IDC-MTC Mechanical Construction Services MTC CET Data Room HVAC Upgrade

PROJECT # H59-D943-FW
H59-N004-FW

MARCH 12, 2019

SOUTH CAROLINA
GMK, INC.
No. C00287
CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA
REGISTERED PROFESSIONAL ENGINEER
No. 21298
JODY DANIEL RICARD

3/12/2019

SOUTH CAROLINA
LICENSED PROFESSIONAL ENGINEER
No. 31520
RYAN MATTHEW INFINGER

3/12/2019

A/E PROJECT # 18052.01

GMK
ASSOCIATES, INC.

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PROJECT NUMBER: H59-D943-FW

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SE-655
INVITATION FOR CONSTRUCTION SERVICES
INDEFINITE DELIVERY CONTRACT

AGENCY/OWNER: Midlands Technical College

PROJECT NAME: IDC-MTC-Mechanical Construction Services

PROJECT NUMBER: H59-D943-FW

PROJECT LOCATION: Midlands Technical College Campuses in Richland and Lexington Counties

DESCRIPTION OF PROJECT/SERVICES: Replace existing Liebert unit and condensing unit serving the data center. Add back-up wall mounted mini split system in the data center. Construction Services to include HVAC and Plumbing License Category -AC5, -HT5, -PB5, -BL3

BID/SUBMITTAL DUE DATE: 5/7/2019 **CONSTRUCTION COST RANGE:** $ 10,000 to $ 250,000 N/A ☐

PROJECT DELIVERY METHOD: Design-Bid-Build

REPRESENTATIVE PROJECT NAME (if applicable): Midlands technical College CET Building Data Room HVAC Upgrade

REPRESENTATIVE PROJECT NUMBER (if applicable): H59-N004-FW

BID SECURITY IS REQUIRED IN AN AMOUNT NOT LESS THAN 5% OF THE BASE BID.

CONTRACT INFORMATION

1.	The contract period of the awarded Indefinite Delivery Contract (IDC):	2 years
2.	Maximum expenditures over the period of the awarded IDC:	$ 1,000,000
3.	Maximum single project expenditure that will be allowed under the awarded IDC:	$ 250,000
4.	Maximum number of IDC's Agency may award under this solicitation:	5

BIDDING DOCUMENTS/PLANS MAY BE OBTAINED FROM: https://www.midlandstech.edu/procurement

PLAN DEPOSIT AMOUNT: $ 0.00 **IS DEPOSIT REFUNDABLE** Yes ☐ No ☐ N/A ☒

Bidders must obtain Bidding Documents/Plans from the above listed source(s) to be listed as an official plan holder. Bidders that rely on copies obtained from any other source do so at their own risk. All written communications with official plan holders & bidders will be via email or website posting.

AGENCY PROJECT COORDINATOR: Carey Page

EMAIL: pagewc@midlandstech.edu **TELEPHONE:** 803-822-3217

PRE-BID CONFERENCE: Yes ☒ No ☐ **MANDATORY ATTENDANCE:** Yes ☐ No ☒

PRE-BID DATE: 4/24/2019 **TIME:** 10:00 am

PRE-BID PLACE: NE Campus, CET Building Room 109

BID DUE DATE: See Top of Page **TIME:** 2:00 pm

BID OPENING PLACE: Procurement Department/Reed Hall, Room 119

BID DELIVERY ADDRESSES:

HAND-DELIVERY:
Attn: Latitia Trazevant, Procurement Manager
Reed Hall, 1260 Lexington Drive
West Columbia, SC 29170

MAIL SERVICE:
Attn: Latitia Trazevant, Procurement Manager
Reed Hall, 1260 Lexington Drive
West Columbia, SC 29170

APPROVED BY: Fred Walker *(OSE Project Manager)* **DATE:** 4/8/2019

INSTRUCTIONS TO THE AGENCY:

1. Submit a copy of the completed SE-655 to the OSE Project Manager in MS Word format.
2. If the IDC is using Low Bid of a Representative Project as the method of award, submit Page 2 of the SE-655 to OSE.
3. OSE Project Manager will review and send approved copy to SCBO and the Agency

SE-656
INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION SERVICES INDEFINITE DELIVERY CONTRACT

AGENCY: Midlands Technical College

PROJECT NAME: IDC-MTC-Mechanical Construction Services

PROJECT NUMBER: H59-D943-FW

PROJECT LOCATION: Midlands Technical College Campuses in Richland and Lexington Counties

DESCRIPTION OF CONSTRUCTION SERVICES *(Include Contractor License category/subcategory)*: Construction Services to include HVAC and Plumbing License Category -AC5, -HT5, -PB5, -BL3 for all campuses located in Richland and Lexington counties.

