PROJECT MANUAL

Menominee County ISD
Central Elementary
Fire Alarm Replacement

Menominee, MI 49858

U.P. ENGINEERS & ARCHITECTS, INC.
1701 DUNLAP AVENUE, SUITE B
MARINETTE, WI 54143

UPEA Project No. M385-04227 (FA)

November 7, 2025

DOCUMENT 00 01 10

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SECTION 00 11 13

ADVERTISEMENT FOR BIDS

Project:	Central Elementary Fire Alarm Replacement 1800 18th Avenue, Menominee, MI 49858
Owner:	Menominee County ISD 1201 41st Avenue, Menominee, MI 49858, 906-863-5665
Architect/Engineer:	U.P. Engineers & Architects, Inc. 1701 Dunlap Avenue, Suite B, Marinette, WI 54143, 715-732-4188
Date:	November 7, 2025

Bids will be accepted under seal for the replacement of the existing fire alarm system in the Central Elementary School.

Bids will be received at the office of the Architect/Engineer at address above or by email at bmarklein@upea.com, until 1:00 PM local time on December 1, 2025, at which time and place the Bids will be officially opened and read aloud. Bids not received by the indicated time will not be opened.

Project Description: Replacement of existing building fire alarm system including existing wiring, accessible conduit, horns, pull stations and main fire panel. New fire alarm system shall be voice annunciation type with clear lensed strobe devices.

An Optional Pre-bid Meeting will be held for Bidders at 10:00 AM local time on November 21, 2025, at the project location, 1800 18th Avenue, Menominee, MI 49858.

Bid Documents for the Project may be obtained by contacting U.P. Engineers & Architects, Inc., information listed above. Documents are available in either paper form or as PDF documents, with a non-refundable fee as follows: Paper: $50 PDF: $0

Documents will also be available for viewing at the office of the Architect/Engineer and at the following Builders Exchanges: Builders Exchange of Michigan, Builders Exchange of Wisconsin, Iron Mountain-Kingsford Builders Exchange, Delta Chamber of Commerce, Marquette Builders Exchange.

Bidders are required to provide a Bid Bond according to the requirements in Section 00 21 13 - Instructions to Bidders. Bidders are required to submit qualifications to the approval of the Architect and Owner with their bid.

Submit your Bid on the Bid Form provided. Bidders are required to complete Bid Form 00 41 13. Refer to other Bidding requirements described in Section 00 21 13.

Your Bid will be required to be submitted under a condition of irrevocability for a period of 30 days after submission.

Owner reserves the right to waive irregularities and to accept or reject any or all Bids.

Steve Martin, Superintendent

END OF SECTION

SECTION 00 21 13

INSTRUCTIONS TO BIDDERS

1.1 SUMMARY

A. Document Includes:

1. Instructions to Bidders.
2. Site examination.
3. Prebid conference.
4. Substitutions.
5. Bid security.

B. Related Documents:

1. Document 00 11 13 – Advertisement to Bid.
2. Document 00 31 00 - Available Project Information.
3. Document 00 41 13 - Bid Form - Stipulated Sum.
4. Document 00 43 00 - Procurement Form Supplements.
5. Section 01 10 00 - Summary.
6. Section 01 60 00 - Product Requirements.

1.2 INSTRUCTIONS TO BIDDERS

A. These Instructions to Bidders amend or supplement other provisions of Bidding Documents and Contract Documents.

1.3 SITE EXAMINATION

A. Examine Project Site before submitting Bid.

B. A visit to Project Site has been arranged for Bidders at 10:00 AM local time on November 21, 2025, at the project location.

C. If necessary, contact Owner at following address and telephone number to arrange date and time to visit Project Site:

1. Email Address: stevemartin@mc-isd.org
2. Telephone: 906-863-5665, ext. 1013

1.4 PREBID MEETING

A. A prebid meeting is scheduled for 10:00 AM local time on November 21, 2025, at the project location, 1800 18th Ave. Menominee, MI 49858.

B. General Contract and/or major subcontract Bidders are encouraged but not required to attend.

C. Representatives of Architect and Owner will attend.

D. Information relevant to Bidding Documents will be issued by Addendum.

1.5 SUBSTITUTIONS

A. Where Bidding Documents stipulate products, substitution requests will be considered by Architect and Owner up to 7 days before receipt of Bids. Substitutions that have not been approved by addenda to all bidders will not be accepted.

B. With each substitution request, provide sufficient information for Architect to determine acceptability of proposed products; comply with substitution request submittal requirements as specified in Section 01 60 00 - Product Requirements, including use of Substitution Request Form.

1.6 BID SECURITY

A. Bids shall be accompanied by Bid security as follows:

1. Bid bond of a sum no less than 10 percent of the Bid Sum on standard surety company form.

1.7 CONTRACT TIME

A. Perform Work within time indicated in Document Section 01 10 00 - Summary.

B. Bidder, in submitting an offer, accepts Contract Time period stated for performing Work.

C. Time is of Essence:

1. Owner requires Work of this Contract be substantially complete by February 20, 2026, with final completion by February 27, 2026.
2. Consideration will be given to time of completion when reviewing submitted Bids.

END OF SECTION

SECTION 00 31 00

AVAILABLE PROJECT INFORMATION

1.1 SUMMARY

A. Available Project information has been furnished by Owner to Architect for use in designing this Project.

1. Each Bidder shall be fully familiar with available Project information, which has been prepared for Owner by separate consultants.
2. Available Project information is offered solely for reference and shall not be considered part of Contract Documents.
3. Data contained in Documents prepared by Owner's separate consultants is believed to be reliable; however, Owner and Architect do not guarantee their accuracy or completeness.
4. In preparing their Bids, Bidders shall consider and evaluate data contained in available Project information as well as Contract Documents prepared by Architect.

B. Related Documents:

1. Document 00 21 13 - Instructions to Bidders: Site examination.

END OF DOCUMENT

SECTION 00 41 13

BID FORM - STIPULATED SUM (SINGLE-PRIME CONTRACT)

1.1 BID INFORMATION

A. To: Menominee County ISD

B. Project Title: Central Elementary Fire Alarm Replacement

C. Date: .....

D. Submitted by: .....

E. Company Name and Address: .....

1.2 OFFER

A. Having examined the Place of the Work and all matters referred to in the Instructions to Bidders and the Contract Documents prepared by the Architect for the above-referenced Project, we, the undersigned, hereby offer to enter into a Contract to perform the Work for the Prices of:

Base Bid – Central Elementary Fire Alarm Replacement .....
in lawful money of the United States of America.

B. We have included the Bid security as required by the Instructions to Bidders.

C. All applicable federal taxes are included and State of Michigan and City of Menominee taxes are included in the Prices.

1.3 ACCEPTANCE

A. This offer shall be open to acceptance and is irrevocable for 15 days from the Bid closing date.

B. If this Bid is accepted by the Owner within the time period stated above, we will:
1. Furnish the required bonds within seven days of receipt of Notice of intent to Award.

C. If this Bid is accepted within the indicated time, and we fail to commence the Work or we fail to provide the required bonds, the Bid security shall be forfeited as damages to the Owner by reason of our failure, limited in amount to the lesser of the face value of the Bid security or the difference between this Bid and the Bid upon which Contract is signed.

D. In the event our Bid is not accepted within the time stated above, the required Bid security will be returned to the undersigned, according to the provisions of the Instructions to Bidders, unless a mutually satisfactory arrangement is made for its retention and validity for an extended period of time.

1.4 CONTRACT TIME

A. If this Bid is accepted, we will:
   1. Be substantially complete with work needed for owner occupancy by the 20th day of February 2026.
   2. Complete the Work by the 27th day of February 2026.

1.5 CHANGES TO THE WORK

A. When the Architect establishes that the method of valuation for changes in the Work will be net cost plus a percentage fee according to General Conditions, our percentage fee shall be 15 percent overhead and profit on the net cost of our own Work, and 10 percent on the gross cost of Work performed by any Subcontractor.

B. On Work deleted from the Contract, our credit to the Owner shall be the Architect-approved net cost plus 50 percent of the overhead and profit percentage noted above.

1.6 ADDENDA

A. Following Addenda have been received, and the modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Price.

   1. Addendum #
   2. Addendum #

1.7 APPENDICES

A. Following documents are attached to and made a condition of the Bid:

   1. Bid security.
   2. Bidder's qualifications statement and supporting data.

1.8 SUBCONTRACTORS

A. Provide the name of any Subcontractors:

   1. .....

   2. .....

1.9 BID FORM SIGNATURES

A. The Corporate Seal of ..... was hereunto affixed in the presence of:

   1. .....

B. If the Bid is a joint venture or partnership, add additional forms of execution for each member of the joint venture in the appropriate form or forms as above.

END OF DOCUMENT

SUBSTITUTION REQUEST FORM

To: Menominee County ISD

Project Title: Central Elementary Fire Alarm Replacement

From:

Section No.	Drawing Reference	Specified Product	Proposed Substitution

Does the substitution affect dimensions shown on drawings?	Yes	No
Does the substitution affect other trades?	Yes	No
Does the substitution affect the appearance?	Yes	No
Does the substitution differ in the options available from that specified?	Yes	No
Does the manufacturer's guarantee differ from that specified?	Yes	No

If you indicated "Yes" to any of the items above, or if there are any other differences, attach a thorough explanation on company letterhead. If differences are not noted and acknowledged in writing by Architect, product must equal the specification requirements.

The proposed substitution was used within the last 24 months on the following project without failure:

Project Name_____

Location_____

Architect_____ Telephone_____

Owner_____ Telephone_____

The undersigned states that the function, appearance, and quality are equivalent to or superior to the specified item.

Submitted By:

Firm Name:

Address:

Phone:

Email:

For Architect/Engineer

- ☐ Accepted
- ☐ Accepted as Noted
- ☐ Rejected: not enough information
- ☐ Rejected: does not meet specifications
- ☐ Rejected: not received on time

By_____

Date_____

Remarks_____

AFFIDAVIT OF BIDDER

The undersigned, the owner or authorized officer of _____ (the "Bidder"), pursuant to the familial disclosure requirement provided in the Menominee County ISD (the "District") advertisement for construction bids, hereby represent and warrant, except as provided below, that no familial relationships exist between the owner(s) or any employee of District and any member of the Board of Education of the School District or the Superintendent of the School District.

List any Familial Relationships:

BIDDER:

_____

By: _____

Its: _____

STATE OF)

)ss.

COUNTY OF _____)

This instrument was acknowledged before me on the _____ day of _____, 20___, by _____.

_____

, Notary Public

_____ County, _____

My Commission Expires: _____

Acting in the County of: _____

AFFIDAVIT OF COMPLIANCE – IRAN ECONOMIC SANCTIONS ACT

MICHIGAN PUBLIC ACT NO. 517 OF 2012

The undersigned, the owner or authorized officer of _____ (the "Bidder"), pursuant to the compliance certification requirement provided in the Menominee County ISD (the "District") Advertisement for Bids, hereby certifies, represents and warrants that the Bidder (including its officers, directors and employees) is not an "Iran Linked Business" within the meaning of the Iran Economic Sanctions Act, Michigan Public Act No. 517 of 2012 (the "Act"), and that in the event Bidder is awarded a Contract as a result of the aforementioned Advertisement for Bids, the Bidder will not become an "Iran Linked Business" at any time during the course of performing under the Contract.

The Bidder further acknowledges that any person who is found to have submitted a false certification is responsible for a civil penalty of not more than $250,000.00 or 2 times the amount of the Contract or proposed Contract for which the false certification was made, whichever is greater, the cost of the School District's investigation, and reasonable attorney fees, in addition to the fine. Moreover, any person who submitted a false certification shall be ineligible to bid on an Advertisement for Bids for three (3) years from the date that it is determined that the person has submitted the false certification.

BIDDER:

_____
Name of Bidder

By: _____

Its: _____

STATE OF _____)

)ss.

COUNTY OF _____)

This instrument was acknowledged before me on the _____ day of _____, 20____, by _____.

_____

_____ , Notary Public

_____County, _____

My Commission Expires: _____

Acting in the County of: _____

SECTION 00 43 00

PROCUREMENT FORM SUPPLEMENTS

1.1 PROJECT INFORMATION

A. To: Menominee County ISD

B. Project Name: Central Elementary Fire Alarm Replacement

C. Date: .....

D. Submitted by: .....

E. According to Document 00 21 13 - Instructions to Bidders - AIA and Document 00 41 13- Bid Form - Stipulated Sum (Single-Prime Contract), we include the Appendices to Bid Form Supplements listed below.

1. The information provided shall be considered an integral part of the Bid Form.

1.2 BID FORM SUPPLEMENT SIGNATURES

A. The Corporate Seal of.....

B. (Bidder - print the full name of your firm) was hereunto affixed in the presence of .....

C. (Authorized signing officer and title)

D. (Seal) .....

E. (Authorized signing officer and title):

F. (Seal) .....

1.3 APPENDIX A - LIST OF SUBCONTRACTORS

A. The list of Subcontractors attached is an integral part of the Bid Form and is referenced in the Bid submitted by:

1. (Bidder) .....
2. To Menominee County ISD
3. Dated .....

1.4 APPENDIX B - LIST OF UNIT PRICES

A. The list of Unit Prices attached is an integral part of the Bid Form and is referenced in the Bid submitted by:

1. (Bidder) .....
2. To Menominee County ISD
3. Dated .....

END OF DOCUMENT

SECTION 00 52 13

AGREEMENT FORM - STIPULATED SUM

1.1 SUMMARY

A. Document Includes:

1. Agreement.

B. Related Documents:

1. Document 00 72 13 - General Conditions - Stipulated Sum.

1.2 AGREEMENT

A. Basis of Agreement between Owner and Contractor: AIA A101 - Standard Form of Agreement between Owner and Contractor where the basis of payment is a Stipulated Sum.

END OF DOCUMENT

SECTION 00 72 13

GENERAL CONDITIONS - STIPULATED SUM

1.1 SUMMARY

A. Document Includes:

1. General Conditions.

B. Related Documents:

1. Document 00 52 13 - Agreement Form - Stipulated Sum.

1.2 GENERAL CONDITIONS

A. General Conditions of the Contract: AIA A105 - Standard Short Form of Agreement Between Owner and Contractor.

END OF DOCUMENT

SECTION 01 10 00

SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Contract description.
3. Contractor's use of Site and premises.
4. Work sequence.
5. Work restrictions.
6. Owner occupancy.
7. Permits.
8. Specification conventions.

B. Related Requirements:

1. Section 01 20 00 - Price and Payment Procedures.
2. Section 01 32 16 - Construction Progress Schedule: Digital project management procedures and web-based project management software package.
3. Section 01 50 00 - Temporary Facilities and Controls: Limitations and procedures governing temporary use of Owner's facilities.
4. Section 01 70 00 - Execution and Closeout Requirements.

1.2 PROJECT INFORMATION

A. Name: Central Elementary Fire Alarm Replacement.

1. Project Location: 1800 18th Avenue, Menominee, MI 49858

B. Owner: Menominee County ISD.

1. Owner's Representative: Steve Martin, Superintendent.

C. Project Architect/Engineer: U. P. Engineers & Architects, Inc.

1. Engineer’s Representative: Bill Marklein, Project Manager.

D. Web-Based Project Software: Project software will be used for purposes of managing communication and documents during the construction stage.

1. See Section 01 32 16 - Construction Progress Schedule for requirements for using web-based Project software.

1.3 CONTRACT DESCRIPTION

A. Work of the Project includes replacement of the existing fire alarm system in the entire building with a new voice annunciation style system.

B. Perform Work of Contract under Stipulated Sum Contract with Owner according to Conditions of Contract.

1.4 CONTRACTOR'S USE OF SITE AND PREMISES

A. Restricted Use of Site: Contractor shall have limited use of Project Site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

B. Limits on Use of Site: Limit use of Project Site to areas within the Contract limits indicated. Do not disturb portions of Project Site beyond areas in which the Work is indicated.

C. Limits on Use of Site: Confine construction operations.

1. Limit use of Site and premises to allow:

    a. Owner occupancy.
    b. Use by the public.

2. Driveways, Walkways, and Entrances: Keep driveways, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.

    a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
    b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on Site.

D. Emergency Building Exits during Construction: Shall always remain clear.

E. Construction Operations: Limited to areas indicated on Drawings.

F. Time Restrictions for Performing Work: None.

G. Utility Outages and Shutdown:

1. Coordinate and schedule electrical and other utility outages with Owner.
2. Outages: Allow only at previously agreed upon times.
3. At least one week before scheduled outage, submit outage request plan to Architect and Owner itemizing dates, times, and duration of each requested outage.

H. Construction Plan: Before start of construction, submit a construction plan regarding access to Work, use of Site, and planned utility outages for acceptance by Owner. After acceptance of plan, construction operations shall comply with accepted plan unless deviations are accepted by Owner in writing.

I. Site Access Note: Contractor's personnel will be subject to fingerprint/ background checks if performing work during school hours (Monday-Thursday, 7:30am to 3:30pm).

1.5 WORK SEQUENCE

A. Construct Work in order to accommodate Owner's occupancy requirements during construction period. Coordinate construction schedule and operations with Architect/Engineer and Owner:

B. Construction Plan: Before start of construction, submit a construction plan regarding phasing of demolition and new Work for acceptance by Owner. After acceptance of plan, comply with accepted plan when coordinating construction sequencing unless deviations are accepted by Owner in writing.

1.6 WORK RESTRICTIONS

A. Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction (AHJ).

B. On-Site Work Hours: Work hours may scheduled as needed to meet Project requirements.
1. Work inside Building: Requires Owner approval after substantial completion.
2. Hours for Utility Shutdowns: Requires Owner approval.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless approval is provided in writing by Owner.

D. Noise, Vibration, Dust, and Odors: Coordinate with Owner operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy.

E. Smoking and Controlled Substance Restrictions: Use of alcoholic beverages, marijuana, and other controlled substances on Owner's property is not permitted.

1.7 OWNER OCCUPANCY

A. Schedule and substantially complete designated portions of the Work for occupancy before Substantial Completion of the entire Work.

1. Owner requires Work of this Contract be substantially complete by February 20, 2026, with final completion by February 27, 2026.
2. Owner's use and occupancy of designated areas before Final Completion of entire Project do not relieve Contractor of responsibility to maintain specified insurance coverages on a 100 percent basis until date of final payment.

B. Owner will occupy Site and Building during construction. Holiday breaks are scheduled for November 26-28 and December 22 - January 2. Three classrooms within the school will be occupied during school hours and work must be performed in these areas after hours or on

holiday breaks. All other work areas are available during school hours with prior notification of schedule.

C. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

D. Schedule Work to accommodate Owner occupancy.

1.8 PERMITS

A. Furnish all necessary permits for construction of Work. Project plans are subject to and pending approval from the Bureau of Construction Codes and Bureau of Fire Services for the State of Michigan. Plan review reference numbers will be provided upon contract award.

1.9 SPECIFICATION CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.

B. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Schedule of Values.

B. Application for Payment.

C. Change procedures.

D. Defect assessment.

E. Unit prices.

F. Alternates.

1.2 SCHEDULE OF VALUES

A. Submit electronic file of schedule on Contractor's standard form or electronic media printout for review.

B. Submit Schedule of Values within 15 days after date of Owner-Contractor Agreement.

C. Revise schedule to list approved Change Orders with each Application for Payment.

1.3 APPLICATION FOR PAYMENT

A. Submit electronic file of each Application for Payment on Contractor's Application for Payment form.

B. Submit updated construction schedule with each Application for Payment.

C. Payment Period: Submit at intervals stipulated in the Agreement.

D. Submit submittals with transmittal letter as specified in Section 01 33 00 - Submittal Procedures.

E. Submit waivers as requested by Owner.

F. Substantiating Data: When Architect or Owner requires substantiating information, submit data justifying dollar amounts in question. Include the following with Application for Payment:
1. Affidavits attesting to off-Site stored products.

2. Construction Progress Schedule, revised and current as specified in Section 01 33 00 - Submittal Procedures.

1.4 CHANGE PROCEDURES

A. Submittals: Submit name of individual who is authorized to receive change documents and is responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.

B. Carefully study and compare Contract Documents before proceeding with fabrication and installation of Work. Promptly advise Architect of any error, inconsistency, omission, or apparent discrepancy.

C. Requests for Interpretation (RFI) and Clarifications: Allot time in construction scheduling for liaison with Architect; establish procedures for handling queries and clarifications.

1. Use Contractor’s standardized form for RFIs.
2. Architect may respond with a direct answer on the Request for Interpretation form, Architect's Supplemental Instruction form, or Proposal Request (Change Order Request).

D. Architect will advise of minor changes in the Work not involving adjustment to Contract Price or Contract Time by issuing supplemental instructions on Architect's Supplemental Instruction form.

E. Architect may issue Proposal Request including a detailed description of proposed change with supplementary or revised Drawings and Specifications, a change in Contract Time for executing the change with the period of time during which the requested price will be considered valid. Contractor will prepare and submit estimate within 10 days.

F. Document requested substitutions according to Section 01 25 00 - Substitution Procedures.

G. Stipulated Price Change Order: Based on Proposal Request and Contractor's fixed price quotation or Contractor's request for Change Order as approved by Architect.

H. Construction Change Directive: Architect may issue directive, signed by Owner, instructing Contractor to proceed with change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work and designate method of determining any change in Contract Price or Contract Time. Promptly execute change.

I. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in Conditions of the Contract. Architect will determine change allowable in Contract Price and Contract Time as provided in Contract Documents.

J. Maintain detailed records of Work done on time and material basis. Provide full information required for evaluation of proposed changes and to substantiate costs for changes in the Work.

K. Document each quotation for change in Project Cost or Time with sufficient data to allow evaluation of quotation.

L. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in Conditions of the Contract.

M. Correlation of Contractor Submittals:

1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line item and adjust Contract Price.
2. Promptly revise Progress Schedules to reflect change in Contract Time, revise schedules to adjust times for other items of Work affected by the change, and resubmit.
3. Promptly enter changes in Record Documents.

1.5 DEFECT ASSESSMENT

A. Replace the Work, or portions of the Work, not conforming to specified requirements.

B. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct appropriate remedy or adjust payment.

C. The defective Work may remain, but unit price will be reduced at discretion of Architect and Owner.

D. Defective Work will be partially repaired according to instructions of Architect, and unit price will be reduced at discretion of Architect and Owner.

E. Authority of Architect to assess defects and identify payment adjustments is final.

F. Nonpayment for Rejected Products: Payment will not be made for rejected products for any of the following reasons:

1. Products wasted or disposed of in a manner that is not acceptable.
2. Products determined as unacceptable before or after placement.
3. Products not completely unloaded from transporting vehicle.
4. Products placed beyond lines and levels of the required Work.
5. Products remaining on hand after completion of the Work.
6. Loading, hauling, and disposing of rejected products.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 01 25 00

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Quality assurance.

B. Product options.

C. Product substitution procedures.

1.2 QUALITY ASSURANCE

A. Contract is based on products and standards established in Contract Documents without consideration of proposed substitutions.

B. Products specified define standard of quality, type, function, dimension, appearance, and performance required.

C. Substitution Proposals: Permitted for specified products except where specified otherwise. Do not substitute products unless substitution has been accepted and approved in writing by Owner.

1.3 PRODUCT OPTIONS

A. See Section 01 60 00 - Product Requirements.

1.4 PRODUCT SUBSTITUTION PROCEDURES

A. Document 00 22 13 - Instructions to Bidders specifies time restrictions for submitting requests for substitutions during Bidding period.

B. Substitutions may be considered when a product becomes unavailable through no fault of Contractor.

C. Document each request with complete data, substantiating compliance of proposed substitution with Contract Documents, including:

1. Manufacturer's name and address, product, trade name, model, or catalog number, performance and test data, and reference standards.
2. Itemized point-by-point comparison of proposed substitution with specified product, listing variations in quality, performance, and other pertinent characteristics.
3. Reference to Article and Paragraph numbers in Specification Section.

4. Cost data comparing proposed substitution with specified product and amount of net change to Contract Sum.
5. Changes required in other Work.
6. Availability of maintenance service and source of replacement parts as applicable.
7. Certified test data to show compliance with performance characteristics specified.
8. Samples when applicable or requested.
9. Other information as necessary to assist Architect's evaluation.

D. A request constitutes a representation that Bidder or Contractor:

1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
2. Will provide same warranty for substitution as for specified product.
3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
4. Waives claims for additional costs or time extension that may subsequently become apparent.
5. Will coordinate installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.
6. Will reimburse Owner and Architect for review or redesign services associated with reapproval by authorities having jurisdiction.

E. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals without separate written request or when acceptance will require revision to Contract Documents.

F. Substitution Submittal Procedure:

1. Submit requests for substitutions on form with all required information clearly provided.
2. Submit electronic files of Request for Substitution for consideration. Limit each request to one proposed substitution.
3. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on proposer.
4. Architect will notify Contractor in writing of decision to accept or reject request.

1.5 INSTALLER SUBSTITUTION PROCEDURES

A. Architect will consider requests for substitutions only within 7 days after date of Owner-Contractor Agreement.

B. Document each request with:

1. Installer's qualifications.
2. Installer's experience in work similar to that specified.
3. Other information as necessary to assist Architect's evaluation.

C. Substitution Submittal Procedure:

1. Submit electronic files of Request for Substitution for consideration. Limit each request to one proposed substitution.

2. Architect will notify Contractor in writing of decision to accept or reject request.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Coordination and Project conditions.

B. Preconstruction meeting.

C. Site mobilization meeting.

D. Progress meetings.

E. Preinstallation meetings.

F. Closeout meeting.

G. Alteration procedures.

1.2 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and Work of various Sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.

B. Verify that utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate Work of various Sections having interdependent responsibilities for installing, connecting to, and placing operating equipment in service.

C. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit as closely as practical; place runs parallel with lines of building. Use spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

1. Coordination Drawings: Prepare as required to coordinate all portions of Work. Show relationship and integration of different construction elements that require coordination during fabrication or installation to fit in space provided or to function as intended. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are important.

D. Coordination Meetings: In addition to other meetings specified in this Section, hold coordination meetings with personnel and Subcontractors to ensure coordination of Work.

E. In finished areas, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.

F. Coordinate completion and clean-up of Work of separate Sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.

G. After Owner's occupancy of premises, coordinate access to Site for correction of defective Work and Work not complying with Contract Documents, to minimize disruption of Owner's activities.

1.3 PRECONSTRUCTION MEETING

A. Architect will schedule and preside over meeting after Notice of Award.

B. Attendance Required: Architect, Owner, major Subcontractors, and Contractor.

C. Minimum Agenda:

1. Execution of Owner-Contractor Agreement.
2. Submission of executed bonds and insurance certificates.
3. Distribution of Contract Documents.
4. Submission of list of Subcontractors, list of products, schedule of values, and Progress Schedule.
5. Designation of personnel representing parties in Contract, and Architect.
6. Communication procedures.
7. Procedures and processing of requests for interpretations, field decisions, submittals, substitutions, Applications for Payments, proposal request, Change Orders, and Contract closeout procedures.
8. Scheduling.
9. Critical Work sequencing.

D. Contractor: Record minutes and distribute to participants within two days after meeting, to Architect, Owner, and those affected by decisions made.

1.4 SITE MOBILIZATION MEETING

A. Owner will schedule meeting at Project Site prior to Contractor occupancy.

B. Attendance Required: Architect, Owner, Contractor, Contractor's superintendent, and major Subcontractors.

C. Minimum Agenda:

1. Use of premises by Owner and Contractor.
2. Owner's requirements and occupancy.
3. Construction facilities and controls.
4. Temporary utilities provided by Owner.
5. Building layout.
6. Security and housekeeping procedures.
7. Schedules.
8. Procedures for testing.
9. Procedures for maintaining record documents.

10. Requirements for startup of equipment.
11. Inspection and acceptance of equipment put into service during construction period.

D. Contractor: Record minutes and distribute to participants within two days after meeting, to Architect, Owner, and those affected by decisions made.

1.5 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at bi-weekly intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, and preside over meetings.

C. Attendance Required: Job superintendent, major Subcontractors and suppliers, and Architect, Owner, as appropriate to agenda topics for each meeting.

D. Minimum Agenda:

1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems impeding planned progress.
5. Review of submittal schedule and status of submittals.
6. Review of off-Site fabrication and delivery schedules.
7. Maintenance of Progress Schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on Progress Schedule and coordination.
13. Other business relating to Work.

E. Contractor: Record minutes and distribute to participants within two days after meeting, to Architect, Owner, and those affected by decisions made.

1.6 PREINSTALLATION MEETINGS

A. When required in individual Specification Sections, convene preinstallation meetings at Project Site before starting Work of specific Section.

B. Require attendance of parties directly affecting, or affected by, Work of specific Section.

C. Notify Architect seven days in advance of meeting date.

D. Prepare agenda and preside over meeting:

1. Review conditions of installation, preparation, and installation procedures.
2. Review coordination with related Work.

E. Record minutes and distribute to participants within two days after meeting, to Architect, Owner, and those affected by decisions made.

1.7 CLOSEOUT MEETING

A. Schedule Project closeout meeting with sufficient time to prepare for requesting Substantial Completion. Preside over meeting and be responsible for minutes.

B. Attendance Required: Contractor, major Subcontractors, Architect, Owner, and others appropriate to agenda.

C. Notify Architect seven days in advance of meeting date.

D. Minimum Agenda:

1. Start-up of facilities and systems.
2. Operations and maintenance manuals.
3. System demonstration and observation.
4. Operation and maintenance instructions for Owner's personnel.
5. Contractor's inspection of Work.
6. Contractor's preparation of an initial "punch list."
7. Procedure to request Architect inspection to determine date of Substantial Completion.
8. Completion time for correcting deficiencies.
9. Inspections by authorities having jurisdiction.
10. Certificate of Occupancy and transfer of insurance responsibilities.
11. Partial release of retainage.
12. Final cleaning.
13. Preparation for final inspection.
14. Closeout Submittals:

    a. Project record documents.
    b. Operating and maintenance documents.
    c. Operating and maintenance materials.
    d. Affidavits.

15. Final Application for Payment.
16. Contractor's demobilization of Site.
17. Maintenance.

E. Record minutes and distribute to participants within two days after meeting, to Architect, Owner, and those affected by decisions made.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 ALTERATION PROCEDURES

A. Designated areas of existing facilities will be occupied for normal operations during progress of construction. Cooperate with Owner in scheduling operations to minimize conflict and to permit continuous usage.

1. Perform Work not to interfere with operations of occupied areas.
2. Keep utility and service outages to a minimum and perform only after written approval of Owner.
3. Clean Owner-occupied areas daily. Clean spillage, overspray, and heavy collection of dust in Owner-occupied areas immediately.

B. Materials: As specified in product Sections; match existing products with new and salvaged products for patching and extending Work.

C. Employ skilled and experienced installer to perform alteration and renovation Work.

D. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion. Comply with Section 01 70 00 - Execution and Closeout Requirements

E. Remove unsuitable material not marked for salvage, including rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.

F. Remove debris and abandoned items from area and from concealed spaces.

G. Prepare surface and remove surface finishes to permit installation of new Work and finishes.

H. Close openings in exterior surfaces to protect existing Work from weather and extremes of temperature and humidity.

I. Remove, cut, and patch Work to minimize damage and to permit restoring products and finishes to specified condition.

J. Refinish existing visible surfaces to remain in renovated rooms and spaces, to specified condition for each material, with neat transition to adjacent finishes.

K. Where new Work abuts or aligns with existing Work, provide smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

L. When finished surfaces are cut so that smooth transition with new Work is not possible, terminate existing surface along straight line at natural line of division and submit recommendation to Architect for review.

M. Where a change of plane of 1/4 inch or more occurs, submit recommendation for providing smooth transition to Architect for review.

N. Trim existing doors to clear new finish. Refinish trim to specified condition.

O. Patch or replace portions of existing surfaces that are damaged, lifted, discolored, or showing other imperfections.

P. Finish surfaces as specified in individual product Sections.

END OF SECTION

SECTION 01 32 16

CONSTRUCTION PROGRESS SCHEDULE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Web-based project management software package.

B. Digital Project data licensing.

C. Submittals.

D. Quality assurance.

E. Format for network analysis schedules.

F. Schedules.

G. Review and evaluation.

H. Updating schedules.

I. Distribution.

1.2 PROJECT MANAGEMENT CORRESPONDENCE

A. Contractor is to establish and maintain records of Project communication and documentation until final completion. Records are to be available to the Owner and Architect upon request.

1. Records shall be established and maintained for at a minimum, the following features:

a. Compilation of Project data, including Contractor, Subcontractors, Architect, Architect's administrator, Owner, and other entities involved in Project. Include names of individuals and contact information.
b. Document workflow planning, allowing management of workflow among Project entities.
c. Create, log, track, and notify Project members of Project communications required in other Specification Sections, including, but not limited to, RFIs, submittals, minor changes in the Work, Construction Change Directives, and Change Orders.
d. Track status of each Project communication in real time, and log time and date when responses are provided.
e. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
f. Process and track payment applications.
g. Process and track contract modifications.
h. Create and distribute meeting minutes.

i. Document management for Drawings, Specifications, and coordination drawings, including revision control.
j. Management of construction progress photographs.

1.3 DIGITAL PROJECT DATA LICENSING

A. Use of Architect's Digital Data Files: Digital data files of Architect's CAD drawings will be provided by Architect for Contractor's use during construction.

B. Conditions for Use:

1. Digital data files may be used by Contractor in preparing coordination drawings and Project Record Drawings.
2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
3. Contractor shall execute a data licensing agreement in the form acceptable to Owner and Architect.

    a. Subcontractors and other parties granted access by Contractor to Architect's digital data files shall execute a data licensing agreement in the form of Agreement acceptable to Owner and Architect.
4. The following digital data files will be furnished for each appropriate discipline:

    a. M385-04227 Baseplan

1.4 SUBMITTALS

A. Submit network schedules under transmittal letter form specified in Section 01 33 00 - Submittal Procedures.

B. Schedule Updates:

1. Overall percent complete, projected and actual.
2. Completion progress by listed activity and sub-activity, to within five days prior to submittal.
3. Changes in Work scope and activities modified since submittal.
4. Delays in submittals or resubmittals, deliveries, or Work.
5. Adjusted or modified sequences of Work.
6. Other identifiable changes.
7. Revised projections of progress and completion.

C. Narrative Progress Report:

1. Submit with each submission of Progress Schedule.
2. Summary of Work completed during the past period between reports.
3. Work planned during the next period.
4. Explanation of differences between summary of Work completed and Work planned in previously submitted report.

5. Current and anticipated delaying factors and estimated impact on other activities and completion milestones.
6. Corrective action taken or proposed.

1.5 QUALITY ASSURANCE

A. Scheduler: Contractor's personnel specializing in scheduling with two years' minimum experience in scheduling construction work of complexity comparable to the Project, and having use of computer facilities capable of delivering detailed graphic printout within 72 hours of request.

B. Contractor's Administrative Personnel: 2 years' minimum experience in using and monitoring schedules on comparable Projects.

1.6 SCHEDULES

A. Bar Chart Schedules

1. Format: Bar chart Schedule, to include at least:

    a. Identification and listing in chronological order of those activities reasonably required to complete the Work, including:

        1) Subcontract Work.
        2) Major equipment design, fabrication, factory testing, and delivery dates including required lead times.
        3) Move-in and other preliminary activities.
        4) Equipment and equipment system test and startup activities.
        5) Project closeout and cleanup.
        6) Work sequences, constraints, and milestones.

    b. Listings identified by Specification Section number.
    c. Identification of the following:

2. Horizontal time frame by month, week, and day.
3. Duration, early start, and completion for each activity and subactivity.
4. Critical activities and Project float.
5. Subschedules to further define critical portions of Work.

1.7 REVIEW AND EVALUATION

A. Participate in joint review and evaluation of schedules with Architect at each submittal.

B. Evaluate Project status to determine Work behind schedule and Work ahead of schedule.

C. After review, revise schedules incorporating results of review, and resubmit within 10 days.

1.8 UPDATING SCHEDULES

A. Maintain schedules to record actual start and finish dates of completed activities.

B. Indicate progress of each activity to date of revision, with projected completion date of each activity. Update schedules to depict current status of Work.

C. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.

D. Upon approval of a Change Order, include the change in the next schedule submittal.

E. Indicate changes required to maintain Date of Substantial Completion.

F. Prepare narrative report to define problem areas, anticipated delays, and impact on schedule. Report corrective action taken or proposed and its effect.

1.9 DISTRIBUTION

A. Following joint review, distribute copies of updated schedules to Contractor's Project site file, Subcontractors, suppliers, Architect, Owner, and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Definitions.

