall be clevis or split ring type with vertical adjustment and beam clamp similar to Grinnell Fig. 260, with maximum spacing per ASHRAE or NFPA Standards, whichever is most stringent:

Pipe Size	Steel Pipe	Copper Pipe	PVC Pipe	Rod Size
½ to ¾ inch	5 foot	5 foot	Continuous	3/8”
1 to 1¼ inch	7 foot	6 foot	Continuous	3/8”
1½ to 2 inch	9 foot	8 foot	Continuous	1/2”
2½ to 3½ inch	11 foot	9 foot	Continuous	5/8”
4 to 6 inch	12 foot	10 foot	Continuous	3/4”
8 to 12 inch	12 foot	--	Continuous	7/8“
14 to 18 inch	12 foot	--	Continuous	1¼”

C. Conform to ASME B31.9, ASTM F708, MSS SP58, MSS SP69 and MSS SP89.

D. Hangers for Pipe Sizes ½ to 1½ Inch: Malleable iron, adjustable swivel, split ring.

E. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.

F. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

G. Wall Support for Pipe Sizes up thru 3 Inches: Cast iron hook.

H. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.

I. Vertical Support: Steel riser unistrut clamps at high, mid, and low locations.

J. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

K. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

L. Inserts: Malleable iron case of steel shell and expander plug for threaded connection with lateral adjustments, top slot for reinforcing rods, lugs for attaching to forms, size inserts to suit threaded hanger rods.

1.39 PIPING AND EQUIPMENT SUPPORT

A. Attachments of mechanical equipment to structural members are the responsibility of the installing trade. Structural members shall not be field cut, welded or otherwise modified without approval of the Architect/Engineer. Attachment to steel joist shall be made at panel points. When routing piping or ductwork perpendicular to joist, a support shall be provided at every steel joist; when parallel to joist, a

support shall be provided at no more than 6' on centers or two panel bays. Structural members shall not be overloaded as a result of attachments. Attachment/equipment loading for all trades resulting in total load greater than an equivalent uniform 5 psf for any member shall be submitted to the Architect/Engineer for review. Mechanical Trades may contact the project Structural Engineer as required for panel point location assistance and welder certification requirements. Electrical Trades are still responsible for design, layout, and fabrication and installation of electrical supports and support attachment methods. Mechanical Trades shall submit attachment methods to the Structural Engineer for review.

B. Install products in accordance with manufacturer's instructions.

C. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.

D. Do not use spring steel clips and clamps.

E. Do not use powder-actuated anchors.

F. Do not drill or cut structural members without permission from Architect/Engineer.

G. Fabricate supports from structural steel or steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.

1.40 CLEANING AND FINISHING

A. During construction period, remove all debris, rubbish, tools, equipment, unused materials, etc. as required or requested by the Architect/Engineer. All cost for cleanup and removal will be the responsibility of the contractor.

B. Upon completion of the project and before final acceptance by the Owner, the entire installation shall be thoroughly cleaned, all rubbish and unused material removed to the satisfaction of the Architect/Engineer. All dust and dirt shall be removed from all equipment, piping, ductwork, etc.

C. Thoroughly clean all heating units, fans and fan wheels, diffusers and grilles, air handler plenums and air filter frames, etc. using compressed air if necessary.

D. Thoroughly clean all floor drains, cleanouts, and plumbing fixtures. Clean all trays and strainers.

E. Finish paint all equipment, materials, piping, etc. as noted on drawings or listed in this specification. Match Owner's existing color scheme. Any Division 21 equipment which has been scratched or damaged shall be finished equal to the original finish.

1.41 EQUIPMENT/SYSTEMS START-UP

A. Furnish and schedule manufacturer's start-up service for all equipment and systems. These start-up services shall be performed in the presence of, and to the satisfaction of the Owner and Architect/Engineer.

1.42 EQUIPMENT/SYSTEMS SIGN-OFF

A. The Mechanical Trades shall furnish written sign-offs on all systems stating that the equipment and systems have been checked, tested, started and that their operation has been verified correct through the entire range of operation that can be expected through the seasons.