The above named Agency hereby solicits bids for the Construction Services Indefinite Delivery Contract shown above. The Invitation for Bids includes the advertisement (SE-655), bid form, Notice of Intent to Award Indefinite Delivery Contract (SE-670), Construction Services Indefinite Delivery Contract (SE-680), General Conditions to Construction Services Indefinite Delivery Contract (SE-685), drawings and specifications (if applicable), and all addenda issued prior to bid opening, all of which are collectively referred to herein as the Solicitation Documents.

The Invitation for Bids is issued pursuant to SC Code § 11-35-3310 and the Manual for Planning and Execution of State Permanent Improvements, Part II (Manual).

1. GENERAL INFORMATION

1.1 Agency may award up to Five (5) Indefinite Delivery Contract(s) (IDC) under this solicitation provided the Agency receives an adequate number of responsive and responsible bids. In no event, will the Agency award more contracts than the number set forth in the previous sentence.

1.2 Work is to be performed at the following location(s): *(Insert location of work, e.g. a particular campus or campuses)*

Any of the Midlands Techinical College Campuses in Richland and Lexington Counties

1.3 The awarded IDC will be for a period not to exceed 2 years *(may not exceed 2 years)*.

1.4 The awarded IDC allows the Agency to award a total amount of work not to exceed $ 1,000,000.00

1.5 Work awarded under the IDC will be awarded using form SE-690, Construction Services IDC Delivery Order. Agency will provide IDC awardees the opportunity to bid on all Delivery Orders for the services set forth in this Invitation.

1.6 The Agency may only award one Delivery Order per project to the contractor. However, a Delivery Order may be amended. A Delivery Order may only be amended in writing signed by both parties using form SE-695, Construction Services Delivery Order Modification.

1.7 Work awarded under the IDC for a single project may not exceed $ 250,000.00.

1.8 Projects and Delivery Orders may not be divided to avoid the limits set forth in 1.6 and 1.7 above.

1.9 *(Check the block for the provision applicable to this solicitation)*

☐ The minimum amount of work to be awarded under the IDC is $_____.

☒ Agency does not guarantee a minimum amount of work, nor does it guarantee the size or quantity of any work that is awarded under the IDC.

1.10 Bidders will agree to perform work for the advertised discipline in the following manner: *(Check one)*

☐ The cost of the work to the Agency will be determined using unit prices listed by the Bidder on its Bid Form. No other additions to the cost of the work will be permitted except the cost of Performance and Payment Bonds if required for specific Delivery Orders; or

☒ The cost of the work to the Agency will be determined by competitive bidding of each Delivery Order among all contractors having an active contract that the Agency awarded pursuant to this Invitation for Bids.

1.11 Bidders must be properly licensed in the discipline and the Group Classification to permit an award up to the maximum individual project award set forth in 1.7. Successful bidder(s) must maintain this license for the term of the contract.

SE-656
INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION SERVICES INDEFINITE DELIVERY CONTRACT

2. SOLICITATION DOCUMENTS

2.1 All persons obtaining Bidding Documents from the issuing office designated in the advertisement shall provide that office with Bidder's contact information to include the Bidder's name, telephone number, mailing address, and email address. Agency will send all addenda modifying the Solicitation Documents to all plan holders of record.

2.2 By submitting a bid, Bidder represents that it has read and understands the Solicitation Documents. Bidders are expected to examine the Solicitation Documents thoroughly and should request an explanation of any ambiguities, discrepancies, errors, omissions, or conflicting statements. Failure to do so will be at the Bidder's risk. Bidder assumes responsibility for any patent ambiguity that Bidder does not bring to the Agency's attention prior to bid opening. Bidder shall make any requests for substitution, questions, clarifications, or interpretations of the bid documents in writing to the Agency at least 10 days before the Bid Date. The Agency will not give oral instruction prior to bidding nor will any oral instructions to bidders be binding on the Agency.

2.3 The Agency will make corrections, interpretations, or changes that modify the Solicitation Documents by written addendum. As provided in SC Regulation 19-445.2042(B), if this solicitation provides for a pre-bid conference, nothing stated at the pre-bid conference shall change the Solicitation Documents unless a change is made by written addendum.