B. Submittal procedures.

C. Construction progress schedules.

D. Proposed product list.

E. Product data.

F. Use of electronic CAD files of Project Drawings.

G. Shop Drawings.

H. Samples.

I. Other submittals.

J. Test reports.

K. Certificates.

L. Manufacturer's instructions.

M. Manufacturer's field reports.

N. Construction photographs.

O. Contractor review.

P. Architect review.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect responsive action.

B. Informational Submittals: Written and graphic information and physical Samples that do not require Architect responsive action. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

A. Transmit each submittal with Architect-accepted form.

B. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.

C. Identify: Project, Contractor, Subcontractor and supplier, pertinent Drawing and detail number, and Specification Section number appropriate to submittal.

D. Apply Contractor's stamp, signed or initialed, certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is according to requirements of the Work and Contract Documents.

E. Schedule submittals to expedite Project, and submit electronic submittals as PDF electronic files. Coordinate submission of related items.

F. For each submittal for review, allow 10 days.

G. Identify variations in Contract Documents and product or system limitations that may be detrimental to successful performance of completed Work.

H. Allow space on submittals for Contractor and Architect review stamps.

I. When revised for resubmission, identify changes made since previous submission.

J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.

K. Submittals not requested will not be recognized nor processed.

L. Incomplete Submittals: Architect will not review. Complete submittals for each item are required. Delays resulting from incomplete submittals are not the responsibility of Architect.

1.4 CONSTRUCTION PROGRESS SCHEDULES

A. Comply with Section 01 32 16 - Construction Progress Schedule

1.5 PROPOSED PRODUCT LIST

A. Within 15 days after date of Owner-Contractor Agreement, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, indicate manufacturer, trade name, model or catalog designation, and reference standards.

1.6 PRODUCT DATA

A. Product Data: Action Submittal: Submit to Architect for review for assessing conformance with information given and design concept expressed in Contract Documents.

B. Submit electronic submittals as PDF electronic files.

C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

1.7 ELECTRONIC CAD FILES OF PROJECT DRAWINGS

A. Electronic CAD Files of Project Drawings: May only be used to expedite production of Coordination Drawings for the Project. Use for other Projects or purposes is not allowed.

B. Electronic CAD Files of Project Drawings: Distributed only under the following conditions:

1. Use of files is solely at receiver's risk. Architect does not warrant accuracy of files. Receiving files in electronic form does not relieve receiver of responsibilities for measurements, dimensions, and quantities set forth in Contract Documents. In the event of ambiguity, discrepancy, or conflict between information on electronic media and that in Contract Documents, notify Architect of discrepancy and use information in hard-copy Drawings and Specifications.
2. CAD files do not necessarily represent the latest Contract Documents, existing conditions, and as-built conditions. Receiver is responsible for determining and complying with these conditions and for incorporating addenda and modifications.
3. User is responsible for removing information and references to Contract Documents. Shop Drawings submitted with information associated with other trades or with references to Contract Documents will not be reviewed and will be immediately returned.
4. Receiver shall not hold Architect responsible for data or file clean-up required to make files usable, nor for error or malfunction in translation, interpretation, or use of this electronic information.
5. Receiver shall understand that there is no guarantee that computer viruses are not present in files or in electronic media.
6. Receiver shall not hold Architect responsible for such viruses or their consequences, and shall hold Architect harmless against costs, losses, or damage caused by presence of computer virus in files or media.

1.8 SHOP DRAWINGS

A. Shop Drawings: Action Submittal: Submit to Architect for assessing conformance with information given and design concept expressed in Contract Documents.

B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. When required by individual Specification Sections, provide Shop Drawings signed and sealed by a professional Engineer responsible for designing components shown on Shop Drawings.

1. Include signed and sealed calculations to support design.
2. Submit Shop Drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
3. Make revisions and provide additional information when required by authorities having jurisdiction.

D. Submit electronic submittals as PDF electronic files.

E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

1.9 SAMPLES

A. Samples: Action Submittal: Submit to Architect for assessing conformance with information given and design concept expressed in Contract Documents.

B. Samples for Selection as Specified in Product Sections:

1. Submit to Architect for aesthetic, color, and finish selection.
2. Submit Samples of finishes, textures, and patterns for Architect selection.

C. Submit Samples to illustrate functional and aesthetic characteristics of products, with integral parts and attachment devices. Coordinate Sample submittals for interfacing work.

D. Include identification on each Sample, with full Project information.

E. Submit number of Samples specified in individual Specification Sections; Architect will retain Samples.

F. Samples will not be used for testing purposes unless specifically stated in Specification Section.

G. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

1.10 OTHER SUBMITTALS

A. Closeout Submittals: Comply with Section 01 70 00 - Execution and Closeout Requirements.

B. Informational Submittal: Submit data for Architect’s knowledge as Contract administrator or for Owner.

C. Submit information for assessing conformance with information given and design concept expressed in Contract Documents.

1.11 TEST REPORTS

A. Informational Submittal: Submit reports for Architect's knowledge as Contract administrator or for Owner.

B. Submit test reports for information for assessing conformance with information given and design concept expressed in Contract Documents.

1.12 CERTIFICATES

A. Informational Submittal: Submit certification by manufacturer, installation/application Subcontractor, or Contractor to Architect, in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or product but must be acceptable to Architect.

1.13 MANUFACTURER'S INSTRUCTIONS

A. Informational Submittal: Submit manufacturer's installation instructions for Architect's knowledge as Contract administrator or for Owner.

B. Submit printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing, to Architect in quantities specified for Product Data.

C. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.14 MANUFACTURER'S FIELD REPORTS

A. Informational Submittal: Submit reports for Architect's knowledge as Contract administrator or for Owner.

B. Submit report within 48 hours of observation to Architect for information.

C. Submit reports for information for assessing conformance with information given and design concept expressed in Contract Documents.

1.15 CONSTRUCTION PHOTOGRAPHS

A. Provide photographs of Site and construction throughout progress of Work produced by an experienced person acceptable to Architect.

B. Each week submit photographs.

C. Photographs: Digital file type of acceptable quality to analyze the quality and progress of work.

D. Take Site photographs from different directions, overall Work area photographs indicating relative progress of the Work, and detailed images as needed to indicate specific conditions of the Work, 3 days maximum before submitting.

E. Take photographs as evidence of existing Project conditions.

F. Identify each image. Identify name of Project, orientation of view, date and time of view, subject matter of image, and any related project communication or documents.

G. Digital Images: Deliver complete set of digital image electronic files to Owner with Project record documents. Identify electronic media with date photographs were taken. Submit images uncropped.

1. Digital Images: Uncompressed format acceptable to Architect, produced by digital camera with minimum sensor size of 12.0 megapixels, and image resolution of not less than 4000 by 3000 pixels.
2. Date and Time: Include date and time in filename for each image.

1.16 CONTRACTOR REVIEW

A. Review for compliance with Contract Documents and approve submittals before transmitting to Architect.

B. Contractor: Responsible for:

1. Determination and verification of materials including manufacturer's catalog numbers.
2. Determination and verification of field measurements and field construction criteria.
3. Checking and coordinating information in submittal with requirements of Work and of Contract Documents.
4. Determination of accuracy and completeness of dimensions and quantities.
5. Confirmation and coordination of dimensions and field conditions at Site.
6. Construction means, techniques, sequences, and procedures.
7. Safety precautions.
8. Coordination and performance of Work of all trades.

C. Stamp, sign or initial, and date each submittal to certify compliance with requirements of Contract Documents.

D. Do not fabricate products or begin Work for which submittals are required until approved submittals have been received from Architect.

1.17 ARCHITECT REVIEW

A. Do not make "mass submittals" to Architect/Engineer. "Mass submittals" are defined as six or more submittals or items in one day or 15 or more submittals or items in one week. If "mass submittals" are received, Architect's review time stated above will be extended as necessary to perform proper review. Architect will review "mass submittals" based on priority determined by Architect.

B. Informational submittals and other similar data are for Architect's information, do not require Architect's responsive action, and will not be reviewed or returned with comment.

C. Submittals made by Contractor that are not required by Contract Documents may be returned without action.

D. Submittal approval does not authorize changes to Contract requirements unless accompanied by Change Order, Architect's Supplemental Instruction, or Construction Change Directive.

E. Owner may withhold monies due to Contractor to cover additional costs beyond the second submittal review.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Quality control.

B. Tolerances.

C. References.

D. Labeling.

E. Manufacturers' field services.

1.2 QUALITY CONTROL

A. Monitor quality control over suppliers, manufacturers, products, services, Site conditions, and workmanship, to produce Work of specified quality.

B. Comply with specified standards as the minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

C. Perform Work using persons qualified to produce required and specified quality.

D. Products, materials, and equipment may be subject to inspection by Architect and Owner. Such inspections shall not relieve Contractor of complying with requirements of Contract Documents.

E. Supervise performance of Work in such manner and by such means to ensure that Work, whether completed or in progress, will not be subjected to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

1.3 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' recommended tolerances and tolerance requirements in reference standards. When such tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current as of date of Contract Documents except where specific date is established by code.

C. Obtain copies of standards and maintain on Site when required by product Specification Sections.

D. When requirements of indicated reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

E. Neither contractual relationships, duties, or responsibilities of parties in Contract nor those of Architect shall be altered from Contract Documents by mention or inference in reference documents.

1.5 LABELING

A. Attach label from agency approved by authorities having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.

B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label:

1. Model number.
2. Serial number.
3. Performance characteristics.

C. Manufacturer's Nameplates, Trademarks, Logos, and Other Identifying Marks on Products: Not allowed on surfaces exposed to view in public areas, interior or exterior.

1.6 MANUFACTURER'S FIELD SERVICES

A. When specified in individual Specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe Site conditions, conditions of surfaces and installation, quality of workmanship, startup of equipment, testing, adjusting, and balancing of equipment as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Architect minimum 15 days in advance of required observations. Observer is subject to approval of Architect.

C. Report observations and Site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.

D. Refer to Section 01 33 00 - Submittal Procedures, "Manufacturer's Field Reports" Article.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Temporary facilities.

B. Temporary Utilities:

C. Construction Facilities:

D. Temporary Controls:

1. Barriers.
2. Enclosures and fencing.
3. Security.
4. Dust control.
5. Pest and rodent control.
6. Pollution control.

E. Removal of utilities, facilities, and controls.

1.2 TEMPORARY FACILITIES

A. Contractor and each subcontractor provide the following items as necessary for execution of the Work including associated costs:
1. Cleaning during construction.
2. Construction aids.
3. Temporary fire protection, dust control, erosion and sediment control, water control, noise control, and other necessary temporary controls.
4. Temporary barriers, barricades, and similar devices as necessary for safety and protection of construction personnel and public.
5. Temporary provisions for protection of installed Work.

1.3 TEMPORARY ELECTRICITY

A. Owner will pay cost of energy used. Exercise measures to conserve energy. Use Owner's existing power service.

B. Provide temporary electric feeder from existing building electrical service at location as directed by Owner. Do not disrupt Owner's use of service.

C. Complement existing power service capacity and characteristics as required for construction operations.

D. Provide power outlets with branch wiring and distribution boxes located as required for construction operations. Provide suitable, flexible power cords as required for portable construction tools and equipment.

E. Provide main service disconnect and overcurrent protection at convenient location.

F. Permanent convenience receptacles shall not be used during construction.

1.4 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Provide and maintain lighting for construction operations as needed.

B. Maintain lighting and provide routine repairs.

C. Permanent building lighting may be used during construction.

1.5 TEMPORARY HEATING

A. Existing heating systems may be used during construction.

B. Maintain minimum ambient temperature of 55 degrees F in areas where construction is in progress unless indicated otherwise in individual product Sections.

1.6 TEMPORARY COOLING

A. Existing cooling systems may be used during construction.

B. Maintain maximum ambient temperature of 80 degrees F in areas where construction is in progress unless indicated otherwise in individual product Sections.

1.7 TEMPORARY VENTILATION

A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

1.8 SANITARY FACILITIES

A. Existing designated facilities located at project site may be used during construction operations. Maintain a clean and sanitary condition daily.

B. At end of construction, return existing facilities used for construction operations to same or better condition as original condition.

1.9 FIELD OFFICES AND SHEDS

A. Do not use existing facilities for field offices or for storage without written Owner permission.

B. Locate field offices and sheds a minimum distance of 30 feet from existing structures.

C. Storage Areas and Sheds: Size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and inspection of products to suit requirements in Section 01 60 00 - Product Requirements.

D. Removal: At completion of Work remove buildings, foundations, utility services, and debris. Restore areas to same or better condition as original condition.

1.10 VEHICULAR ACCESS

A. Maintain unimpeded access for emergency vehicles. Maintain driveways with turning space between and around combustible materials.

B. Maintain access to fire hydrants and control valves free of obstructions.

C. Use designated and approved existing on-Site roads for construction traffic whenever possible.

1.11 PARKING

A. Use of designated areas of existing on-Site streets and driveways used for construction traffic is permitted.

B. Use of designated areas of existing parking facilities used by construction personnel is permitted.

C. Permanent Pavements and Parking Facilities:
   1. Avoid traffic loading beyond paving design capacity. Tracked vehicles are not allowed.

D. Removal, Repair:

   1. Remove temporary materials and construction at Substantial Completion.
   2. Repair existing facilities damaged by use, to original condition.

1.12 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain Site in clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, before enclosing spaces.

C. Broom and vacuum clean interior areas before starting surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and rubbish from Site weekly and dispose of off-Site.

E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.13 PROJECT IDENTIFICATION

A. No signs are allowed without Owner's permission except those required by law.

B. Removal: Remove signs, framing, supports, and foundations at completion of Project and restore area.

1.14 TRAFFIC REGULATION

A. Signs, Signals, and Devices:

1. Mounted Traffic Control and Informational Signs: As approved by authorities having jurisdiction.
2. Traffic Cones, Drums, and Lights: As approved by authorities having jurisdiction.
3. Flag Person Equipment: As required by authorities having jurisdiction.

B. Flag Persons: Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

C. Flares and Lights: Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

D. Haul Routes:

1. Consult with authorities having jurisdiction and establish public thoroughfares to be used for haul routes and Site access.

E. Removal:

1. Remove equipment and devices when no longer required.
2. Repair damage caused by installation.

1.15 FIRE-PREVENTION FACILITIES

A. Prohibit smoking within buildings.

B. Establish fire watch for cutting, welding, and other hazardous operations capable of starting fires. Maintain fire watch before, during, and after hazardous operations until threat of fire does not exist.

C. Portable Fire Extinguishers: NFPA 10; 10-pound capacity, 4A-60B: C UL rating.
1. Provide minimum of one fire extinguisher in every construction trailer and storage shed.
2. Provide minimum of one fire extinguisher on roof during roofing operations using heat-producing equipment.

1.16 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide barricades and covered walkways required by authorities having jurisdiction for public rights-of-way and for public access to existing building.

C. Protect non-owned vehicular traffic, stored materials, Site, and structures from damage.

1.17 ENCLOSURES AND FENCING

A. Construction: Commercial-grade chain-link fence.

B. Provide 6-foot-high fence around construction Site as needed; equip with vehicular and pedestrian gates with locks.

C. Exterior Enclosures:

1. Provide temporary weathertight closure of exterior openings to accommodate acceptable working conditions and protection for products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual Specification Sections, and to prevent entry of unauthorized persons.
2. Provide temporary roofing as specified.

1.18 SECURITY

A. Restrictions:

1. Do not allow members of the public or media on Site except by written approval of Owner.

1.19 PEST AND RODENT CONTROL

A. Provide methods, means, and facilities to prevent pests and insects from damaging the Work or entering facility.

B. Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

1.20 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances and pollutants produced by construction operations.

B. Comply with pollution and environmental control requirements of authorities having jurisdiction.

1.21 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials before Final Application for Payment inspection.

B. Clean and repair damage caused by installation or use of temporary Work.

C. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Products.

B. Product delivery requirements.

C. Product storage and handling requirements.

D. Product options.

1.2 PRODUCTS

A. At minimum, comply with specified requirements and reference standards.

B. Specified products define standard of quality, type, function, dimension, appearance, and performance required.

C. Furnish products of qualified manufacturers that are suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise. Confirm that manufacturer's production capacity can provide sufficient product, on time, to meet Project requirements.

D. Do not use materials and equipment removed from existing premises except as specifically permitted by Contract Documents.

E. Furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

A. Transport and handle products according to manufacturer's instructions.

B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.

C. Provide equipment and personnel to handle products; use methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Store and protect products according to manufacturer's instructions.

B. Store products with seals and labels intact and legible.

C. Store sensitive products in weathertight, climate-controlled enclosures in an environment suitable to product.

D. For exterior storage of fabricated products, place products on sloped supports aboveground.

E. Provide off-Site storage and protection when Site does not permit on-Site storage or protection.

F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

G. Provide equipment and personnel to store products; use methods to prevent soiling, disfigurement, or damage.

H. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Products complying with specified reference standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and complying with Specifications; no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit Request for Substitution for any manufacturer not named, according to Section 01 25 00 - Substitution Procedures.

PART 2 - PRODUCTS – Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 01 70 00

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Examination.

B. Preparation.

C. Execution.

D. Cutting and patching.

E. Protecting installed construction.

F. Starting of systems.

G. Demonstration and instruction.

H. Testing, adjusting, and balancing.

I. Closeout procedures.

J. Project record documents.

K. Operation and maintenance data.

L. Spare parts and maintenance products.

M. Product warranties and product bonds.

N. Final cleaning.

1.2 EXAMINATION

A. Verify that existing Site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual Specification Sections.

D. Verify that utility services are available with correct characteristics and in correct locations.

1.3 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance according to manufacturer's instructions.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer-required or -recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

1.4 EXECUTION

A. Comply with manufacturer's installation instructions, performing each step in sequence. Maintain one set of manufacturer's installation instructions at Project Site during installation and until completion of construction.

B. When manufacturer's installation instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Verify that field measurements are as indicated on approved Shop Drawings or as instructed by manufacturer.

D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1. Secure Work true to line and level and within specified tolerances, or if not specified, industry-recognized tolerances.
2. Physically separate products in place and provide electrical insulation or protective coatings to prevent galvanic action or corrosion between dissimilar metals.
3. Exposed Joints: Provide uniform joint width and arrange to obtain best visual effect. Refer questionable visual effect choices to Architect/Engineer for final decision.

E. Allow for expansion of materials and building movement.

F. Climatic Conditions and Project Status: Install each unit of Work under conditions to ensure best possible results in coordination with entire Project.