1.43 SUBSTANTIAL COMPLETION

A. Contractor shall submit a letter to the Architect/Engineer advising that all work has been completed in accordance with plans and specifications and the project is ready for a final walk-thru.

END OF SECTION

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SECTION 21 05 10

FIRE PROTECTION SYSTEMS TESTING, CLEANING & STARTUP

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Testing of piping systems.

B. Cleaning of piping systems.

C. Substantial completion check list and sign-off forms.

1.2 SCOPE OF WORK

A. The work covered by this specification consists of furnishing all labor, equipment, material, chemicals or methods that are mentioned, listed or scheduled on drawings or are in this specification. This includes all labor, equipment, materials and miscellaneous incidentals necessary and/or required for the cleaning, flushing and testing of the fire protection piping systems for this project. The work covered under this section of the specification is in no way complete within itself, but is supplementary to the entire specification and drawings.

B. The substantial completion forms shall be required to be signed and submitted to the Architect/Engineer for approval prior to any insulation of piping systems or installation of ceiling tiles. The person that signs the substantial completion forms shall witness the testing, flushing and chemical treatment of the systems. The signature person's company shall be responsible for all cost incurred with future work by the Architect/Engineer or Owner due to inadequate testing, cleaning, operation or chemical treatment of the piping systems.

1.3 SUBMITTALS

A. Submit electronic copies of the completed and signed substantial completion forms included in this section. Submit to the Architect/Engineer as system flushing, testing, and chemical treatment occurs. The Mechanical Trade shall maintain one set of substantial completion forms and submit them to the Architect/Engineer prior to the Architect/Engineer final project walk-through.

B. Submit electronic copies of all equipment, chemicals and product data being furnished to this project for approval.

C. Submit electronic copies of manufacturer's installation instructions, including placement of equipment in systems, piping configuration, and connection requirements.

D. Submit certificate of compliance from authority having jurisdiction, indicating approval of systems that require review by local and state authorities.

1.4 REGULATORY REQUIREMENTS

A. Conform to applicable code for addition of non-potable chemicals to building mechanical systems, and for public sewage systems.

B. Products requiring electrical connection and listed and classified by UL as suitable for the purpose specified and indicated.

PART 2 PRODUCTS – Not Applicable

PART 3 - EXECUTION

3.1 FIRE PROTECTION PIPING SYSTEM

A. All fire protection piping, sprinkler heads, fire pump, etc. shall be flushed, tested, and started per all NFPA and NEC requirements.

3.2 SYSTEM COMPLETION CHECKLIST

A. The checklist which follows this specification section is to be considered part of the specifications.

B. The checklist is to be completed by the Installing Contractor and the prime Mechanical Contractor for each item as directed.

END OF SECTION

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SYSTEMS COMPLETION CHECKLIST						
Inspection/Review Item	Notice Required	Installing Contractor		Date	Owner's Representative Signature	Remarks
		Name	Signature			
Fire Protection System, Continued						
Owner's Training	7 days	Owner Representative				Complete Owner's training or operation of the automation system.
Flushing and testing of fire protection piping	48 hours	Owner Representative				Tested per NFPA requirements
Start-up and testing of fire pump and jockey pump system	48 hours	Owner Representative				Start-up, flow test, etc. per NFPA requirements

By signing this form, the Contractor is certifying that he has personally witnessed completion of that item, and it is complete and complies with all respects to the drawings and specifications.

All items are to be signed off on and submitted to MacMillan Associates Inc. before a final project walk-thru by the Engineer is requested. If the Engineer discovers items incomplete and/or not in accordance with this checklist, the drawings, or the specifications, the Contractor will be backcharged for the Engineer's time and expenses.

SECTION 21 10 00

FIRE PROTECTION PIPING, SPRINKLER HEADS, & MISC.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Pipe, fittings, valves, and connections for a complete fire protection system including all required sprinkler heads, piping, standpipes, etc.