2.4 The Agency will not issue addenda later than 120 hours before the date and time specified in the advertisement for receipt of Bids except to withdraw the Invitation for Bids or to extend the date for receipt of bids.

2.5 When the date for receipt of Bids is postponed and there is insufficient time to issue a written Addendum prior to the original Bid Date, Agency will notify prospective Bidders by telephone or other appropriate means with immediate follow up with a written Addendum. This Addendum will verify the postponement of the original Bid Date and establish a new Bid Date. The new Bid Date will be no earlier than the fifth (5th) calendar day after the date of issuance of the Addendum postponing the original Bid Date.

3. BID PREPARATION

3.1 Bidder shall submit its bid using the bid form included in the Solicitation Documents. Bidder shall fill in any blanks on the bid form legibly using an indelible medium. Bidder shall sign its bid in ink or other indelible media. Sums shall be expressed in figures.

3.2 Bidder shall not make stipulations or qualify its bid in any manner not permitted on the bid form. An incomplete Bid or information not requested that is written on or attached to the bid form that could be considered a qualification of the Bid, may be cause for rejection of the Bid.

3.3 Bid Security: *(Agency, check the block for the provision applicable to this solicitation)*

☐ Bidder is not required to submit Bid Security with its bid.

☒ Bid shall be accompanied by a Bid Security in an amount of not less than 5%. The Bid Security shall be a bid bond or a certified cashier's check made payable to the Agency.

3.3.1 The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Failure of the Bidder to enter into a contract with the Agency, furnish such bonds if required, or to correct any Bid deficiencies allowed by law, shall cause bid security to be forfeited to the Agency as liquidated damages, not as a penalty.

3.3.2 If Bidder submits a bid bond as its bid security, the bond shall be written in the form of AIA Document A310, Bid Bond. The bid bond must be accompanied by a certified and current Power of Attorney for the attorney-in-fact who executes the bond on behalf of the surety company. The Bid Bond shall:

a. Be issued by a Surety Company licensed to do business in South Carolina;

b. Be issued by a Surety Company having, at a minimum, a "Best Rating" of "A" as stated in the most current publication of "Best's Key Rating Guide, Property-Casualty," which company shows a financial strength rating of at least five (5) times the contract price.

c. Be enclosed in the bid envelope at the time of Bid Opening, either in paper copy or as an electronic bid bond authorization number provided on the Bid Form and issued by a firm or organization authorized by the Surety to receive, authenticate and issue binding electronic bid bonds on behalf the Surety.

3.3.3 By submitting a Bid Bond via an electronic bid bond authorization number on the Bid Form and signing the Bid Form, the Bidder certifies that an electronic bid bond has been executed by a Surety meeting the standards required by the Bidding Documents and the Bidder and Surety are firmly bound unto the State of South Carolina under the conditions provided in this Section 3.4.

3.3.4 The Agency will retain the Bid Security of those Bidders being considered for award until an IDC has been executed, all bids are rejected, or the time specified in the Solicitation Documents for holding bids open has elapsed, whichever is earlier.

3.4 Submission of Bids: The Bidders shall submit their Bid, Bid Security, if any, and any other documents required by the Solicitation Documents to be submitted with the Bid, in a sealed opaque envelope. Unless hand delivered by the Bidder, the sealed envelope must be addressed to the Agency's designated purchasing office as shown in the advertisement. The envelope shall be identified on the outside with the Project Name and Number, and the Bidder's name and address. If the Bidder sends its bid to the Agency by mail or special delivery service (UPS, Federal Express, etc.), the envelope should be labeled "BID ENCLOSED" on the face thereof. Bidders hand delivering their bids shall deliver bids to the place of the bid opening as shown in the advertisement. Whether or not Bidders attend the bid opening, they shall give their bids to the Agency's procurement officer or his/her designee as shown in the Advertisement prior to the time of the bid opening.

3.4.1 Each copy of the Bid submitted to the Agency shall be signed by the person(s) legally authorized to bind the Bidder to a contract. If the Bid is submitted by an agent of the Bidder, a current Power of Attorney certifying the agent's authority to bind the Bidder shall be attached to the bid.

3.4.2 The Agency must receive Bids at the designated location before the time and date specified in the Solicitation Documents for receipt of Bids. The Agency will return bids received after the time and date for receipt of Bids unopened.