1. Isolate each unit of Work from incompatible Work as necessary to prevent deterioration.
2. Coordinate enclosure of Work with required inspections and tests to minimize necessity of uncovering Work for those purposes.

G. Mounting Heights: Where not indicated, mount individual units of Work at industry-recognized standard mounting heights for particular application indicated.

1. Refer questionable mounting height choices to Architect/Engineer for final decision.
2. Elements Identified as Handicap Accessible: Comply with applicable codes and regulations.

H. Adjust operating products and equipment to ensure smooth and unhindered operation.

I. Clean and perform maintenance on installed Work as frequently as necessary through remainder of construction period. Lubricate operable components as recommended by manufacturer.

1.5 CUTTING AND PATCHING

A. Employ skilled and experienced Installers to perform cutting and patching.

B. Submit written request in advance of cutting or altering elements affecting the following:

1. Structural integrity of element.
2. Integrity of weather-exposed or moisture-resistant elements.
3. Efficiency, maintenance, or safety of element.
4. Visual qualities of sight-exposed elements.
5. Work of Owner or separate Contractor.

C. Execute cutting, fitting, and patching to complete Work and to accomplish the following:

1. Fit the several parts together, to integrate with other Work.
2. Uncover Work to install or correct ill-timed Work.
3. Remove and replace defective and nonconforming Work.
4. Remove samples of installed Work for testing.
5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

D. Execute Work by methods to avoid damage to other Work and to provide proper surfaces to receive patching and finishing.

E. Cut masonry and concrete materials using masonry saw or core drill.

F. Restore Work with new products according to requirements of Contract Documents.

G. Fit Work tight to pipes, sleeves, ducts, conduits, and other penetrations through surfaces.

H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

I. At penetrations of fire-rated walls, partitions, ceiling, or floor construction, completely seal voids with fire-rated material to full thickness of penetrated element.

J. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.

K. Identify the hazardous substances or conditions exposed during the Work to Architect for decision or remedy.

1.6 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual Specification Sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate Work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Use durable sheet materials to protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

1.7 STARTING OF SYSTEMS

A. Coordinate schedule for startup of various equipment and systems.

B. Notify Architect and Owner seven days prior to startup of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

D. Verify that tests, meter readings, and electrical characteristics agree with those required by equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute startup under supervision of manufacturer's representative or Contractors' personnel according to manufacturer's instructions.

G. When specified in individual Specification Sections, require manufacturer to provide authorized representative who will be present at Site to inspect, check, and approve equipment or system installation prior to startup and will supervise placing equipment or system in operation.

H. Submit a written report in accordance with Section 013300 - Submittal Procedures stating that equipment or system has been properly installed and is functioning correctly.

1.8 DEMONSTRATION AND INSTRUCTION

A. Demonstrate operation and maintenance of products to Owner's personnel prior to date of Substantial Completion.

1.9 TESTING, ADJUSTING, AND BALANCING

A. Owner will appoint, employ, and pay for services of independent firm to perform testing, adjusting, and balancing as needed.

1.10 CLOSEOUT PROCEDURES

A. Prerequisites to Substantial Completion: Complete following items before requesting Certification of Substantial Completion, either for entire Work or for portions of Work:
   1. Complete startup, of systems and equipment, demonstrations to Owner's operating and maintenance personnel as specified in compliance with this Section.
   2. Conduct inspection to establish basis for request that Work is substantially complete.
   3. Obtain and submit releases enabling Owner's occupancy of impacted spaces in the building and access to services and utilities. Include certificate of occupancy, operating certificates, or similar releases from authorities having jurisdiction or utility companies.

B. Substantial Completion Inspection:

   1. When Contractor considers Work to be substantially complete, submit to Architect:

      a. Written certificate that Work, or designated portion, is substantially complete.
      b. List of items to be completed or corrected (initial punch list).

   2. Within seven days after receipt of request for Substantial Completion, Architect will make inspection to determine whether Work or designated portion is substantially complete.
   3. Should Architect determine that Work is not substantially complete:

      a. Architect will promptly notify Contractor in writing, stating reasons for its opinion.
      b. Contractor shall remedy deficiencies in Work and send second written request for Substantial Completion to Architect.
      c. Architect will reinspect Work.
      d. Redo and Inspection of Deficient Work: Repeated until Work passes Architect inspection.

   4. After Work is substantially complete, Contractor shall:

      a. Allow Owner occupancy of Project under provisions stated in specifications.
      b. Complete Work listed for completion or correction within time period stipulated.

   5. Owner will occupy portions of building as specified in Section 011000 - Summary.

C. Prerequisites for Final Completion: Complete following items before requesting final acceptance and final payment.

   1. When Contractor considers Work to be complete, submit written certification that:

      a. Contract Documents have been reviewed.
      b. Work has been examined for compliance with Contract Documents.
      c. Work has been completed according to Contract Documents.
      d. Work is completed and ready for final inspection.

   2. Submittals: Submit following:
      a. Final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.

b. Specified warranties, workmanship bonds, maintenance agreements, and other similar documents.
c. Accounting statement for final changes to Contract Sum.
d. Contractor's affidavit of payment of debts and claims.
e. Contractor affidavit of release of liens.
f. Consent of surety to final payment.

3. Perform final cleaning for Contractor-soiled areas according to this Section.

D. Final Completion Inspection:

1. Within seven days after receipt of request for final inspection, Architect will make inspection to determine whether Work or designated portion is complete.
2. Should Architect consider Work to be incomplete or defective:

a. Architect will promptly notify Contractor in writing, listing incomplete or defective Work.
b. Contractor shall remedy stated deficiencies and send second written request to Architect that Work is complete.
c. Architect will reinspect Work.
d. Redo and Inspection of Deficient Work: Repeated until Work passes Architect inspection.

1.11 PROJECT RECORD DOCUMENTS

A. Maintain on Site one set of the following record documents; record actual revisions to the Work:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Reviewed Shop Drawings, product data, and Samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress, not less than weekly.

E. Specifications: Legibly mark and record, at each product Section, description of actual products installed, including the following:

1. Manufacturer's name and product model and number.
2. Product substitutions or alternates used.
3. Changes made by Addenda, bulletin, Change Order, and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction as follows:

1. Include Contract modifications such as Addenda, supplementary instructions, change directives, field orders, minor changes in the Work, and change orders.
2. Include locations of concealed elements of the Work.
3. Identify and locate existing buried or concealed items encountered during Project.
4. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
5. Field changes of dimension and detail.
6. Details not on original Drawings.

G. Submit PDF electronic files of marked-up documents to Architect before Substantial Completion.

1.12 OPERATION AND MAINTENANCE DATA

A. Submit in PDF composite electronic indexed file.

1.13 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Furnish spare parts, maintenance, and extra products in quantities specified in individual Specification Sections.

B. Deliver to Project Site and place in location as directed by Owner; obtain receipt prior to final payment.

1.14 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Obtain warranties and bonds executed in duplicate by responsible Subcontractors, suppliers, and manufacturers within ten days after completion of applicable item of Work.

B. Execute and assemble transferable warranty documents and bonds from Subcontractors, suppliers, and manufacturers.

C. Verify documents are in proper form, contain full information, and are notarized.

D. Co-execute submittals when required.

E. Submit prior to final Application for Payment.

F. Time of Submittals:
1. Make submittals within ten days after date of Completion and prior to final Application for Payment.
2. For items of Work for which acceptance is delayed, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

1.15 FINAL CLEANING

A. Execute final cleaning prior to final Project assessment.

1. Employ experienced personnel or professional cleaning firm.

B. Clean equipment and fixtures used to sanitary condition with appropriate cleaning materials.

C. Replace filters of operating equipment.

D. Clean debris from roofs, gutters, downspouts, and drainage systems.

E. Clean Site; sweep paved areas, rake clean and run magnet over all landscaped surfaces.

F. Remove waste and surplus materials, rubbish, and construction facilities from Site.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 07 84 00

FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Firestopping through-penetrations of fire rated assemblies.
2. Firestopping joints in fire rated assemblies.
3. Firestopping tops of fire rated walls.

1.2 REFERENCES

A. ASTM International:

1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
2. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
3. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
4. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems.

B. Intertek Testing Services (Warnock Hersey Listed):

1. WH - Certification Listings.

C. Underwriters Laboratories Inc.:

1. UL 263 - Fire Tests of Building Construction and Materials.
2. UL 1479 - Fire Tests of Through-Penetration Firestops.
3. UL 2079 - Tests for Fire Resistance of Building Joint Systems.
4. UL - Fire Resistance Directory.

1.3 DEFINITIONS

A. Firestopping (Through-Penetration Protection System): Sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire rated construction.

1.4 PERFORMANCE REQUIREMENTS

A. Conform to applicable code and UL for fire resistance ratings and surface burning characteristics.

B. Provide certificate of compliance from authority having jurisdiction indicating approval of materials used.

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit data on product characteristics, performance and limitation criteria.

C. Schedule: Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance rating of adjacent assembly.

D. Manufacturer's Installation Instructions: Submit preparation and installation instructions.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements and applicable code requirements.

F. Engineering Judgments: For conditions not covered by UL listed designs, submit judgements by licensed professional engineer suitable for presentation to authority having jurisdiction for acceptance as meeting code fire protection requirements.

G. UL rating on all products used for firestopping.

1.6 QUALITY ASSURANCE

A. Through Penetration Firestopping of Fire Rated Assemblies: UL 1479 or ASTM E814 with 0.10 inch water gage minimum positive pressure differential to achieve fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.

1. Wall Penetrations: Fire F-Ratings as indicated on Drawings, but not less than 1-hour.
2. Floor Penetrations: Fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.

B. Through Penetration Firestopping of Non-Fire Rated Assemblies: Materials to resist free passage of flame and products of combustion.

C. Fire Resistant Joints in Fire Rated Floor, Roof, and Wall Assemblies: UL 2079 to achieve fire resistant rating as indicated on Drawings for assembly in which joint is installed.

D. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

B. Applicator: Company specializing in performing Work of this section with minimum three years experience.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements.

B. Do not apply materials when temperature of substrate material and ambient air is below 60 degrees F.

C. Maintain this minimum temperature before, during, and for minimum 3 days after installation of materials.

PART 2 - PRODUCTS

2.1 FIRESTOPPING

A. Product Description: Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.

1. Silicone Firestopping Elastomeric Firestopping: Single component silicone elastomeric compound and compatible silicone sealant.
2. Foam Firestopping Compounds: Single component foam compound.
3. Formulated Firestopping Compound of Incombustible Fibers: Formulated compound mixed with incombustible non-asbestos fibers.
4. Fiber Stuffing and Sealant Firestopping: Composite of mineral or ceramic fiber stuffing insulation with silicone elastomer for smoke stopping.
5. Intumescent Firestopping: Intumescent putty compound which expands on exposure to surface heat gain.
6. Firestop Pillows: Formed mineral fiber pillows.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify openings are ready to receive firestopping.

3.2 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of firestopping material.

B. Remove incompatible materials affecting bond.

C. Install backing materials to arrest liquid material leakage.

3.3 APPLICATION

A. Install material at fire rated construction perimeters and openings containing penetrating sleeves, piping, ductwork, conduit and other items, requiring firestopping.

B. Apply primer where recommended by manufacturer for type of firestopping material and substrate involved, and as required for compliance with required fire ratings.

C. Apply firestopping material in sufficient thickness to achieve required fire and smoke rating.

D. Place intumescent coating in sufficient coats to achieve rating required.

3.4 FIELD QUALITY CONTROL

A. Inspect installed firestopping for compliance with specifications and submitted schedule.

3.5 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning.

B. Clean adjacent surfaces of firestopping materials.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.

B. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 26 05 00

GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Electrical equipment coordination and installation.
2. Sleeves for raceways and cables.
3. Sleeve seals.
4. Grout.
5. Common electrical installation requirements.

B. Provide all electric wiring including, but not limited to:
1. Branch circuit wiring from the branch circuit panels for fire alarm and other detailed circuit wiring. Where available, re-use existing 120-volt circuits for new fire alarm panels. Provide new breakers, circuits, and wiring for new booster panels and amplifiers.
2. Provide all required demolition of the existing fire alarm after the new system is completely operational.
3. Supports and other accessory items.
4. Conduits, cables, and boxes for all fire alarm system wiring, devices, and equipment.
5. Complete new Fire Alarm systems per section 28 31 11. Provide all devices, wiring, and connections necessary to make the system fully functional in all areas of building.

C. Obtain and pay for all electrical and fire alarm plan reviews, applications, permits and inspections from all of the Authorities Having Jurisdiction

1.03 SUBMITTALS

A. Refer to Section 01 33 00 for additional submittal requirements.

B. Shop Drawings: Provide certified shop drawing submittals (approved by the Prime contractor) for the following items and any other items where indicated in other specification sections:
1. Fire Alarm system components and wiring.

C. Product Data: Provide certified submittals (approved by the Prime contractor) for the following items and any other items where indicated in other specification sections:
1. Conduit, boxes, fittings, and support items

2. Wire and Cable
3. Fire Alarm system equipment, components, wire/cable, and devices
4. For sleeve seals.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Provide like items from one manufacturer.

B. Circuit breakers for additions to existing panels shall be compatible with the panels.

C. Provide new electrical materials of the type and quality detailed, listed by UL, bearing their label wherever standards have been established.

D. Provide incidentals not specifically mentioned herein or noted on Drawings, but needed to complete the system or systems, in a safe and satisfactory working condition.

E. Where materials, equipment, apparatus or other products are specified by manufacturer, brand name, type, or catalog number, such designation is to establish standards of desired quality and style and shall be the basis of the bid.

2.02 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel.

1. Minimum Metal Thickness:

a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052-inch.
b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138-inch.

2.03 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Metraflex Co.
d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
3. Pressure Plates: Plastic. Include two for each sealing element.
4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.04 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.01 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1, NFPA 70 (National Electrical Code – current edition adopted by the Authority Having Jurisdiction), and any local amendments. Fire Alarm cable shall be installed as per NEC Article 760.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

3.02 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

E. Cut sleeves to length for mounting flush with both surfaces of walls.

F. Extend sleeves installed in floors 2 inches above finished floor level.

G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable, unless indicated otherwise.

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants."

J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."

K. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

3.03 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.04 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

END OF SECTION

SECTION 26 05 02

MINOR ELECTRICAL DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical / fire alarm demolition.

PART 2 PRODUCTS – Not Used

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that abandoned wiring and equipment serve only abandoned facilities.

B. Demolition drawings are based on casual field observation and existing record documents.

C. Report discrepancies to Architect before disturbing existing installation.

D. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION

A. See notes on plans and riser diagrams about utilizing existing panels, etc.

B. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Minimize outage duration.
   1. Notify Owner before partially or completely disabling system.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

A. Remove, relocate, and extend existing installations to accommodate new construction.

B. Remove abandoned wiring to source of supply.

C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.

D. Disconnect and remove abandoned fire alarm panels, equipment, devices, and wiring after new system is fully operational and approved.

E. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

F. Repair adjacent construction and finishes damaged during demolition and extension work.

G. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.

H. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.

3.04 CLEANING AND REPAIR

A. Clean and repair existing materials and equipment which remain or are to be reused.

B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement and panel label.

C. Smoke Detectors: Remove temporary covers from smoke detectors at time of system activation.

END OF SECTION

SECTION 26 05 03

EQUIPMENT WIRING CONNECTIONS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes electrical connections to equipment.

1.2 REFERENCES

A. National Electrical Manufacturers Association:
   1. NEMA WD 1 - General Requirements for Wiring Devices.
   2. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit wiring device manufacturer’s catalog information showing dimensions, configurations, and construction.

C. Manufacturer's installation instructions.

1.4 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Submittal procedures.

B. Project Record Documents: Record actual locations, sizes, and configurations of equipment connections.

1.5 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Obtain and review shop drawings, product data, manufacturer’s wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.

C. Determine connection locations and requirements.

D. Sequence rough-in of electrical connections to coordinate with installation of equipment.

E. Sequence electrical connections to coordinate with start-up of equipment.

PART 2 PRODUCTS

2.1 CORD AND PLUGS

A. Attachment Plug Construction: Conform to NEMA WD 1.

B. Must be UL Listed and Labeled.

C. Configuration: NEMA WD 6; match receptacle configuration at outlet furnished for equipment.

D. Cord Construction: Type SO multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.

E. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify equipment is ready for electrical connection, for wiring, and to be energized.

3.2 EXISTING WORK

A. Remove exposed abandoned equipment wiring connections, including abandoned connections above accessible ceiling finishes.

B. Disconnect abandoned utilization equipment and remove wiring connections. Remove abandoned components when connected raceway is abandoned and removed. Install blank cover for abandoned boxes and enclosures not removed.

C. Extend existing equipment connections using materials and methods compatible with existing electrical installations, or as specified.

3.3 INSTALLATION

A. Make electrical connections.

B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.

C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.

D. Install receptacle outlet to accommodate connection with attachment plug.

E. Install cord and cap for field-supplied attachment plug.

F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.

G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.

H. Install terminal block jumpers to complete equipment wiring requirements.

I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

3.4 ADJUSTING

A. Section 01 70 00 - Execution and Closeout Requirements: Testing, adjusting, and balancing.

B. Cooperate with utilization equipment installers and field service personnel during checkout and starting of equipment to allow testing and balancing and other startup operations. Provide personnel to operate electrical system and checkout wiring connection components and configurations.

3.5 EQUIPMENT CONNECTION SCHEDULE

A. Provide electrical connection of equipment (voltage, amperage, fusing, etc.) per equipment manufacturer’s requirements.

END OF SECTION

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes building wire and cable; metal clad cable; and wiring connectors and connections.

1.2 REFERENCES

A. International Electrical Testing Association:
   1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

B. National Fire Protection Association:
   1. NFPA 70 - National Electrical Code.
   2. NFPA 262 - Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.

C. Underwriters Laboratories, Inc.:
   1. UL 1277 - Standard for Safety for Electrical Power and Control Tray Cables with Optional Optical-Fiber Members.

1.3 SYSTEM DESCRIPTION

A. Product Requirements: Provide products as follows:
   1. Stranded conductors.
   2. Conductor not smaller than 12 AWG for power and lighting circuits.
   3. Conductor not smaller than 16 AWG for control circuits.

B. Conduit:
   1. Wire shall be installed in conduit.
   2. Conduit may be used in exposed locations only in unfinished spaces (such as mechanical rooms). All conduit in finished spaces shall be concealed in walls and above ceilings.
   3. MC cable may be used as fixture whips when concealed.