B. Wet-pipe sprinkler system.

C. Dry-pipe sprinkler system (when required).

D. Double interlock preaction system (when required)

E. System design, installation, and certification.

F. Fire department connections.

1.2 REFERENCES

A. ANSI/ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800.

B. ANSI/ASME B16.3 - Malleable Iron Threaded Fittings, Class 150 and 300.

C. ANSI/ASME B16.4 - Cast Iron Threaded Fittings, Class 125 and 250.

D. ANSI/ASME B16.5 - Pipe Flanges and Flanged Fittings.

E. ANSI/ASME B16.9 - Factory-made Wrought Steel Buttwelding Fittings.

F. ANSI/ASME B16.11 - Forged Steel Fittings, Socket-welding and Threaded.

G. ANSI/ASME B16.25 - Buttwelding Ends.

H. ANSI/ASME B36.10 - Welded and Seamless Wrought Steel Pipe.

I. ANSI/ASME Sec 9 - Welding and Brazing Qualifications.

J. ANSI/ASTM A135 - Electric-Resistance-Welded Steel Pipe.

K. ANSI/ASTM A47 - Malleable Iron Castings.

L. ANSI/ASTM B32 - Solder Metal.

M. ANSI/AWS A5.8 - Brazing Filler Metal.

N. ANSI/AWWA C104 - Cement Mortar Lining for Ductile Iron Pipe.

O. ANSI/AWWA C105 - Polyethylene Encasement for Ductile Iron Pipe.

P. ANSI/AWWA C111 - Rubber Gasket Joints for Ductile Iron Pipe.

Q. ANSI/AWWA C110 - Ductile Iron and Gray Iron Fittings.

R. ANSI/AWWA C151 - Ductile Iron Pipe, Centrifugally Cast.

S. ANSI/AWWA C500 - Gate Valves, 3" thru 48" for water and sewage systems.

T. ANSI/AWWA C502 - Dry Barrel Fire Hydrants.

U. ANSI/AWWA C509- Resilient Seated Gate Valves 3" thru 12" for water and sewage systems.

V. ANSI/AWWA C600 - Installation of Ductile Iron Water Mains and Appurtenances.

W. ASTM A53 - Pipe, Steel, Black and Hot-Dipped, Zinc-coated Welded and Seamless.

X. ASTM A234 - Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures.

Y. ASTM A795 - Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use.

Z. AWS D10.9 - Specifications for Qualification of Welding Procedures and Welders for Piping and Tubing.

AA. NFPA 13 - Installation of Sprinkler Systems.

BB. NFPA 14 - Standpipe and Hose Systems.

CC. NFPA 24 - Installation of Private Fire Service Mains and Their Appurtenances.

DD. NFPA 70 - National Electrical Code

EE. UL - Fire Protection Equipment Directory.

1.3 AUTOCAD BACKGROUND FILES

A. The Contractor shall include in their bid any cost for requesting AutoCAD backgrounds for their use from the Architect or Engineer. The cost will be $100.00 for the first plan, and $50.00 for each additional plan that may be requested for AutoCAD use. A waiver of responsibility for the Architect and Engineer related to Contractor use of the CAD files shall be signed by the Contractor.

PART 2 PRODUCTS

2.1 SPRINKLER AND STANDPIPE PIPING, BURIED (Must be Approved by Governing Authorities)

A. Ductile Iron Pipe: ANSI/AAWWA C151/A21.51 rated 350 psi. with Class 350 fittings.

1. ANSI thickness Class 50 minimum, nominal pipe wall thickness .27" minimum, rated 350 psi at laying condition Type 1.

2. Cement lined as per AWWA C104 (ANSI A21.4)
3. Pipe Joints: Push on, ANSI/AWWA C1533/A21.53, with Tyton gaskets.
4. Fitting Joints: Mechanical, compact, ANSI/AWWA C153/A21.53 with stainless steel or Corten anti-rotation bolts and sacrificial zinc anode cap on each bolt.
5. Coating: Exterior of pipe and fittings, asphaltic coating as per ANSI/AWWA.
6. Polyethylene encasement as per ANSI/AWWA C105/A21.5.
7. Concrete thrust blocks, installation, etc. as per published engineering and construction standards of Michigan Department of Transportation and local codes.
8. All material and installation shall be in accordance with manufacturer's recommendations.