3.4.3 The official time for receipt of Bids will be determined by reference to the clock designated by the Agency's Procurement Officer or his/her designee. The Procurement Officer conducting the Bid Opening will determine and announce that the deadline has arrived and no further Bids or bid modifications will be accepted. All Bids and bid modifications in the possession of the Procurement Officer at the time the announcement is completed will be timely, whether or not the bid envelope has been date/time stamped or otherwise marked by the Procurement Officer.

3.4.4 If an emergency or unanticipated event interrupts normal government processes so that Bids cannot be received at the government office designated for receipt of Bids by the exact time specified in the solicitation, the time specified for receipt of Bids will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal government processes resume. In lieu of an automatic extension, an Addendum may be issued to reschedule bid opening. If state offices are closed at the time a pre-bid or pre-proposal conference is scheduled, an Addendum will be issued to reschedule the conference.

4. CONDUCT OF BID OPENING AND CONSIDERATION OF BIDS

4.1 Bid Opening:

4.1.1 Agency will publicly open and read aloud Bids received on time.

4.1.2 At Bid Opening, Agency will announce the date and location of the posting of the Notice of Intent to Award IDC.

4.1.3 Agency will send a copy of the final Bid Tabulation to all Bidders within ten (10) working days of the bid opening.

4.1.4 If Agency determines to make an award, Agency will, after posting a Notice of Intent to Award IDC, send a copy of the Notice to all Bidders.

4.1.5 If only one Bid is received, the Agency may award the representative project only, using the SCOSE AIA A101 and SCOSE AIA A201 documents and using the PIP or Non-PIP project number. The IDC cannot be awarded.

4.2 Agency intends to award contracts in the number set forth in the Solicitation Documents to the lowest responsive and responsible bidders.

4.3 Bid Rejection: The Agency reserves the right to reject any and all bids.

4.3.1 Responsiveness:

4.3.1.1 The reasons for which the Agency will reject Bids include, but are not limited to:

a. Failure by a Bidder to be represented at a Mandatory Pre-Bid Conference or site visit;
b. Failure to deliver the Bid on time;
c. Failure to comply with Bid Security requirements, except as expressly allowed by law;
d. Listing an invalid electronic Bid Bond authorization number on the bid form;
e. Showing any material modification(s) or exception(s) qualifying the Bid;
f. Faxing a Bid directly to the Agency or their representative; or
g. Failure to include a properly executed Power-of-Attorney with the Bid Bond.

4.3.1.2 The Agency may reject a Bid as nonresponsive if the prices bid are materially unbalanced between line items or sub line items. A Bid is materially unbalanced when it is based on prices significantly less than cost for some work and prices which are significantly overstated in relation to cost for other work, and if there is a reasonable doubt that the bid will result in the lowest overall cost to the Agency, even though it may be the low evaluated bid, or if it is so unbalanced as to be tantamount to allowing an advance payment.

4.3.2 Bidder Responsibility: Agency will make a determination of Bidder's responsibility before awarding a contract. Bidder shall provide all information and documentation requested by the Agency to support the Agency's evaluation of responsibility. Failure of Bidder to provide requested information is cause for the Agency, at its option, to determine the Bidder to be non-responsible.

5. TENDERING CONTRACT, CERTIFICATES OF INSURANCE, AND PERFORMANCE AND PAYMENT BONDS

5.1 After expiration of the protest period, the Agency will tender a signed IDC to the successful Bidder(s). The Bidder(s) shall return the fully executed IDC to the Agency within seven (7) days thereafter. The Bidder(s) shall deliver the required proof of insurance and bonding capacity to the Agency not later than three (3) days following the date of execution of the IDC. Failure to deliver these documents as required shall entitle the Agency to consider the Bidder's failure as a refusal to enter into a contract in accordance with the terms and conditions of the Bidder's bid and to make claim on the bid security.

5.2 The IDC will be written on the Construction Services Indefinite Delivery Contract (SE-680).

5.3 After the IDC is fully executed, the Agency may award work to the successful Bidder(s) by issuing a Construction Services IDC Delivery Order (SE-690) as describe in the SE-680 and General Conditions to the SE-680 (SE-685).

6. BIDDER CERTIFICATIONS

6.1 Certification of Independent Price Determination

GIVING FALSE, MISLEADING, OR INCOMPLETE INFORMATION ON THIS CERTIFICATION MAY RENDER YOU SUBJECT TO PROSECUTION UNDER SECTION 16-9-10 OF THE SOUTH CAROLINA CODE OF LAWS AND OTHER APPLICABLE LAWS.