1.4 DESIGN REQUIREMENTS

A. Conductor sizes are based on copper. DO NOT use aluminum wire.

B. All wiring shall be stranded conductors. DO NOT use solid wire.

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures.

B. Material information.

1.6 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout.

B. Project Record Documents: Record actual locations of components and circuits.

1.7 QUALITY ASSURANCE

A. Provide wiring materials located in plenums with peak optical density not greater than 0.5, average optical density not greater than 0.15, and flame spread not greater than 5 feet (1.5 m) when tested in accordance with NFPA 262.

1.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.9 FIELD MEASUREMENTS

A. Verify field measurements are as indicated on Drawings.

1.10 COORDINATION

A. Section 01 30 00 - Administrative.

B. Where wire and cable destination is indicated and routing is not shown, determine routing and lengths required.

C. Wire and cable routing indicated is approximate unless dimensioned. Include wire and cable lengths within 10 ft of length shown.

1.11 DEFINITIONS

A. Furnish: To supply and deliver, unload and inspect for damage.

B. Install: To unpack, assemble, erect, mount, apply, place, finish, cure, protect, clean, energize, program, adjust, test and make completely functional and operational.

C. Provide: To furnish and install.

PART 2 PRODUCTS

2.1 BUILDING WIRE

A. Manufacturers:
1. General Cable Co.
2. Rome Cable.
3. Southwire.

B. Product Description: Single conductor insulated wire.

C. Conductor: Stranded copper.

D. Insulation Voltage Rating: 600 volts.

E. Insulation Temperature Rating: 90 degrees C.

2.2 METAL CLAD CABLE

A. Conductor: Copper.

B. Insulation Voltage Rating: 600 volts.

C. Insulation Temperature Rating: 90 degrees C.

D. Armor Material: Aluminum.

E. Armor Design: Interlocked metal tape or corrugated tube.

F. Jacket: None.

2.3 WIRING CONNECTORS

A. Split Bolt Connectors:

B. Solderless Pressure Connectors:

C. Spring Wire Connectors:

D. Compression Connectors:

2.4 TERMINATIONS

A. Terminal Lugs for Wires 6 AWG and Smaller: Solderless, compression type copper.

B. Lugs for Wires 4 AWG and Larger: Color keyed, compression type copper, with insulating sealing collars.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements.

B. Verify interior of building has been protected from weather.

C. Verify mechanical work likely to damage wire and cable has been completed.

D. Verify raceway installation is complete and supported.

3.2 PREPARATION

A. Completely and thoroughly swab raceway before installing wire.

3.3 INSTALLATION

A. Route wire and cable to meet Project conditions.

B. Neatly train and lace wiring inside boxes, equipment, and panelboards.

C. Identify and color code wire and cable. Identify each conductor with its circuit number or other designation indicated.

D. Special Techniques--Building Wire in Raceway:
1. Pull conductors into raceway at same time.
2. Install building wire 4 AWG and larger with pulling equipment.

E. Special Techniques - Cable:
1. Protect exposed cable from damage.
2. Support cables above accessible ceiling, using spring metal clips or metal cable ties to support cables from structure or ceiling suspension system. Do not rest cable on ceiling panels.
3. Use suitable cable fittings and connectors.

F. Special Techniques - Wiring Connections:
1. Clean conductor surfaces before installing lugs and connectors.
2. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
3. Tape uninsulated conductors and connectors with electrical tape to 150 percent of insulation rating of conductor.
4. Install split bolt connectors for copper conductor splices and taps, 6 AWG and larger.
5. Install solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
6. Install insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

G. Install stranded conductors for branch circuits 10 AWG and smaller. Install crimp on fork terminals for device terminations. Do not place bare stranded conductors directly under screws.

H. Install terminal lugs on ends of 600 volt wires unless lugs are furnished on connected device, such as circuit breakers.

I. Size lugs in accordance with manufacturer's recommendations terminating wire sizes. Install 2-hole type lugs to connect wires 4 AWG and larger to copper bus bars.

J. For terminal lugs fastened together such as on motors, transformers, and other apparatus, or when space between studs is small enough that lugs can turn and touch each other, insulate for dielectric strength of 2-1/2 times normal potential of circuit.

3.4 WIRE COLOR

A. General:
   1. For wire sizes 10 AWG and smaller, install wire colors in accordance with the following:
      a. Black and red for single phase circuits at 120/240 volts.
      b. Black, red, and blue for circuits at 120/208 volts single or three phase.

   2. For wire sizes 8 AWG and larger, identify wire with colored tape at terminals, splices and boxes. Colors are as follows:
      a. Black and red for single phase circuits at 120/240 volts.
      b. Black, red, and blue for circuits at 120/208 volts single or three phase.

B. Neutral Conductors: White. When two or more neutrals are located in one conduit, individually identify each with proper circuit number.

C. Branch Circuit Conductors: Install three or four wire home runs with each phase uniquely color coded.

D. Feeder Circuit Conductors: Uniquely color code each phase.

E. Ground Conductors:
   1. For 6 AWG and smaller: Green.
   2. For 4 AWG and larger: Identify with green tape at both ends and visible points including junction boxes.

3.5 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.3.1.

END OF SECTION

SECTION 28 05 13

FIRE ALARM CABLE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes fire alarm systems cables and accessories.

1.2 REFERENCES

A. National Fire Protection Association:

1. NFPA 262 - Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.

2. NFPA 72 – National Fire Alarm Code.

3. NFPA 70 – National Electrical Code.

B. Underwriters Laboratories, Inc.:

1. UL 2043 - Fire Test for Heat and Visible Smoke Release for Discrete Products and their Accessories Installed in Air-Handling Spaces.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit catalog data for each type of cable.

1.4 QUALITY ASSURANCE

A. Provide wiring materials located in plenums with peak optical density not greater than 0.5, average optical density not greater than 0.15, and flame spread not greater than 5 feet (1.5 m) when tested in accordance with NFPA 262.

B. Provide combustible electrical equipment exposed within plenums with peak rate of heat release not greater than 100 kW, peak optical density not greater than 0.5, and average optical density not greater than 0.15 when tested in accordance with UL 2043.

C. Perform Work in accordance with State of Michigan requirements.
1. All fire alarm cable shall be installed per and comply with the NEC (NFPA 70), Article 760 and other sections as applicable.

D. All wire and cable associated with the fire alarm system shall be as required by the equipment manufacturer. The following information is intended for estimating purposes only. However, the minimum wire gauges and colors specified shall be strictly adhered to.

PART 2 - PRODUCTS

2.1 FIRE ALARM SYSTEM WIRE AND CABLE – GENERAL REQUIREMENTS:

A. All cables and wires #14 AWG and larger shall be stranded conductors.

B. All initiation and notification circuit cabling shall be listed Type FPLP or FPLR (300V) in accordance with NEC article 760.

C. All conductors shall be color-coded. Coding shall be consistent throughout the facility. Green wire shall be used only for equipment ground. The outer jacket of cable for speaker circuits shall be different from the strobe circuit cables.

D. Each Fire Alarm Control Panel, Annunciator Panel, Booster Panel, and Audio Amplifier Panel shall be connected to dedicated branch circuits from the building electrical panels. Circuits shall be labeled “Fire Alarm - _(unique panel designation)_” and circuit breaker shall be provided with a cap lock.

E. Power wiring for Fire Alarm Control Panel, Booster Panels, Amplifier Panels, etc. shall be #12 AWG minimum.

F. Each Fire Alarm Panel, etc. shall have a #6 AWG green equipment ground wire.

G. Cable for Intelligent detector loops shall be 18 to 12 AWG twisted pair with a shield jacket or per manufacturer’s recommendations installed in ¾” EMT conduit. Shield continuity must be maintained and connected to earth ground only at the control panel.

H. Speaker wiring shall be #18 AWG twisted-shielded cable with outer jacket or per manufactures recommendations.

I. Strobe wiring shall be #14 AWG minimum cable with outer jacket.

J. Product Description: stranded copper conductor, 300 volt insulation, rated 60 degree C, two conductor shielded cable with outer jacket.

PART 3 - EXECUTION

3.1 EXISTING WORK

A. Remove exposed abandoned fire alarm wiring and cable, including abandoned cable above accessible ceilings.

B. Maintain access to existing cable connections and other installations remaining active and requiring access. Modify installation or provide access panel.

C. Extend existing circuits using materials and methods compatible with existing installations, or as specified.

3.2 INSTALLATION

A. All wiring shall be run “free-air”, in conduit, or in surface raceway. “Free-air” wiring for horizontal cable runs of Power Limited Fire Alarm (PLFA) DC circuits as approved by the Engineer shall be the method of installation only in the following areas:
   1. Above accessible ceilings.
   2. In other areas where wiring is not susceptible to damage.

B. All other fire alarm wiring shall be installed in conduit (concealed in walls or above ceilings), or in surface metallic “wiremold” for locations not possible to “fish”.

C. Where wiring is installed “free-air”, installation shall be per the following:
   1. Cable shall be run at right angles.
   2. Cables shall not be attached to or supported by existing cabling, plumbing, or steam piping, ductwork, ceiling supports or electrical or communications conduit.
   3. Cables shall not be laid directly on the ceiling grid or ceiling tiles.
   4. Do not exceed manufacturer’s recommended bending radius for cables.
   5. Support intervals shall be per NEC and manufacturer’s requirements.
   6. Cables shall be free of tension at both ends.

D. Splice cable only in accessible junction boxes or at terminal block units.

E. Junction box covers shall be red in color with the letters “FA” at least 1” tall.

F. Make cable shields continuous at splices and connect circuit shield to equipment ground only at source end.

G. Install input circuits in separate cables and raceways from output circuits.

H. For devices wired with conduit, leave 8 inches excess cable at each termination at device and other system outlet, and 36-inch tails at the Fire Alarm Control Panels, Booster Panels, etc.

I. Provide protection for exposed cables where subject to damage.

J. Install wiring for outside circuits in acceptable conduit for application.

K. Support cables above accessible ceilings to keep from resting on ceiling tiles. Install spring metal clips or plastic cable ties to support cables from structure. Install with J-hooks, bridle rings, or drive rings.

L. Use suitable cable fittings and connectors.

M. Ground and bond circuits in accordance with Section 28 05 26.

END OF SECTION

SECTION 28 05 26

GROUNDING AND BONDING FOR ELECTRONIC SAFETY & SECURITY

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Wire.
   2. Mechanical connectors.
   3. Equipment grounding.

1.2 REFERENCES

A. Institute of Electrical and Electronics Engineers:
   1. IEEE 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems.
   2. IEEE 1100 - Recommended Practice for Powering and Grounding Electronic Equipment.

B. International Electrical Testing Association:
   1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

C. National Fire Protection Association:
   1. NFPA 70 - National Electrical Code.

1.3 SYSTEM DESCRIPTION

A. Equipment Ground.
   1. Provide separate insulated equipment grounding conductor in each conduit and raceway. DO NOT rely on conduit as the sole means of equipment grounding.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures.

B. Product Data: Submit data on grounding electrodes and connections.

C. Test Reports: Indicate overall resistance to ground and resistance of each electrode.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout.

B. Project Record Documents: Record actual locations of components and grounding electrodes.

1.6 QUALITY ASSURANCE

A. Provide grounding materials conforming to requirements of NEC, IEEE 142, and UL labeled.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements.

B. Accept materials on site in original factory packaging, labeled with manufacturer's identification.

C. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.

D. Do not deliver items to project before time of installation. Limit shipment of bulk and multiple-use materials to quantities needed for immediate installation.

1.9 COORDINATION

A. Section 01 30 00 - Administrative Requirements.

B. Complete grounding and bonding of building reinforcing steel prior concrete placement.

PART 2 PRODUCTS

2.1 WIRE

A. Material: Stranded copper.

B. Foundation Electrodes: match size of service grounding conductor.

C. Grounding Electrode Conductor: Copper conductor bare.

D. Bonding Conductor: Copper conductor bare or insulated.

2.2 MECHANICAL CONNECTORS

A. Description: Bronze connectors, suitable for grounding and bonding applications, in configurations required for particular installation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify final backfill and compaction has been completed before driving rod electrodes.

3.2 PREPARATION

A. Remove paint, rust, mill oils and surface contaminants at connection points.

3.3 INSTALLATION

A. Install in accordance with IEEE 142.

B. Install grounding and bonding conductors concealed from view.

C. Bond together each metallic raceway, pipe, duct and other metal objects.

D. Provide separate insulated equipment grounding conductor in each conduit and raceway. Conductor shall be sized per National Electrical Code requirements.

3.4 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Grounding and Bonding: Perform inspections and tests listed in NETA ATS, Section 7.13.

C. Perform ground resistance testing in accordance with IEEE 142.

D. Perform leakage current tests in accordance with NFPA 99.

E. Perform continuity testing in accordance with IEEE 142.

END OF SECTION

SECTION 28 05 29

HANGERS AND SUPPORTS FOR ELECTRONIC SAFETY AND SECURITY SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Conduit supports.
2. Formed steel channel.
3. Spring steel clips.
4. Sleeves.
5. Mechanical sleeve seals.
6. Firestopping relating to electrical work.
7. Firestopping accessories.
8. Equipment bases and supports.

1.2 REFERENCES

A. ASTM International:
1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
2. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
3. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
4. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems.

B. FM Global:
1. FM - Approval Guide, A Guide to Equipment, Materials & Services Approved By Factory Mutual Research For Property Conservation.

C. National Fire Protection Association:
1. NFPA 70 - National Electrical Code.

D. Underwriters Laboratories Inc.:
1. UL 263 - Fire Tests of Building Construction and Materials.
2. UL 723 - Tests for Surface Burning Characteristics of Building Materials.
3. UL 1479 - Fire Tests of Through-Penetration Firestops.
4. UL 2079 - Tests for Fire Resistance of Building Joint Systems.
5. UL - Fire Resistance Directory.

E. Intertek Testing Services (Warnock Hersey Listed):
1. WH - Certification Listings.

1.3 DEFINITIONS

A. Firestopping (Through-Penetration Protection System): Sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire rated construction.

1.4 SYSTEM DESCRIPTION

A. Firestopping Materials: ASTM E119, ASTM E814, UL 263, UL 1479] to achieve fire ratings as noted on Drawings for adjacent construction, but not less than 1 hour fire rating.
   1. Ratings may be 3-hours for firestopping in through-penetrations of 4-hour fire rated assemblies unless otherwise required by applicable codes.

B. Firestop interruptions to fire rated assemblies, materials, and components.

1.5 PERFORMANCE REQUIREMENTS

A. Firestopping: Conform to applicable code for fire resistance ratings and surface burning characteristics.

B. Firestopping: Provide certificate of compliance from authority having jurisdiction indicating approval of materials used.

1.6 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures.

B. Shop Drawings: Indicate system layout with location and detail of trapeze hangers.

C. Product Data:
   1. Hangers and Supports: Submit manufacturers catalog data including load capacity.
   2. Firestopping: Submit data on product characteristics, performance and limitation criteria.

D. Firestopping Schedule: Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance rating of adjacent assembly.

E. Design Data: Indicate load carrying capacity of trapeze hangers and hangers and supports.

F. Manufacturer's Installation Instructions:
   1. Hangers and Supports: Submit special procedures and assembly of components.
   2. Firestopping: Submit preparation and installation instructions.

G. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

H. Engineering Judgements: For conditions not covered by UL or WH listed designs, submit judgements by licensed professional engineer suitable for presentation to authority having jurisdiction for acceptance as meeting code fire protection requirements.

1.7 QUALITY ASSURANCE

A. Through Penetration Firestopping of Fire Rated Assemblies: UL 1479 or ASTM E814 with 0.10 inch water gage minimum positive pressure differential to achieve fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.
   1. Wall Penetrations: Fire F-Ratings as indicated on Drawings, but not less than 1-hour.
   2. Floor and Roof Penetrations: Fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.
      a. Floor Penetrations Within Wall Cavities: T-Rating is not required.

B. Through Penetration Firestopping of Non-Fire Rated Floor [and Roof] Assemblies: Materials to resist free passage of flame and products of combustion.
   1. Noncombustible Penetrating Items: Noncombustible materials for penetrating items connecting maximum of three stories.
   2. Penetrating Items: Materials approved by authorities having jurisdiction for penetrating items connecting maximum of two stories.

C. Fire Resistant Joints in Fire Rated Floor, Roof, and Wall Assemblies: ASTM E1966 or UL 2079 to achieve fire resistant rating as indicated on Drawings for assembly in which joint is installed.

D. Fire Resistant Joints Between Floor Slabs and Exterior Walls: ASTM E119 with 0.10 inch water gage minimum positive pressure differential to achieve fire resistant rating as indicated on Drawings for floor assembly.

E. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements.

B. Accept materials on site in original factory packaging, labeled with manufacturer's identification.

C. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements.

B. Do not apply firestopping materials when temperature of substrate material and ambient air is below 60 degrees F.

C. Maintain this minimum temperature before, during, and for minimum 3 days after installation of firestopping materials.

D. Provide ventilation in areas to receive solvent cured materials.

PART 2 PRODUCTS

2.1 CONDUIT SUPPORTS

A. Manufacturers:
1. Allied Tube & Conduit Corp.
2. Electroline Manufacturing Company.
3. O-Z Gedney Co.

B. Hanger Rods: Threaded high tensile strength galvanized carbon steel with free running threads.

C. Beam Clamps: Malleable Iron, with tapered hole in base and back to accept either bolt or hanger rod. Set screw: hardened steel.

D. Conduit clamps for trapeze hangers: Galvanized steel, notched to fit trapeze with single bolt to tighten.

E. Conduit clamps - general purpose: Two hole heavy duty type malleable iron for surface mounted conduits. All fasteners shall be tamper resistant type. Provide 5 extra bits for each size, type, and style of tamper resistant fastener used.

F. Cable Ties: High strength nylon temperature rated to 185 degrees F. Self locking.

2.2 FORMED STEEL CHANNEL

A. Product Description: Galvanized 12 gage thick steel. With holes 1-1/2 inches on center.

2.3 SPRING STEEL CLIPS

A. Product Description: Mounting hole and screw closure.

2.4 MECHANICAL SLEEVE SEALS

A. Product Description: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between object and sleeve, connected with bolts and pressure plates causing rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

2.5 FIRESTOPPING

A. Product Description: Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.
   1. Silicone Firestopping Elastomeric Firestopping: Single or Multiple component silicone elastomeric compound and compatible silicone sealant.
   2. Foam Firestopping Compounds: Single or Multiple component foam compound.
   3. Formulated Firestopping Compound of Incombustible Fibers: Formulated compound mixed with incombustible non-asbestos fibers.
   4. Fiber Stuffing and Sealant Firestopping: Composite of mineral or ceramic fiber stuffing insulation with silicone elastomer for smoke stopping.
   5. Mechanical Firestopping Device with Fillers: Mechanical device with incombustible fillers and silicone elastomer, covered with sheet stainless steel jacket, joined with collars, penetration sealed with flanged stops.
   6. Intumescent Firestopping: Intumescent putty compound which expands on exposure to surface heat gain.
   7. Firestop Pillows: Formed mineral fiber pillows.