B. PVC Pipe:
1. 1½" to 3" - ASTM D2241, SDR 21 - Class 200 AWWA C900.
2. 4" and Larger - ASTM D2241, DR18- Class 150 AWWA C900.
3. Fittings: ASTM D2466, PVC
4. Joints: ASTM D3139, integral bell and gasket seal installed with concrete thrust blocks, or ASTM D2855, solvent weld with ASTM D2564 solvent cement.

2.2 SPRINKLER AND STANDPIPE PIPING, ABOVE GROUND

A. Fire protection pipe shall be black steel, ASTM A135, ASA Schedule 10 for grooved systems, Schedule 40 for screwed systems, Grade A, ASTM Spec. A-53, U.L. listed and F.M. approved and in compliance with NFPA 13.

1. Fittings for steel pipe may be grooved with gasket and clamp, threaded, flanged, or welded. Welding shall be performed by ASME (Boiler Code - Section IX) qualification welders. Fittings shall be 175 psig water working pressure.

2. Grooved end fittings shall be short-pattern, with flow equal to standard pattern fittings. Basis of Design: Victaulic FireLock.

3. Grooved joint couplings shall consist of two ductile iron housing segments to ASTM A536, pressure responsive gasket to ASTM D2000, and zinc electroplated steel bolts and nuts to ASTM A449.

a. Rigid Type: Coupling housings shall be cast with offsetting, angle-pattern bolt pads to provide joint rigidity and support and hanging in accordance with NFPA-13. Couplings shall be fully installed at visual pad-to-pad offset contact. Tongue-and-recess type couplings, or any coupling that requires exact gapping of bolt pads at required torque ratings, are not permitted.

1) Victaulic Style 009-EZ and 107H, Installation-Ready, for direct stab installation without field disassembly, with grade EHP gasket, suitable for water service to +250 deg F

2) Victaulic FireLock Style 005 and Style 07 "Zero-Flex"

b. Flexible Type: For use in locations where vibration attenuation and stress relief are required, and for the elimination of flexible connectors. Victaulic Installation-Ready Style 177 or Style 77

2.3 GATE VALVES

A. Up to and including 2 Inches: Bronze body, bronze trim, rising stem, handwheel, OS&Y, single wedge or disc, threaded ends.

B. Over 2 Inches: Iron body, bronze trim, rising stem, handwheel, OS&Y, single wedge, flanged or grooved ends. Basis of Design: Victaulic Series 771H.

2.4 BUTTERFLY VALVES

A. 2 Inches and Over: Ductile iron body with grooved ends, electroless-nickel coated ductile iron disc, pressure responsive elastomer seat, and stainless steel stem. (Stem shall be offset from the disc centerline to provide complete 360-degree circumferential seating.)

B. Valves shall include a weatherproof actuator housing with two SPDT supervisory switches, and handwheel.

C. Basis of Design: Victaulic Series 705.

2.5 DRAIN VALVES

A. Gate Valve.

B. Brass ball valve with cap and chain, ¾ inch hose thread.

2.6 STANDPIPE AND HOSE SYSTEM EQUIPMENT (When required)

A. Hose Cabinet:
1. Style: Recessed, semi-recessed or surface mounted. See drawings.
2. Tub: 16 gage thick steel, prepared for pipe and accessory rough-in.
3. Door: 12 gage thick steel, with 1/4 inch thick wired glass full panel, hinged, positive latch device.
4. Finish: Enameled, color red.

B. Hose Rack: Steel; with polished chrome finish; swivel type with pins and water stop.

C. Hose: 50 feet of rubber lined synthetic hose; mildew and rot-resistant.

D. Nozzle: Brass, chrome plated; combination fog, straight stream, and adjustable shut-off.

E. Angle Valve: Hydrolator type, 1½ inch nominal size. Verify size with NFPA requirements.

F. Fire Department Outlet Valve: Angle type; brass finish; 2½ inch size, thread to match fire department hardware, 300 psig working pressure, with threaded cap and chain of same material and finish.