(a) By submitting a bid, the Bidder certifies that—

(1) The prices in this Bid have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other Bidder or competitor relating to—

(i) Those prices;
(ii) The intention to submit a bid; or
(iii) The methods or factors used to calculate the prices offered.

(2) The prices in this Bid have not been and will not be knowingly disclosed by the Bidder, directly or indirectly, to any other Bidder or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the Bidder to induce any other concern to submit or not to submit a Bid for the purpose of restricting competition.

(b) Each signature on the Bid is considered to be a certification by the Signatory that the Signatory—

(1) Is the person in the Bidder's organization responsible for determining the prices being offered in this Bid, and that the Signatory has not participated and will not participate in any action contrary to paragraphs (a)(1) through (a)(3) of this certification; or

(2) (i) Has been authorized, in writing, to act as agent for the Bidder's principals in certifying that those principals have not participated, and will not participate in any action contrary to paragraphs (a)(1) through (a)(3) of this certification [As used in this subdivision (b)(2)(i), the term "principals" means the person(s) in the Bidder's organization responsible for determining the prices offered in this Bid];

(ii) As an authorized agent, does certify that the principals referenced in subdivision (b)(2)(i) of this certification have not participated, and will not participate, in any action contrary to paragraphs (a)(1) through (a)(3) of this certification; and

(iii) As an agent, has not personally participated, and will not participate, in any action contrary to paragraphs (a)(1) through (a)(3) of this certification.

(c) If the Bidder deletes or modifies paragraph (a)(2) of this certification, the Bidder must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

6.2 Drug Free Workplace: By submitting a bid, the Bidder certifies that Bidder will maintain a drug free workplace in accordance with the requirements of Title 44, Chapter 107 of South Carolina Code of Laws, as amended.

6.3 Certification Regarding Debarment and Other Responsibility Matters:

(a) (1) By submitting an Bid, Bidder certifies, to the best of its knowledge and belief, that-

(i) Bidder and/or any of its Principals-

(A) Are not presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any state or federal agency;

(B) Have not, within a three-year period preceding this Bid, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of bids; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property; and

(C) Are not presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in paragraph (a)(1)(i)(B) of this provision.

(ii) Bidder has not, within a three-year period preceding this bid, had one or more contracts terminated for default by any public (Federal, state, or local) entity.

(2) "Principals," for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions).

(b) Bidder shall provide immediate written notice to the Procurement Officer if, at any time prior to contract award, Bidder learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(c) If Bidder is unable to certify the representations stated in paragraphs (a)(1), Bid must submit a written explanation regarding its inability to make the certification. The certification will be considered in connection with a review of the Bidder's responsibility. Failure of the Bidder to furnish additional information as requested by the Procurement Officer may render the Bidder nonresponsible.

(d) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and information of a Bidder is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Bidder knowingly or in bad faith rendered an erroneous certification, in addition to other remedies available to the State, the Procurement Officer may terminate the contract resulting from this solicitation for default.

6.4 Ethics Certification: By submitting a bid, the Bidder certifies that the Bidder has and will comply with, and has not, and will not; induce a person to violate Title 8, Chapter 13 of the South Carolina Code of Laws (ethics act). The following statutes require special attention: SC Code § 8-13-700, regarding use of official position for financial gain; SC Code § 8-13-705, regarding gifts to influence action of public official; SC Code § 8-13-720, regarding offering money for advice or assistance of public official; SC Code §§ 8-13-755 and 8-13-760, regarding restrictions on employment by former public official; SC Code § 8-13-775, prohibiting public official with economic interests from acting on contracts; SC Code § 8-13-790, regarding recovery of kickbacks; SC Code § 8-13-1150, regarding statements to be filed by consultants; and SC Code § 8-13-1342, regarding restrictions on contributions by contractor to candidate who participated in awarding of contract. The state may rescind any contract and recover all amounts expended as a result of any action taken in violation of this provision. If contractor participates, directly or indirectly, in the evaluation or award of public contracts, including without limitation, change orders or task orders regarding a public contract, contractor shall, if required by law to file such a statement, provide the statement required by SC Code § 8-13-1150 to the procurement officer at the same time the law requires the statement to be filed.