2.6 FIRESTOPPING ACCESSORIES

A. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces and suitable for required fire ratings.

B. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

C. General:
   1. Furnish UL listed products or products tested by independent testing laboratory.
   2. Select products with rating not less than rating of wall or floor being penetrated.

D. Non-Rated Surfaces:
   1. Stamped steel, chrome plated, hinged, split ring escutcheons or floor plates or ceiling plates for covering openings in occupied areas where conduit is exposed.
   2. For exterior wall openings below grade, furnish modular mechanical type seal consisting of interlocking synthetic rubber links shaped to continuously fill annular space between conduit and cored opening or water-stop type wall sleeve.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify openings are ready to receive sleeves.

B. Verify openings are ready to receive firestopping.

3.2 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of firestopping material.

B. Remove incompatible materials affecting bond.

C. Do not drill or cut structural members.

3.3 INSTALLATION - HANGERS AND SUPPORTS

A. Anchors and Fasteners:
   1. Concrete Structural Elements: Provide precast inserts, expansion anchors, powder actuated anchors and preset inserts.
   2. Steel Structural Elements: Provide beam clamps, spring steel clips, steel ramset fasteners, and welded fasteners.
   3. Concrete Surfaces: Provide expansion anchors.
   4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Provide toggle bolts and hollow wall fasteners.
   5. Solid Masonry Walls: Provide expansion anchors.
   6. Sheet Metal: Provide sheet metal screws.
   7. Wood Elements: Provide wood screws.

B. Inserts:
   1. Install inserts for placement in concrete forms.
   2. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
   3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
   4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

C. Install conduit and raceway support and spacing in accordance with NEC, except all exposed EMT shall have heavy-duty 2-hole conduit straps at spacing not to exceed 5’.

D. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.

E. Install multiple conduit runs on common hangers.

F. Supports:
   1. Fabricate supports from structural steel or formed steel channel. Install hexagon head bolts to present neat appearance with adequate strength and rigidity. Install spring lock washers under nuts.
   2. Install surface mounted cabinets and panelboards with minimum of four anchors.
   3. In wet and damp locations install steel channel supports to stand cabinets and panelboards 1 inch off wall.
   4. Support vertical conduit at every floor.

3.4 INSTALLATION - FIRESTOPPING

A. Install material at fire rated construction perimeters and openings containing penetrating sleeves, piping, ductwork, conduit and other items, requiring firestopping.

B. Apply primer where recommended by manufacturer for type of firestopping material and substrate involved, and as required for compliance with required fire ratings.

C. Apply firestopping material in sufficient thickness to achieve required fire and smoke rating.

3.5 INSTALLATION - EQUIPMENT BASES AND SUPPORTS

A. Provide housekeeping pads of concrete, minimum 3-1/2 inches thick and extending 6 inches beyond supported equipment.

B. Using templates furnished with equipment, install anchor bolts, and accessories for mounting and anchoring equipment.

3.6 INSTALLATION - SLEEVES

A. Exterior watertight entries: Seal with adjustable interlocking rubber links.

B. Conduit penetrations not required to be watertight: Sleeve and fill with silicon foam.

C. Set sleeves in position in forms. Provide reinforcing around sleeves.

D. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.

E. Where conduit or raceway penetrates floor, ceiling, or wall, close off space between conduit or raceway and adjacent work with fire stopping insulation and caulk airtight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.

3.7 FIELD QUALITY CONTROL

A. Inspect installed firestopping for compliance with specifications.

3.8 CLEANING

A. Clean adjacent surfaces of firestopping materials.

3.9 PROTECTION OF FINISHED WORK

A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 28 05 33

RACEWAY AND BOXES FOR ELECTRONIC SAFETY & SECURITY

PART 1 GENERAL

1.1 SUMMARY

A. Section includes conduit and tubing, surface raceways, outlet boxes, pull and junction boxes.

1.2 REFERENCES

A. American National Standards Institute:
   1. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
   2. ANSI C80.3 - Specification for Electrical Metallic Tubing, Zinc Coated.
   3. ANSI C80.5 - Aluminum Rigid Conduit - (ARC).

B. National Electrical Manufacturers Association:
   1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
   2. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
   3. NEMA OS 1 - Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
   4. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.

1.3 SYSTEM DESCRIPTION

A. Raceway and boxes located as indicated on Drawings, and at other locations required for splices, taps, wire pulling, equipment connections, and compliance with regulatory requirements. Raceway and boxes are shown in approximate locations unless dimensioned. Provide raceway to complete wiring system.

1.4 DESIGN REQUIREMENTS

A. Minimum Raceway Size: 3/4 inch unless otherwise specified.

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures.

B. Product Data: Submit for the following:
   1. Flexible metal conduit.
   2. Liquidtight flexible metal conduit.
   3. Raceway fittings.
   4. Conduit bodies.
   5. Surface raceway.
   6. Pull and junction boxes.

C. Manufacturer's Installation Instructions: Submit application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.6 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements.

B. Project Record Documents:
1. Record actual routing of conduits larger than 2 inch .
2. Record actual locations and mounting heights of outlet, pull, and junction boxes.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements.

B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

C. Protect PVC conduit from sunlight.

1.8 COORDINATION

A. Section 01 30 00 - Administrative Requirements.

B. Coordinate installation of outlet boxes for equipment.

C. Coordinate mounting heights, orientation and locations of outlets mounted above counters, benches, and backsplashes.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Carlon Electrical Products.

B. Allied Tube.

C. Wheatland.

2.2 METAL CONDUIT

A. Rigid Steel Conduit: ANSI C80.1.

B. Rigid Aluminum Conduit: ANSI C80.5.

C. Intermediate Metal Conduit (IMC): Rigid steel.

2.3 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

A. Product Description: Interlocked aluminum construction with PVC jacket.

B. Fittings: NEMA FB 1.

2.4 ELECTRICAL METALLIC TUBING (EMT)

A. Product Description: ANSI C80.3; galvanized tubing.

B. Fittings and Conduit Bodies: NEMA FB 1; steel or malleable iron, compression type.

2.5 SURFACE METAL RACEWAY

A. Product Description: Sheet metal channel with fitted cover, suitable for use as surface metal raceway.

B. Acceptable Manufacturers:
1. Thomas & Betts
2. Wiremold

C. Size: as required for circuits, conductors, and cables to be installed. DO NOT exceed fill capacity as determined by the National Electrical Code and manufacturer’s requirements.

D. Finish: manufacturer’s standard primer, suitable for field painting.

E. Fittings, Boxes, and Extension Rings: Furnish manufacturer's standard accessories; match finish on raceway.

2.6 OUTLET BOXES

A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel. NOTE: in all areas accessible to prisoners; surface mounted boxes shall have NO pre-punched knock-outs.
1. Device/Equipment Supporting Boxes: Rated for weight of equipment supported; furnish 1/2 inch male fixture studs where required.
2. Concrete Ceiling Boxes: Concrete type.

B. Cast Boxes: NEMA FB 1, Type FD, cast feralloy. Furnish gasketed cover by box manufacturer. Furnish threaded hubs.

C. Wall Plates for Finished Areas: As specified in Section 26 27 26.

D. Wall Plates for Unfinished Areas: Furnish gasketed cover.

2.7 PULL AND JUNCTION BOXES

A. Sheet Metal Boxes: NEMA OS 1, galvanized steel. NOTE: : in all areas accessible to prisoners; surface mounted boxes shall have NO pre-punched knock-outs.

B. Hinged Enclosures.

C. Surface Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface mounted junction box:
   1. Material: Galvanized cast iron.
   2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify outlet locations and routing and termination locations of raceway prior to rough-in.

3.2 EXISTING WORK

A. Remove exposed abandoned raceway, including abandoned raceway above accessible ceiling finishes. Cut raceway flush with walls and floors, and patch surfaces.

B. Remove concealed abandoned raceway to its source.

C. Disconnect abandoned outlets and remove devices. Remove abandoned outlets when raceway is abandoned and removed. Install blank cover for abandoned outlets not removed.

D. Maintain access to existing boxes and other installations remaining active and requiring access. Modify installation or provide access panel.

E. Extend existing raceway and box installations using materials and methods [compatible with existing electrical installations, or] as specified.

F. Clean and repair existing raceway and boxes to remain or to be reinstalled.

3.3 INSTALLATION

A. Ground and bond raceway and boxes.

B. Fasten raceway and box supports to structure and finishes.

C. Identify raceway and boxes.

D. Arrange raceway and boxes to maintain headroom and present neat appearance.

3.4 INSTALLATION - RACEWAY

A. Raceway routing is shown in approximate locations unless dimensioned. Route to complete wiring system.

B. Use surface raceway (wiremold) only on existing brick walls where it is not possible to “fish” in the existing wall cavity. Surface EMT conduit may be used in locations where

approval is granted by the State of Michigan (areas where existing surface EMT exists). All other walls shall utilize conduit concealed within the wall.

C. Arrange raceway supports to prevent misalignment during wiring installation.

D. Support raceway using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers. Surface raceways shall be supported by heavy-duty two-hole straps utilizing tamper resistant fasteners. All tamper resistant fasteners shall be of a type to match existing located on the site – contractor is responsible to verify on site & with State of Michigan prior to ordering. Provide 5 extra bits & turn over to the facility at completion of project.

E. Group related raceway; support using conduit rack. Construct rack using steel channel. Provide space on each for 25 percent additional raceways.

F. Do not support raceway with wire or perforated pipe straps. Remove wire used for temporary supports

G. Do not attach raceway to ceiling support wires or other piping systems.

H. Construct wireway supports from steel channel.

I. Route exposed raceway parallel and perpendicular to walls.

J. Route raceway installed above accessible ceilings parallel and perpendicular to walls.

K. Route conduit in and under slab from point-to-point.

L. Minimum Size Conduit under Slab: 1 inch.

M. Maintain clearance between raceway and piping for maintenance purposes.

N. Maintain 12 inch clearance between raceway and surfaces with temperatures exceeding 104 degrees F.

O. Cut conduit square using saw or pipe cutter; de-burr cut ends.

P. Bring conduit to shoulder of fittings; fasten securely.

Q. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for minimum 20 minutes.

R. Install conduit hubs to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

S. Avoid moisture traps; install junction box with drain fitting at low points in conduit system.

T. Install suitable pull string or cord in each empty raceway except sleeves and nipples.

U. Install suitable caps to protect installed conduit against entrance of dirt and moisture.

V. Surface Raceway: Install flat-head screws, clips, and straps to fasten raceway channel to surfaces; mount plumb and level. Install insulating bushings and inserts at connections to outlets and corner fittings.

W. Close ends and unused openings in wireway.

3.5 INSTALLATION - BOXES

A. Adjust box location up to 10 feet prior to rough-in to accommodate intended purpose.

B. Orient boxes to accommodate wiring devices.

C. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

D. In Accessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.

E. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.

F. Do not install flush mounting box back-to-back in walls; install with minimum 6 inches separation. Install with minimum 24 inches separation in acoustic rated walls.

G. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.

H. Install stamped steel bridges to fasten flush mounting outlet box between studs.

I. Install flush mounting box without damaging wall insulation or reducing its effectiveness.

J. Install adjustable steel channel fasteners for hung ceiling outlet box.

K. Do not fasten boxes to ceiling support wires or other piping systems.

L. Support boxes independently of conduit.

M. Install gang box where more than one device is mounted together. Do not use sectional box.

N. Install gang box with plaster ring for single device outlets.

3.6 INTERFACE WITH OTHER PRODUCTS

A. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation.

B. Locate outlet boxes to allow luminaires positioned as indicated.

C. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

3.7 ADJUSTING

A. Adjust flush-mounting outlets to make front flush with finished wall material.

B. Install knockout closures in unused openings in boxes.

3.8 CLEANING

A. Clean interior of boxes to remove dust, debris, and other material.

B. Clean exposed surfaces and restore finish.

END OF SECTION

SECTION 28 05 53

IDENTIFICATION FOR ELECTRONIC SAFETY AND SECURITY

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Nameplates.
   2. Labels.
   3. Wire markers.
   4. Conduit markers.

B. Related Sections:
   1. Section 28 31 11 – Digital Addressable Fire Alarm System.

1.2 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data:
   1. Submit manufacturer’s catalog literature for each product required.
   2. Submit electrical identification schedule including list of wording, symbols, letter size, color coding, tag number, location, and function.

C. Manufacturer's Installation Instructions: Indicate installation instructions, special procedures, and installation.

1.3 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations of tagged devices; include tag numbers.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with State of Michigan requirements

1.5 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Accept identification products on site in original containers. Inspect for damage.

C. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

D. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

B. Install labels and nameplates only when ambient temperature and humidity conditions for adhesive are within range recommended by manufacturer.

PART 2 PRODUCTS

2.1 NAMEPLATES

A. Product Description: Laminated three-layer plastic with engraved black letters on white contrasting background color.

B. Letter Size:
1. 1/8 inch high letters for identifying individual equipment and loads.
2. 1/4 inch high letters for identifying grouped equipment and loads.

C. Minimum nameplate thickness: 1/8 inch.

2.2 LABELS

A. Labels: Embossed adhesive tape, with 3/16 inch white letters on black background.

2.3 WIRE MARKERS

A. Description: Cloth tape, split sleeve, or tubing type wire markers.

B. Legend:
1. Power and Lighting Circuits: Branch circuit or feeder number as indicated on Drawings.
2. Control Circuits: Control wire number as indicated on shop drawings.

C. CONDUIT AND RACEWAY MARKERS

D. Description: Labels fastened with adhesive or Stencils.

E. Color:
1. Fire Alarm System: Red lettering on white background.
2. Camera System: Black lettering on white background.
3. Intrusion Detection System: White Lettering on black background.

F. Legend:
1. Fire Alarm System: FIRE ALARM.
2. Video Surveillance: CCTV
3. Intrusion Detection: SECURITY.

2.4 STENCILS

A. Stencils: With clean cut symbols and letters of following size:
   1. Up to 2 inches Outside Diameter of Raceway: 1/2 inch high letters.
   2. 2-1/2 to 6 inches Outside Diameter of Raceway: 1 inch high letters.

B. Stencil Paint: As specified in Section 09 90 00, semi-gloss enamel, colors conforming to one of the following:
   1. Black lettering on white background.
   2. White lettering on gray background.
   3. Red lettering on white background.

PART 3 EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 EXISTING WORK

A. Install identification on existing equipment to remain in accordance with this section.

B. Install identification on unmarked existing equipment.

C. Replace lost labels.

3.3 INSTALLATION

A. Install identifying devices after completion of painting.

B. Nameplate Installation:
   1. Install nameplate parallel to equipment lines.
   2. Install nameplate for each electrical distribution and control equipment enclosure with corrosive-resistant mechanical fasteners, or adhesive.
   3. Install nameplates for each control panel and major control components located outside panel with corrosive-resistant mechanical fasteners, or adhesive.
   4. Secure nameplate to equipment front using screws, rivets, or adhesive.
   5. Secure nameplate to inside surface of door on recessed panels in finished locations.

C. Label Installation:
   1. Install label parallel to equipment lines.
   2. Install label for identification of individual control device stations.
   3. Install labels for permanent adhesion and seal with clear lacquer.

D. Wire Marker Installation:
   1. Install wire marker for each conductor at panelboard gutters, pull boxes, outlet and junction boxes, and each load connection.

2. Mark data cabling at each end. Install additional marking at accessible locations along the cable run.
3. Install labels at data outlets identifying patch panel and port designation as indicated on Drawings.

E. Conduit Raceway Marker Installation:
   1. Install conduit raceway marker for each conduit raceway longer than 6 feet.
   2. Conduit Raceway Marker Spacing: 20 feet on center.
   3. Raceway Painting: Identify conduit using field painting.
      a. Paint colored band on each conduit longer than 6 feet.
      b. Paint bands 20 feet on center.
      c. Color:
         1) Fire Alarm System: Red.
         2) Intrusion Detection: Yellow
         3) Video Surveillance: Green

F. Install Work in accordance with State of Michigan requirements.

END OF SECTION

SECTION 28 31 11

FIRE DETECTION and ALARM SYSTEM

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. A project addendum may be supplied with this document which details any project-specific additions or deletions to this general specification document.

1.2 SYSTEM DESCRIPTION

A. Project consists of removal of existing and installation of all-new fire alarm system for MCISD Central Elementary school building.

B. All new fire alarm systems shall be installed, tested, inspected, and fully operational prior to disconnection and removal of existing systems.

C. New digital and addressable fire alarm control panels with Intelligent Addressable initiating devices will be installed for the entire building as shown on the plans.
   1. Entire Building shall have voice evacuation Fire Alarm System in accordance with the Michigan Building Code.

D. Contractor shall provide dedicated telephone line connection to each remote dialer, or provide cellular dialer, associated with the Fire Alarm system. Contractor shall provide all set-up and programming for remote monitoring of the new Fire Alarm by an approved 3rd Party remote monitoring agency that is UL certified.

E. Addressable Control Panels shall be non-coded, analog-addressable systems with manual and automatic alarm initiation, shall provide sensitivity control of certain smoke detectors, and shall have multiplexed signal transmission dedicated to fire alarm initiated system inputs and outputs.