2.7 FIRE DEPARTMENT CONNECTION

A. Type: Flush mounted wall type with brass. Two way with thread size to suit fire department hardware; threaded dust cap and chain of matching material and finish.

B. Drain: ¾ inch automatic drip, outside.

C. Label: "Standpipe - Fire Department Connection".

D. At the low point near each fire department connection, install a 90-degree elbow with drain connection to allow for system drainage to prevent freezing. Basis of Design: Victaulic #10-DR.

2.8 SPRINKLER HEADS

A. Sprinklers shall be glass bulb type, with a hex-shaped wrench boss integrally cast into the sprinkler body to reduce the risk of damage during installation. Basis of Design: Victaulic Company.
   1. Wrenches shall be provided by the sprinkler manufacturer that directly engage the wrench boss.
   2. Sprinklers with rubber O-rings are not permitted.

B. Suspended Ceiling:
   1. Type: Standard coverage semi-recessed pendant type with matching push-on escutcheon plate. (Used in finish areas unless noted otherwise on drawings).
   2. Head Finish: Chrome plated.
   3. Escutcheon Plate Finish: Chrome plated.
   4. Fusible Link: Glass bulb type temperature rated for specific area hazard.
   5. Basis of Design: Victaulic Model V27.

C. Exposed Area Type:
   1. Type: Standard coverage upright type.
   2. Head Finish: Brass.
   3. Fusible Link: Glass bulb or fusible solder link type temperature rated for specific area hazard.
   4. Basis of Design: Victaulic Model V27.

D. Sidewall Type:
   1. Type: Standard coverage semi-recessed horizontal sidewall type with matching push on escutcheon plate and guard if required by area use.
   2. Head Finish: Chrome plated.
   3. Escutcheon Plate Finish: Chrome plated.
   4. Fusible Link: Glass bulb type temperature rated for specific area hazard.
   5. Basis of Design: Victaulic Model V27.

E. Concealed type (use only when noted on drawings):
   1. Quick response bulb spring type, 175 psi working pressure rated, 500 psi factory tested, bronze frame, brass deflection, brass screw, engineered plastic bulb seat, silicone 0-ring, glass bulb with glycerin solution, upper steel escutcheon plate, brass cover plate with color selected by Architect.
   2. Glass bulb shall be temperature rated for specific hazard.
   3. Basis of Design: Victaulic Model V38 or V39.

F. Security Areas/Holding Cells

1. Utilize institutional maximum security sprinkler heads in all prisoner holding and transport areas that meet all NFPA and Department of Correction codes requirements and recommendations.

G. Guards: Finish to match sprinkler head.

H. Escutcheons and guards shall be listed, supplied, and approved for use with the sprinkler by the sprinkler manufacturer.

I. Vic-flex multiple-use, open-gate, flexible drop system may be used to properly locate the sprinklers. The drop shall include a UL approved Series AH2 braided hose with a bend radius to 2" to allow for proper installation in confined spaces. The hose shall be listed for [(4) bends at 31" length] [(5) bends at 36" length] [(8) bends at 48" length] [(10) bends at 60" length] [(12) bends at 72" length]. Union joints shall be provided for ease of installation. The flexible drop shall attach to the ceiling grid using a one-piece open gate Series AB1 bracket. The bracket shall allow installation before the ceiling tile is in place. The drop system shall include all required supports and bracing. The braided drop system is UL listed and FM approved for sprinkler services to 175 psi (1206 kPa).

2.9 PIPING SPECIALTIES

A. Wet Pipe Sprinkler Alarm Valve: Check type valve with divided seat ring, rubber faced clapper to automatically actuate electrically operated alarms, with pressure retard chamber and variable pressure trim. Internal components shall be replaceable without removing the valve from the installed position. Basis of Design: Victaulic Series 751.

B. Dry Pipe Sprinkler Alarm Valve: Check type valve with divided seat ring, EPDM clapper seal or rubber faced clapper to automatically actuate electrically or hydraulically operated alarms, with accelerator. Actuation to be determined by Fire Protection Contractor to meet all codes and regulations. Required air pressure shall be 13-psi (90-kPa). The valve shall be externally resettable, and all internal components shall be replaceable without removing the valve from the installed position. Basis of Design: Victaulic Series 768-NXT.

C. Flooding Deluge Valve: Check type with an aluminum bronze clapper and EPDM clapper seal, or gate type valve with rubber disc actuated manually, pneumatically, electrically or hydraulically with electrically or hydraulically operated alarms, with alarm testing trim. Type of actuation to be determined by Fire Protection Contractor to meet all codes and requirements. The valve shall be externally resettable, and all internal components shall be replaceable without removing the valve from the installed position. Basis of Design: Victaulic Series 769-NXT.

D. Preaction Valve: Deluge valve and swing check valve with releasing trim featuring both a solenoid valve and a dry pipe actuator in a series configuration. The swing check valve isolates the body of the deluge valve from the system air pressure, which holds the dry pipe actuator closed. The solenoid valve remains closed until it is electrically energized by a deluge releasing panel that responds to the operation of a fire detection device. The valve shall be externally resettable, and all internal components shall be replaceable without removing the valve from the installed position. Basis of Design: Victaulic Series 769-NXT.

E. Electric Alarm: The sprinkler contractor shall include a weatherproof audio visual (horn/strobe) device mounted on the outside of the building above the siamese connection. Include all conduit/wire etc. back to a reserved circuit breaker as well as to the flow switch.

F. Water Flow Switch: Vane type switch for mounting horizontal or vertical, with two contacts rated 10 amp at 115 volt AC. Basis of design: System Sensor.

G. Excess Pressure Pump (if determined necessary by Fire Protection Contractor):
1. Type: Close coupled motor and pumped unit.
2. Construction: Bronze with stainless steel shafts, carbon bearings.
3. Performance: Determined by Fire Protection Contractor.
4. Motor: Open drip proof, permanently lubricated, 115 volt, single phase, 60 hp. Hp determined by Fire Protection Contractor.
5. Accessories: Include flexible hose connections, inlet strainer, relief valve.

2.10 AIR COMPRESSOR (If required for dry pipe system or double interlock preaction system)

A. Duplex unit, electric motor driven, ASME rated horizontal receiver tank, air pressure operated electric switch, motor, motor starter with automatic mechanical alternator, safety valves, check valves, automatic tank drain, muffler-filter, belt guard, and controls. Size capacity to be determined by the Fire Protection Contractor.

2.11 PIPE HANGERS AND SUPPORTS

A. Fire Protection Piping:
1. Conform to NFPA 13 and NFPA 14.
2. Hangers for Pipe Sizes 1/2 to 1 1/2 Inch: Malleable iron, adjustable swivel, split ring.
3. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
5. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
6. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
7. Vertical Support: Steel riser clamp.
8. Floor Support: Cast iron adjustable pipe saddle, locknut, nipple, floor flange, and concrete pier or steel support.
9. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

2.12 DOUBLE CHECK VALVE ASSEMBLY

A. A testable double detector check valve assembly with meter bypass shall be furnished and installed as required by local authorities.

B. Provide on new fire protection systems, as well as on existing systems that are being altered, added to or changes. Coordinate exact requirements with local authorities.

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. [Bevel or groove plain end ferrous pipe.]

B. Remove scale and foreign material, from inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Unions and flanges for servicing and disconnect are not required in installations using grooved joint couplings. (The couplings shall serve as disconnect points.)

E. Coordinate work of this Section with other affected work.

3.2 INSTALLATION

A. Install piping in accordance with NFPA 13 for sprinkler systems, NFPA 14 for standpipe and hose systems, NFPA 24 for service mains and NFPA 70 National Electrical Code and all other applicable codes and regulations.

B. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.