1.3 BUILDING CODES and STANDARDS

A. National Fire Protection Association (NFPA):
   1. NFPA-70 National Electrical Code (NEC)
   2. NFPA-72 National Fire Alarm Code
   3. NFPA 101 Life Safety Code
   4. IBC International Building Code
   5. IFC International Fire Code
   6. IMC International Mechanical Code
   7. State of Michigan Building Codes and Amendments
   8. State of MI; Bureau of Fire Services; K-12 School Fire Safety Rules

B. National Electrical Manufacture’s Association (NEMA)

C. Underwriters Laboratories, Inc. (UL)
1. UL-864 Control Units for Fire Protective Signaling Systems (9th Edition)
2. UL-268 Smoke Detector for Fire Protective Signaling Systems
3. UL-217 Smoke Detectors for Single and Multiple Station
4. UL-521 Heat Detectors for Fire Protective Signaling Systems
5. UL-464 Audible Signaling Appliances
6. UL-1971 Visual Signaling Appliances
7. UL-38 Manually Actuated Signaling Boxes
8. UL-1481 Power Supplies for Fire Protective Signaling Systems

1.4 SUBMITTALS

A. The Contractor shall purchase no equipment for the system specified herein until the Engineer & Owner has approved the project submittals in their entirety and has returned them to the contractor. It is the responsibility of the contractor to meet the entire intent and functional performance detailed in these specifications. Approved submittals shall only allow the contractor to proceed with the installation and shall not be construed to mean that the contractor has satisfied the requirements of these specifications.

B. Each submittal shall include a cover letter providing a list of each variation that the submittal may have from the requirements of the Contract Documents or clearly state that there are none. In addition, the Contractor shall provide specific notation on each Shop Drawing, sample, catalog cut, data sheet, installation manual, etc. submitted for review and approval, of each such variation.
1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to the Architect. Contractor is responsible for submitting complete shop drawings for review to the State of Michigan Bureau of Fire Services.
2. Shop Drawings shall be prepared by persons with the following qualifications:
   a. Trained and certified by manufacturer in fire-alarm system design.
   b. NICET-certified fire-alarm technician, Level II minimum or Michigan registered Professional Engineer.
   c. Fire Alarm installer (company/firm) shall be Certified by the Bureau of Fire Services in accordance with Act 144
   d. Provide documentation of all certifications/registrations with submittals.

C. Product Data: Product Data sheets with the printed logo or trademark of the manufacturer of all equipment. Indicated in the documentation shall be the type, size, rating, style, and catalog number for all items proposed to meet the system performance detailed in this specification. The proposed equipment shall be subject to the approval of the Owner.

D. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Comply with recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA72.
2. Include voltage drop calculations for notification appliance circuits.
3. Include battery-calculations.

4. Include performance parameters and installation details for each detector, verifying that each detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
5. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale and coordinating installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.
6. Include wiring diagrams indicating all HVAC equipment wiring with interconnections to duct smoke detectors; including automatic shutdown of air handlers and H&V units based on duct smoke detection.
7. Include wiring diagrams for combination smoke/fire damper connections.
8. Include fire alarm panel layout, grounding schematic, and single-line connection diagram.
9. Include floor plans at 1/8” = 1’-0” scale to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits.
10. Include all other items in submittal as required by section 907.1.2 of the Michigan Building Code and by the Michigan Bureau of Fire Services.

E. Operation and Maintenance Data: For fire-alarm systems and components to be included in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Operation and Maintenance Data, include the following:
1. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA72.
2. Provide "Record of Completion Documents" according to NFPA72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.
3. Record copy of site-specific software database file, hardcopy print-out and CD, with password for delivery to the owner. Proprietary system/service companies will not be acceptable.
4. Provide complete “as-built” plan for each building, in paper and AutoCad format with device addresses on plan for all devices.
5. Provide "Maintenance, Inspection and Testing Records" according to NFPA72 article of the same name and include the following:
    a. Frequency of testing of installed components.
    b. Frequency of inspection of installed components.
    c. Requirements and recommendations related to results of maintenance.
    d. Manufacturer's user training manuals (hardcopy) and electronic on CD.
6. Manufacturer's required maintenance related to system warranty requirements.
7. Abbreviated operating instructions for mounting at fire-alarm control unit.
8. Copy of NFPA72.

F. Software and Firmware Operational Documentation:
1. CD of site-specific software database file with password, all product data sheets and AutoCAD files. Provide hard copy print-out of the software program. Proprietary system/service companies will not be acceptable.
2. Provide a list of global system settings
3. Provide a list of the contents of each system cabinet and their settings
4. Provide a list of all addressable devices with their addresses and settings

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Firm and Personnel shall be trained and certified by manufacturer for installation of units required for this Project. Firm and/or personnel shall also be certified by the Bureau of Fire Services in accordance with Act 144. Provide documentation of certification/compliance.

B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level IV technician. Provide documentation of certification/compliance.

C. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA70, by a qualified testing agency, and marked for intended location and application.

E. NFPA Certification: Obtain certification according to NFPA72 in the form of a placard by an approved alarm company.

1.6 WARRANTY and SOFTWARE SERVICE AGREEMENT

A. The contractor shall warranty all materials, installation and workmanship for five (5) years from date of acceptance, unless otherwise specified. A copy of the manufacturers' warranty shall be provided with closeout documentation and included with the operation and installation manuals.

B. The System Supplier shall maintain a service organization with adequate spare parts stocked within 350 miles of the installation. Any defects that render the system inoperative shall be repaired within 24 hours of the Owner notifying the contractor.

C. Technical Support: Beginning with Substantial Completion, provide software support for five (5) years, shall be included in this project.

D. Detector Sensitivity Testing: During the warranty period, each year the contractor is to perform detector sensitivity testing and provide report to the Owner unless the system is UL Listed to perform automatic sensitivity testing without any manual intervention and should detector fall outside of sensitivity window, the system will automatically indicate a device’s trouble. A copy of UL letter is to be provided as proof of system operation.

E. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within five (5) years from date of Substantial Completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software at no added cost.
   1. Provide 30 days notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

1.7 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Provide quantity equal to 2% percent of amount of each type installed, but no fewer than 2 unit of each type.
   a. Smoke Detectors, heat detectors, manual pull stations, duct smoke detector, monitor modules and control modules:
   b. Notification appliances; speakers, speaker-strobes and strobes.
2. Keys: Ten extra sets for access to locked and tamper-proof components.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protected premises protective signaling fire alarm system. The authorized representative of the manufacturer of the major equipment, such as control panels, shall be responsible for the satisfactory installation of the complete system.

B. The Contractor shall provide, from the acceptable manufacturer's current product lines, equipment and components, which comply with the requirements of these Specifications. Equipment or components, which do not provide the performance and features, required by these specifications are not acceptable, regardless of manufacturer.

C. Strict conformance to this specification is required to ensure that the installed and programmed system will function as designed, and will accommodate the future requirements and operations of the building Owner. All specified operational features must be met without exception.

D. All control panel assemblies and connected (new) field appliances shall be provided by the same System Supplier**,** and shall be designed and tested to ensure that the system operates as specified. All equipment and components shall be installed in strict compliance with the manufacturer's recommendations.

E. That equipment proposed to be supplied will be considered only if it meets all sections of the performance specification. Any deviations of system performance outlined in this specification will only be considered when the following requirements have been met:
   1. A complete description of proposed alternate system performance methods with three (3) copies of working drawings thereof for approval by the Owner, not less than ten (10) calendar days prior to the scheduled date for submission of bids.
   2. The supplier of alternate equipment shall furnish evidence that the proposed alternate system performance is equal to or superior than the system operation stated in the specification. Such evidence shall be submitted to the Owner, not less than ten (10) calendar days prior to the scheduled date for submission of bids.
   3. The supplier shall submit a point-by-point statement of compliance for all sections in this specification. The statement of compliance shall consist of a list of all paragraphs within these sections. Where the proposed system complies fully with the paragraph as written, placing the word "comply" opposite the paragraph number shall indicate such. Where the proposed system does not comply with the paragraph, as written, and the supplier feels the proposed system will accomplish the intent of the paragraph, a full description of the function as

well as a full narrative description of how its proposal will meet its intent shall be provided. Any submission that does not include a point-by-point statement of compliance as described herein shall be disqualified. Where a full description is not provided, it shall be assumed that the proposed system does not comply.

4. The supplier of alternate equipment shall submit a list from the alternate manufacturer on the manufacturer's letterhead indicating the names and addresses of all authorized suppliers in the area. Proprietary products will not be considered.
5. The acceptability of any alternate proposed system shall be the sole decision of the Owner or authorized representative.

F. Approved Products: All panels and peripheral devices shall be of the standard product of single manufacturer and shall display the manufacturer's name of each component. The catalog numbers specified under this section are those of Edwards (formerly EST), part of UTC Climate, Controls & Security and shall constitute the type, product quality, material and desired operating features.

2.2 SYSTEMS OPERATIONAL DESCRIPTION

A. Fire-alarm signal initiation shall be by one or more of the following devices:
1. Manual stations.
2. Heat detectors.
3. Smoke detectors.
4. Duct smoke detectors.
5. Verified automatic alarm operation of smoke detectors.
6. Automatic sprinkler system water flow.
7. Kitchen hood fire suppression system(s).

B. Fire-alarm signal shall initiate the following actions:
1. Activate custom pre-recorded audible intelligible voice alarm via zoned amplifiers and speakers, with capability for live voice alarm with paging microphone interface (to be included).
2. Continuously operate the visual notification appliances.
3. Identify alarm at fire-alarm control unit and remote annunciators.
4. Transmit an alarm signal to the remote alarm receiving station.
5. Release fire and smoke doors held open by magnetic door holders.
6. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
7. Close smoke dampers in air ducts of designated air-conditioning duct systems.
8. Initiation from a duct smoke detector shall automatically shut the affected unit down and provide alarm to the fire alarm system.
9. Record events in the system memory.
10. Record events by the system printer.

C. Supervisory signal initiation shall be by one or more of the following devices and actions:
1. Valve supervisory switch.

D. System trouble signal initiation shall be by one or more of the following devices and actions:
1. Open circuits, shorts, and grounds in designated circuits.

2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
3. Loss of primary power at fire-alarm control unit.
4. Ground or a single break in fire-alarm control unit internal circuits.
5. Abnormal AC voltage at fire-alarm control unit.
6. Break in standby battery circuitry.
7. Failure of battery charging.
8. Abnormal position of any switch at fire-alarm control unit or annunciator.

E. System Trouble and Supervisory Signal Actions: Initiate notification appliance and annunciate at fire-alarm control unit and remote annunciators. Record the event on system printer.

2.3 FIRE-ALARM CONTROL UNIT

A. The main control panel or remote control panel(s) shall be a multi-processor based networked system designed specifically for detection and alarm applications. The control panel(s) shall be listed and approved for the application under the standard(s) as listed. The control panel shall be model EST3X or as approved by Engineer.

B. The control panel(s) shall include all required hardware, software and site-specific system programming to provide a complete and operational system. The control panel(s) shall be designed such that interactions between any applications can be configured, and modified using software provided by a single supplier. The control panel operational priority shall assure that life safety takes precedence among the activities coordinated by the control panel.

C. The network of control panels shall include the following features.
1. Ability to download all network applications and firmware from the configuration computer on the network or at any control panel (network node) location.
2. Each control panel (network node) shall have an LCD display with common controls. The display shall be configurable to display the status of any and all combinations of alarm, supervisory, trouble, monitor, or group event messages.
3. From each LCD display on the system shall be capable of being programmed for control functions of any node or the entire network. The LCD display shall reside on the network as a node and continue to operate with fault on the network. An LCD can be programmed to be only operation when a node is operational in stand-alone mode, with a network fault.
4. The system program shall have a minimum of 100 system definable Service Groups to facilitate the testing of installed system based on the physical layout of the system. Service groups that disable entire circuits serving multiple floors or fire zones shall not be allowed.
5. Advanced Windows based programming with Program Version Reporting to document any and all changes made during system start-up or system commissioning. Time and date stamps of all modifications made to the program must be included to allow full retention of all previous program version data. The operator display shall clearly identify unacknowledged and acknowledged alarm, supervisory, trouble, and monitor status messages. The system shall provide the ability to download data from the analog/addressable detectors to a PC while the system is on-line and operational in the protected premises. The

downloaded data may then be analyzed in a diagnostic program supplied by the system manufacturer.

6. Provide system reports that list a detailed description of the status of system parameters for corrective action or for preventive maintenance. Reports shall be displayed on the operator interface and be capable of being sent to a printer.
7. Provide an authorized operator with the ability to operate or modify system functions such as system time, date, passwords, holiday dates, restart the system and clear the control panel event history file.
8. Provide an authorized operator the ability to perform test functions within the installed system.
9. Supervision of system components, wiring, initiating devices and software shall be provided by the control panel. Failure or fault of system component or wiring shall be indicated by type and location on the LCD display. Software and processor operation shall be independently monitored for failure. The system shall provide fail-safe operation, with multiple-levels of system operation

D. Each network control panel shall be capable of:
1. Supporting up to 2500 intelligent analog/addressable points.
2. Supporting up to six (6) intelligent addressable loops, each loop supporting 125 detectors and 125 modules, total of 250 points.
3. Supporting network connections up to 63 other control panels and annunciators.
4. Supporting up to 124 (security/access control) Keypad/Displays.
5. Supporting up to ten network digital dialers with Contact ID or SIA format and TAP Pager protocol.
6. Supporting multiple RS-232 communication ports and protocol.
7. Supporting up to 1740 chronological history events.
8. Total network response shall not exceed 3 seconds.

E. Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, monitor, trouble and component status messages and control menu.
1. The common control switches and with corresponding LEDs provided as minimum will be; Reset Alarm Silence, Panel Silence, and Drill. It shall be able to add additional switches/LEDs as required.
2. The main control panel shall have display that is 24 lines by 40 character graphic LCD and backlit when active.
3. Each point shall have custom event message of up to 40 charters, for total of 80 charters. In addition to instructional text message support a maximum of 2,000 characters each.
4. Provide 8 simultaneous events to be displayed. The first seven (7) highest priority events in addition to the most recent event. The events shall be automatically placed in event types (Alarm, Supervisory, Monitor & Trouble) for easy access and shall be possible to view the specific event type separately. Having to scroll through a mixed list of event types is not acceptable.
5. Provide an internal audible signal with different programmable patterns to distinguish between alarm, supervisory, trouble and monitor conditions.
6. This display shall be an EST 3-LCDXL1.
7. Systems not capable of such a display on the main panel faceplate shall include a CRT/Monitor display meeting the above requirements and battery stand-by.

F. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions

G. Circuits Requirements:
   1. Signaling Line Circuits for Network Communications:
      a. Class A, Style 7.
   2. Signaling Line Circuits for Intelligent Analog Addressable Loop:
      a. Class B, Style 4.
      b. No more than 100 detectors or 100 modules installed on a loop.
   3. Initiating Device Circuit:
      a. Class B, Style B
   4. Notification Appliance Circuits:
      a. Class B, Style Y.
      b. Maximum circuit loading to 2 amps for visuals.
   5. Activation of alarm notification appliances and other functions shall occur within 3 seconds after the activation of an initiating device.

H. Smoke-Alarm Verification:
   1. Initiate an audible and visible indication of an "alarm-verification" signal at fire-alarm control unit.
   2. Activate an NRTL-listed and -approved "alarm-verification" sequence at fire-alarm control unit and detector.
   3. Record events by the system printer.
   4. Sound general alarm if the alarm is verified.
   5. Cancel fire-alarm control unit indication and system reset if the alarm is not verified.

I. Door Controls: Door hold-open devices that are controlled by smoke detectors at doors in smoke barrier walls shall be connected to fire-alarm system.

J. Remote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and change to alternate settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory, and print out the final adjusted values on system printer.

K. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, shall be powered by nominal 24-V dc source.

L. Secondary Power: Shall provide 24 hours supervisory and 15 minutes of alarm with batteries, automatic battery charger, and automatic transfer switch.

2.4 REMOTE ANNUNCIATOR

A. Annunciator shall match those of fire-alarm control unit LCD display functions for alarm, supervisory, monitor and trouble indications and common system controls including;

acknowledging, silencing, resetting, and testing. See section 2.3 E for specific requirements.

1. This display shall be EST, model 3-LCDXL1 or 3-LCDANN.

2.5 NAC Power Supply:

A. The NAC power supply shall be independent unit that will provide power to visual strobe notification appliances. It shall be possible to configure the NAC's to follow the main panel's NAC or activate from intelligent synchronized modules. The booster NAC's must be configurable to operate independently at any one of the following rates: continuous synchronized, or 3-3-3 temporal. Fault conditions on the power supply shall not impede alarm activation of host NAC circuits or other power supplies. The NAC power supply must be able to provide concurrent power for notification devices, security devices, access control equipment and auxiliary devices such as door holders. All the NAC Power Supplies shall be synchronized. The power supply shall support up to 24 amp hour batteries.

1. Power supply shall be minimum of 10 amps and UL 864 Listed.
2. Four independent 3amp NAC circuits. Each being configurable as auxiliary power.
3. All circuits shall be synchronized.
4. Shall be EST, model BPS10A.

2.6 Audio Notification System:

A. The Audio Notification System shall include all amplifiers, power supplies, panels, cabinets, tone generator, digital message repeater, and supervisory interface for a complete voice evacuation system as required by the Michigan Building Code.

B. Voice Evacuation System shall include the following components and features at a minimum:

1. Custom configuration software.
2. Integrated field recordable digital message player.
3. Twenty minute message capacity.
4. Field selectable for 25 or 70 Vrms speakers.
5. 120 VAC power supply and battery charger include.
6. Paging microphone overrides message and tone.
7. Built-in alarm and alert signals.
8. Ability to incorporate announcements and class-change bells.
9. Shall include EST models 2741, 0013, 0089, 0587, 0558, and 0556

2.7 INTELLIGENT ANALOG SYSTEM SMOKE DETECTORS

A. General Requirements for Intelligent Analog Detectors

1. Integral Microprocessor: All decisions are made at the detector determining if the device is in the alarm or trouble condition.
2. Non-Volatile Memory: Permanently stores serial number and type of device. Automatically updates historic information including hours of operation, last maintenance date, number of alarms and troubles, time of last alarm, and analog signal patterns for each sensing element just before last alarm.