C. Install piping to conserve building space, and not interfere with use of space and other work.

D. Group piping whenever practical at common elevations.

E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

F. Slope piping and arrange systems to drain at low points.

G. Prepare pipe, fittings, supports, and accessories for finish painting. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

H. Grooved joint shall be installed in accordance with the manufacturer's written recommendations. Grooved ends shall be clean and free from indentations, projections, or roll marks. The gasket shall be molded and produced by the coupling manufacturer of an elastomer suitable for the intended service. The coupling manufacturer's factory trained representative shall provide on-site training for the contractor's field personnel in the use of grooving tools and installation of product. The representative shall periodically visit the job site to ensure best practices in grooved product installation are being followed. (A distributor's representative is not considered qualified to conduct the training.)

I. Do not penetrate building structural members unless indicated.

J. Provide sleeves when penetrating footings, floors and walls. Seal pipe and sleeve penetrations to achieve fire resistance equivalent to fire separation required.

K. Die cut screw joints with full cut standard taper pipe threads with red lead and linseed oil or other non-toxic joint compound applied to male threads only.

L. Install valves with stems upright or horizontal, not inverted. Remove protective coatings after installation.

M. Provide valves for shut-off or isolating service. Verify all code requirements for location and operation of all shutoff valves. Installation shall meet code.

N. Provide drain valves at main shut-off valves, low points of piping and apparatus.

O. Install equipment, sprinkler heads, miscellaneous materials, etc. in accordance with manufacturer's instructions.

P. Locate and secure hose cabinet plumb and level. Verify height of top of cabinet (inside horizontal) surface above finished floor.

Q. Locate angle valve in cabinet at required height above floor. Locate fire department connection below angle valve and not closer than 4 inches from side or bottom of cabinet.

R. Connect standpipe system to water source ahead of domestic water connection.

S. Where static pressure exceeds 100 psi at any hose station, provide pressure reducing valve to prevent pressure on hose exceeding 90 psi.

T. Provide two way fire department outlet connection on roof.

U. Flush entire new piping system of foreign matter.

V. Install buried shut-off valve in valve box. Provide post indicator.

W. Provide double check valve assembly and required valving at sprinkler system water source connection.

X. Locate fire department connection with sufficient clearance from walls, obstructions, or adjacent siamese connectors to allow full swing of fire department wrench handle. Verify and get local fire department approval for location and type of connection.

Y. Locate outside electric alarm bell on building wall. Coordinate location with Architect/Engineer.

Z. Install and connect fire pumps in accordance with NAPA 13 and NFPA 70 (when required in design). Special attention shall be given to NFPA 70, Article 69S, including 695-12(d).

AA. Install air compressor (when required) on vibration isolators and pipe receiver tank drain to nearest floor drain.

BB. Place pipe runs to minimize obstruction to other work.

CC. Place piping in concealed spaced above finished ceilings.

DD. Center heads in two directions in ceiling tile and provide piping offsets as required. Coordinate location of piping, heads, etc. with ceiling layout, lights and all other trades. Location of all sprinkler heads shall be approved by the Architect.

EE. Apply masking tape or paper cover to ensure concealed sprinkler head cover plates do not receive field paint finish.

FF. Do not install sprinklers that have been dropped, damaged, or show a visible loss of fluid. Never install sprinklers with cracked bulbs.

GG. Sprinkler bulb protectors shall be removed by hand. Do not use any tools or devices that could damage the bulb.

HH. Install system main drain at low point of system. Extend drain piping to nearest janitor's sink with drain piping routed above ceilings if drain is located outside a mechanical room.

3.3 SYSTEM TEST

A. Hydrostatically test entire system in accordance with NFPA 14.

B. Test shall be witnessed by authority having jurisdiction. Architect/Engineer shall be notified.

3.4 QUALIFICATIONS

A. A licensed Fire Protection Contractor shall design, detail and install a fire protection sprinkler system to cover the new and/or remodeled areas.

B. The Fire Protection Contractor shall provide a flow test and furnish complete detailed CAD working drawings of the system and shall submit them to the Fire Marshal, Architect/Engineer and all agencies required by Code for review and approval.

C. The Fire Protection Contractor shall include in their bid any cost for requesting CAD backgrounds or files for their use from the Architect or Engineer. At a minimum $100.00 for the first file and $50.00 for each additional file.

END OF SECTION

MAI: 2022-1558