3. Electronic Addressing: Permanently stores programmable system address. It shall be possible to address each intelligent module without the use of DIP or rotary switches. Devices using switches for addressing shall not be acceptable.
4. Automatic Device Mapping: Each detector transmits wiring information regarding its location with respect to other devices on the circuit, creating an As-Built wiring diagram. This will also provide enhanced supervision of the device physical location and the device message shall reside with the location and not the device address. Devices installed in the wrong location will always report the correct message of the physical location.
5. Sensitivity Range: Each analog addressable smoke detector's sensitivity shall be capable of being programmed individually as: most sensitive, more sensitive, normal, less sensitive or least sensitive. It shall be possible to automatically change the sensitivity of individual analog/addressable detectors for the day and night periods. It shall be possible to program control panel activity to each level.
6. Pre-Alarm: Detector stores 20 pre-alarm sensitivity values to alert local personnel prior to the sensor reaching full evacuation sensitivity. Sensitivity values can be set in 5% increments.
7. Environmental Compensation: The detector's sensing element reference point shall automatically adjust, compensating for background environmental conditions such as dust, temperature, and pressure. Periodically, the sensing element real-time analog value shall be compared against its reference value. The detector shall provide a maintenance alert signal when the detector reaches 75% (Dirty) to 99% (More Dirty) compensation has been used. The detector shall provide a dirty fault signal when 100% or greater compensation has been used.
8. Twin Status LEDs: Flashing Green LED shows normal; flashing RED shows alarm state; steady RED and steady GREEN show alarm state in stand-alone mode, visible from any direction.
9. UL Sensitivity Testing: The detector shall utilize a supervised microprocessor that is capable of monitoring the sensitivity of the detector. If the detector sensitivity shifts outside of the UL limits, a trouble signal is sent to the panel.
10. Device Replacement: The system shall allow for changing of detector types for service replacement purposes without the need to reprogram the system. The replacement detector type shall automatically continue to operate with the same programmed sensitivity levels and functions as the detector it replaced. System shall display an off-normal condition until the proper detector type has been installed or change in the application program profile has been made.

B. Intelligent 4D Multi-sensor Detector (Photo/Ion/Thermal and Time)
1. Provide intelligent analog addressable 4D multi-sensor smoke detectors at the locations shown on the drawings. The 4D Intelligent detector gathers analog information from each of its three fire sensing elements and converts it into digital signals. The detector’s on-board microprocessor measures and analyzes these signals separately with respect to a fourth element – Time. It compares the information to historical readings, time patterns and known fire characteristics to make an alarm decision. Digital filters remove signal patterns that are not typical of fires.
2. Separately mounted combinations of photoelectric detectors, ionization detectors and heat detectors in the same location, clustered at the manufacturer's listed spacing is an acceptable alternative.
3. Provide EST, model SIGA-IPHS.

C. Intelligent 3D Multi-sensor Detector (Photo/Thermal and Time)

1. Provide intelligent analog addressable 3D multi-sensor smoke detectors at the locations shown on the drawings. The 3D Intelligent detector gathers analog information from each of its two fire sensing elements and converts it into digital signals. The detector's on-board microprocessor measures and analyzes these signals separately with respect to a third element – Time. It compares the information to historical readings, time patterns and known fire characteristics to make an alarm decision. Digital filters remove signal patterns that are not typical of fires.
2. Provide EST, model SIGA-PHS.

D. Intelligent Photoelectric Detector

1. Provide intelligent analog addressable photoelectric smoke detectors at the locations shown on the drawings.
2. Provide EST, model SIGA-PS.

E. Intelligent 135 Degree Fixed Temperature / Rate of Rise Heat Detector

1. Provide intelligent combination fixed temperature/rate-of-rise heat detectors at the locations shown on the drawings. The heat detector shall have a low mass thermistor heat sensor and operate at a fixed temperature and at a temperature rate-of-rise. It shall continually monitor the temperature of the air in its surroundings to minimize thermal lag to the time required to process an alarm. The integral microprocessor shall determine if an alarm condition exists and initiate an alarm based on the analysis of the data. Systems using central intelligence for alarm decisions shall not be acceptable. The intelligent heat detector shall have a nominal fixed temperature alarm point rating of 135^{o}F (57^{o}C) and a rate-of-rise alarm point of 15^{o}F (9^{o}C) per minute. The heat detector shall be rated for ceiling installation at a minimum of 70 ft (21.3m) centers and be suitable for wall mount applications.
2. Provide EST, model SIGA-HRS.

F. Fixed Temperature Heat Detector

1. Provide intelligent fixed temperature heat detectors at the locations shown on the drawings. The heat detector shall have a low mass thermistor heat sensor and operate at a fixed temperature. It shall continually monitor the temperature of the air in its surroundings to minimize thermal lag to the time required to process an alarm. The integral microprocessor shall determine if an alarm condition exists and initiate an alarm based on the analysis of the data. Systems using central intelligence for alarm decisions shall not be acceptable. The heat detector shall have a nominal alarm point rating of 135^{o}F (57^{o}C). The heat detector shall be rated for ceiling installation at a minimum of 70 ft (21.3m) centers and be suitable for wall mount applications.
2. Provide EST, model SIGA-HFS.

G. Detector Base Types

1. Provide standard detector mounting bases suitable for mounting on 1-gang, or 4inch octagon box and 4 inch square box. The base shall, contain no electronics and support all series detector types. Bases with electronics or dip-switches are not acceptable.
   a. Provide EST, model SIGA-SB or SB4.

2. Provide relay detector mounting bases suitable for mounting on 1-gang, or 4" octagon box and 4" square box. The relay base shall support all Signature Series detector types and have the following minimum requirements:
   a. The relay shall be a bi-stable type and selectable for normally open or normally closed operation.
   b. The position of the contact shall be supervised.
   c. The relay shall automatically de-energize when a detector is removed.
   d. The operation of the relay base shall be controlled by its respective detector processor or under program control as required by the application. Detector relays not capable of operational programming independent of the detector shall not be considered equal. Form "C" Relay contacts shall have a minimum rating of 1 amp @ 30 Vdc and be listed for "pilot duty".
   e. Removal of the respective detector shall not affect communications with other detectors.
   f. Provide EST, model SIGA-RB or RB4
3. Provide audible detector mounting bases suitable for mounting on 4" x 4" octagonal concrete ring (mud box) and 4" square x 2-1/8" (54 mm) deep box.
   a. The base shall support all Signature Series detector types and be capable of single or group operation. The audible base shall emit a temporal alarm tone and be selectable for low or high output.
   b. The operation of the audible base shall be controlled by its respective detector processor or under program control as required by the application. Detector audible base not capable of operational programming independent of the detector shall not be considered equal.
   c. The audible bases shall be UL268 and UL464 Listed, and provide a reverberant room sound output per UL464 of 81 dBA at 10ft (3m). and an average anechoic sound output of 90 dBA at 10 ft.(3m).
   d. Provide EST, model SIGA-AB4G.

H. Intelligent Duct Smoke Detector -Photoelectric
1. Provide intelligent photoelectric duct smoke detector at the locations shown on the drawings.

   a. One form C auxiliary alarm relay rated at 2amps @ 30Vdc.
   b. The operating range shall be 100ft/min to 4,000ft/min air velocity and temperature range of –20 to 158F.
   c. Sample tube can be installed with or without the cover place and be rotated in 45degree increments to ensure proper alignment with duct airflow.
   d. Local magnet-activated test switch.
   e. Provide EST, model SIGA-SD

2. Provide remote test station with Alarm LED and Key Switch.
   a. Provide EST, model SD-TRK.
3. Relay Fan Shutdown: Rated to interrupt fan motor control circuit. Furnish and install separate device for each motor start. Connect to motor start as required for fan shutdown during alarm condition.
   a. Provide EST, model SIGA-CR.

2.8 INTELLIGENT MODULES

A. It shall be possible to address each intelligent module without the use of DIP or rotary switches. Devices using switches for addressing shall not be acceptable. The personality of multifunction modules shall be programmable at site to suit conditions and may be changed at any time using a personality code downloaded from the Analog Loop Controller.
   1. Integral Microprocessor: All decisions are made at the module determining if the device is alarm or trouble condition.
   2. Non-Volatile Memory: Permanently stores serial number, and type of device. Automatically updates historic information including hours of operation, number of alarms and troubles, time of last alarm.
   3. Automatic Device Mapping: Each detector transmits wiring information regarding its location with respect to other devices on the circuit, creating an As-Built wiring diagram. This will also provide enhanced supervision of the device physical location. The device message shall reside with the location and not the device address. Devices installed in the wrong location will always report the correct message of the physical location.
   4. Twin Status LEDs: The modules shall have a minimum of 2 diagnostic LEDs mounted behind a finished cover plate. A green LED shall flash to confirm communication with the loop controller. A red LED shall flash to display alarm status.
   5. Input and output circuit wiring shall be supervised for open and ground faults.
   6. Two styles of modules shall be available, those designed for gang box mounting, and where multiple modules are required in a single location, plug in modules shall be provided with a Universal Input/Output motherboard.

B. Intelligent Input Module. The Input Module shall provide one or two supervised Class B input circuit capable of a minimum of 4 personalities, each with a distinct operation. The module shall be suitable for mounting on North American 2 ½" (64mm) deep 1-gang boxes and 1 ½" (38mm) deep 4" square boxes with 1-gang covers. The single input module shall support the following circuit types:
   1. Normally-Open Alarm Latching (Manual Stations, Heat Detectors, etc.)
   2. Normally-Open Alarm Delayed Latching (Waterflow Switches)
   3. Normally-Open Active Non-Latching (Monitor, Fans, Dampers, Doors, etc.)
   4. Normally-Open Active Latching (Supervisory, Tamper Switches)
   5. Provide EST model SIGA-CT1 or CT2 or SIGA-MCT2

C. Intelligent Relay Module. Provide addressable control relay circuit modules shall provide one (1) form C dry relay contacts rated at 24Vdc @ 2 amps (pilot duty) to control external appliances or equipment. The position of the relay contact shall be confirmed by the system firmware. The module shall be suitable for mounting on 2 ½" (64mm) deep 1-gang boxes and 1 ½" (38mm) deep 4" square boxes with 1-gang covers.
   1. Provide EST, model SIGA-CR or SIGA-MCR.

D. NAC Control Module: Provide intelligent NAC control module shall provide one (1) supervised Class B output circuit capable of a minimum of 2 personalities, each with a distinct operation. The gang box -mounted version shall be suitable for mounting in 2½" (64mm) deep 2-gang boxes and 1 ½" (38mm) deep 4" square boxes with 2-gang covers, or European 100mm square boxes. The plug-In version shall plug into a universal multi-module motherboard. The NAC control module shall support the following operations:

1. 24volt NAC circuit
2. Audio notification circuit 25v or 70v
3. Telephone Power Selector with Ring Tone (Firefighter's Telephone)
4. Visual Synchronized Output to Genesis appliances or to NAC Power Supply.
5. Provide EST, model SIGA-CC1 or –CC1S or SIGA-MCC1 or MCC1S.

2.9 MANUAL FIRE-ALARM BOXES

A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box. All Manual Fire Alarm Boxes shall be metal construction.
   1. Double-action mechanism requiring two actions to initiate an alarm, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
   2. The manual pull station will have an intelligent module integral of the unit.
   3. Station Reset: key operated switch shall match the control panel key.
   4. Manual pull stations that initiated an alarm condition by opening the unit are not acceptable.
   5. Provide EST, model SIGA-270.

B. Indoor Protective Shield: Factory-fabricated clear plastic enclosure. Hinged at the top to permit lifting for access to initiate alarm. Lifting the cover actuates an integral battery powered audible horn (when noted on the drawings) intended to discourage false-alarm operation.

C. Weatherproof manual pull station shall be provided of red metal construction with special weatherproof gasket metal red box.
   1. Single-action operation.
   2. Station Reset: key operated switch shall match the control panel key.
   3. The intelligent monitor module will be located within the building and not with the station
   4. Provide EST, model MPSR1.

2.10 NOTIFICATION APPLIANCES

A. All appliances shall be of the same manufacturer as the Fire Alarm Control Panel specified to insure absolute compatibility between the appliances and the control panels, and to insure that the application of the appliances are done in accordance with the single manufacturers' instructions.

B. Any appliances, which do not meet the above requirements, and are submitted, for use must show written proof of their compatibility for the purpose intended. Such proof shall be in the form of documentation from all manufacturers which clearly states that their equipment (as submitted) are 100% compatible with each other for the purposes intended. All appliances shall be UL listed Fire Protective Service and shall be UL 1971.

C. Notification Appliances – Visual (Fire – Evacuation)

1. Provide wall or ceiling mounted clear lens strobes with white body and "FIRE" markings. Strobes shall provide a smooth light distribution pattern field selectable candela 15 cd, 30 cd, 75 cd, and 110 cd flash output rating, UL1971 listed with in-out screw terminals shall be provided for wiring. The strobe (15, 30, 75, 110) candela rating shall be view from the side window to verify the setting. All strobes shall be synchronized to within 10 milliseconds for an indefinite period shall not require the use of separately installed remote synch modules. The strobes shall mount to one-gang electrical box.
2. The device shall have plastic protective cover for during installation.
3. The actual candela setting on the visual shall be marked on the appliance.
4. Provide EST, model Genesis Series devices.

D. Notification Appliance – Combination Speaker/Strobe:

1. Provide wall or ceiling mounted clear lens speaker/strobes with white body and "FIRE" markings. Strobes shall provide a smooth light distribution pattern field selectable candela 15 cd, 30 cd, 75 cd, 95 cd or 95 cd to 177 cd flash output rating, UL1971 listed with screw terminals provided for wiring connections. The strobe candela rating shall be shown from the side window to verify the setting. All strobes shall be synchronized to within 10 milliseconds for an indefinite period and shall not require the use of separately installed synch modules.
2. Speaker taps/output shall be 25V or 70V rms, selectable from 0.25W to 2.0W.
3. Provide EST, model Genesis Series devices.

E. Notification Appliance – Speaker:

1. Provide wall or ceiling mounted speaker with white body and "FIRE" markings.
2. Speaker taps/output shall be 25V or 70V rms, selectable from 0.25W to 2.0W.
3. Provide EST, model Genesis Series devices.

2.11 GUARDS FOR PHYSICAL PROTECTION

A. Provide welded mesh of size and shape for the manual pull stations, smoke detectors, notification appliances at location noted on the drawings.
1. Note: All devices located in gym spaces shall have wire guards installed.

2.12 MAGNETIC DOOR HOLDERS

A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching doorplate.
1. Electromagnet: Requires no more than 3 W to develop 25-lbf holding force.
2. Wall-Mounted Units: Flush mounted unless otherwise indicated.
3. Rating: 120-V ac, 24-V ac or dc.
4. Provide EST, model 1500 series or DH Series.

2.13 WIRE AND CABLE

A. Signaling Line Circuits – Network Data: Twisted pair, not less than No. 18Awg or as recommended by the manufacturer.

B. Signaling Line Circuits – Intelligent Loop: Non-Twisted pair, not less than No. 16Awg or as recommended by the manufacturer.
   1. Circuit Integrity Cable: Provide as required to meet NFPA or Local Code requirements.
   2. CI Cable shall meet article 760, power limited fire alarm service.

C. Notification Appliance Circuits –
   1. Audio: Twisted pair, not less than No. 16Awg or as recommended by the manufacturer.
   2. Visual. Twisted pair, not less than No. 14Awg or as recommended by the manufacturer.

PART 3 EXECUTION

3.1 EQUIPMENT INSTALLATION

A. Comply with NFPA72 for installation of fire-alarm equipment.

B. Equipment Mounting: Install fire-alarm control unit on finished floor with tops of cabinets not more than 72 inches above the finished floor.

C. Connecting to Existing Equipment:
   1. Connect new fire alarm system to existing HVAC and fire sprinkler systems equipment in existing building.
   2. Connect new equipment to existing monitoring equipment at the supervising station, if present.
   3. Expand, modify, and supplement existing control / monitoring equipment as necessary to extend existing control / monitoring functions to the new points. New components shall be capable of merging with existing configuration without degrading the performance of either system.

D. Smoke-or Heat-Detector Spacing:
   1. Comply with NFPA72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing.
   2. Comply with NFPA72, "Heat-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for heat-detector spacing.
   3. Smooth ceiling spacing shall not exceed 30 feet.
   4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Appendix A or Appendix B in NFPA 72.
   5. HVAC: Locate detectors not closer than 5 feet from air-supply diffuser or return-air opening.
   6. Lighting Fixtures: Locate detectors not closer than 12 inches from any part of a lighting fixture.

E. Duct Smoke Detectors: Comply with NFPA72 and NFPA90A. Install sampling tubes so they extend the full width of duct.

F. Notification Appliance Devices: Ceiling mounted is preferred, where drop ceilings are available for wiring. If wall mounted is required, install between 80 and 96 inches above floor.

G. Fire-Alarm Control Unit: Surface mounted, with tops of cabinets not more than 72 inches above the finished floor.

H. Annunciator: Install with top of panel not more than 56 inches above the finished floor.

3.2 CONNECTIONS

A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Division 8 Section "Door Hardware." Connect hardware and devices to fire-alarm system.
   1. Verify that hardware and devices are NRTL listed for use with fire-alarm system in this Section before making connections.

B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 3 feet from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
   1. Smoke dampers in air ducts of designated air-conditioning duct systems.
   2. Supervisory connections at valve supervisory switches.

3.3 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 16 Section "Electrical Identification."

B. Install framed instructions in a location visible from fire-alarm control unit.

C. All initiating devices shall have bar code label installed visibly on the device. This bar code shall be used for digital inspection of the fire alarm system using Building-Reports.Com.

3.4 GROUNDING

A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

3.5 FIELD QUALITY CONTROL

A. Field tests shall be witnessed by Architect, Engineer and authorities having jurisdiction.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Tests and Inspections:
   1. Visual Inspection: Conduct visual inspection prior to testing.
      a. Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.
      b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA72; retain the "Initial/Reacceptance" column and list only the installed components.
   2. System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA72.
   3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.
   4. Test audible appliances for the private operating mode according to manufacturer's written instructions.
   5. Test visible appliances for the public operating mode according to manufacturer's written instructions.
   6. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA72.

E. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.

F. Fire-alarm system will be considered defective if it does not pass tests and inspections.

G. Prepare test and inspection reports.

H. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

I. Annual Test and Inspection: During the 5 year warranty period, each year test fire-alarm system complying with visual and testing inspection requirements in NFPA72. Use forms developed for initial tests and inspections.

J. Detector Sensitivity Testing: During the 5 year warranty period, each year the contractor is to perform detector sensitivity testing and provide report to the Owner. Unless, the system is UL Listed to perform automatic sensitivity testing without any manual intervention and should detector fall outside of sensitivity window, the system will automatically indicated a devices trouble. A copy of UL letter is to be provided as proof of system operation

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.
B. Provide for minimum of 4 hours of on-site training for owner employees. Include instructions for responding to alarms, troubleshooting system alarm/trouble signals, maintenance intervals, and system reporting procedures.
C. Provide copies of and utilize the project/building Operation and Maintenance Manual (O&M) during owner training.
D. Provide attendance sheet for each participant with check boxes for all areas of training. Instructor shall sign all forms.
E. Provide complete attendance sheet for all participants and instructor to sign.

END OF SECTION