6.5 Restrictions Applicable to Bidders and Gifts: Violation of these restrictions may result in disqualification of your bid, suspension or debarment, and may constitute a violation of the state Ethics Act. (a) After issuance of the solicitation, ***bidder agrees not to discuss this procurement activity in any way with the Owner or its employees, agents or officials.*** All communications must be solely with the Procurement Officer. This restriction may be lifted by express written permission from the Procurement Officer. This restriction expires once a contract has been formed. (b) Unless otherwise approved in writing by the Procurement Officer, ***bidder agrees not to give anything to the Owner, any affiliated organizations, or the employees, agents or officials of either, prior to award.*** (c) Bidder acknowledges that the policy of the State is that a governmental body should not accept or solicit a gift, directly or indirectly, from a donor if the governmental body has reason to believe the donor has or is seeking to obtain contractual or other business or financial relationships with the governmental body. SC Regulation 19-445.2165(C) broadly defines the term donor.

6.6 Open Trade Representation (Jun 2015): By submitting an Offer, Offeror represents that Offeror is not currently engaged in the boycott of a person or an entity based in or doing business with a jurisdiction with whom South Carolina can enjoy open trade, as defined in SC Code § 11-35-5300.

7. MISCELLANEOUS PROVISIONS

7.1 Non-Resident Taxpayer Registration Affidavit - Income Tax Witholding:

IMPORTANT TAX NOTICE - NONRESIDENTS ONLY

Withholding Requirements for Payments to Nonresidents: SC Code § 12-8-550 requires persons hiring or contracting with a nonresident conducting a business or performing personal services of a temporary nature within South Carolina to withhold 2% of each payment made to the nonresident. The withholding requirement does not apply to (1) payments on purchase orders for tangible personal property when the payments are not accompanied by services to be performed in South Carolina, (2) nonresidents who are not conducting business in South Carolina, (3) nonresidents for contracts that do not exceed $10,000 in a calendar year, or (4) payments to a nonresident who (a) registers with either the S.C. Department of Revenue or the S.C. Secretary of State and (b) submits a Nonresident Taxpayer Registration Affidavit - Income Tax Withholding, Form I-312 to the person letting the contract.

For information about other withholding requirements (e.g., employee withholding), contact the Withholding Section at the South Carolina Department of Revenue at 803-898-5383 or visit the Department's website at: www.sctax.org

This notice is for informational purposes only. This Owner does not administer and has no authority over tax issues. All registration questions should be directed to the License and Registration Section at 803-898-5872 or to the South Carolina Department of Revenue, Registration Unit, Columbia, SC 29214-0140. All withholding questions should be directed to the Withholding Section at 803-898- 5383.

SE-656
INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION SERVICES INDEFINITE DELIVERY CONTRACT

PLEASE SEE THE "NONRESIDENT TAXPAYER REGISTRATION AFFIDAVIT INCOME TAX WITHHOLDING" FORM (FORM NUMBER I-312) LOCATED AT:
http://www.sctax.org/Forms+and+Instructions/withholding/default.htm

7.2 Contractor Licensing: Contractors listed on the Bid Form who are required by the SC Code of Laws to be licensed, must be licensed at the time of bidding.

7.3 Submitting Confidential Information: For every document Bidder submits in response to or with regard to this solicitation or request, Bidder must separately mark with the word "CONFIDENTIAL" every page, or portion thereof, that Bidder contends contains information that is exempt from public disclosure because it is either (a) a trade secret as defined in SC Code § 30-4-40(a)(1), or (b) privileged and confidential, as that phrase is used in SC Code § 11-35-410. For every document Bidder submits in response to or with regard to this solicitation or request, Bidder must separately mark with the words "TRADE SECRET" every page, or portion thereof, that Bidder contends contains a trade secret as that term is defined by SC Code § 39-8-20 of the Trade Secrets Act. For every document Bidder submits in response to or with regard to this solicitation or request, Bidder must separately mark with the word "PROTECTED" every page, or portion thereof, that Bidder contends is protected by SC Code § 11-35-1810. All markings must be conspicuous; use color, bold, underlining, or some other method in order to conspicuously distinguish the mark from the other text. Do not mark your entire bid as confidential, trade secret, or protected! If your bid, or any part thereof, is improperly marked as confidential or trade secret or protected, the State may, in its sole discretion, determine it nonresponsive. If only portions of a page are subject to some protection, do not mark the entire page. By submitting a response to this solicitation, Bidder (1) agrees to the public disclosure of every page of every document regarding this solicitation or request that was submitted at any time prior to entering into a contract (including, but not limited to, documents contained in a response, documents submitted to clarify a response, & documents submitted during negotiations), unless the page is conspicuously marked "TRADE SECRET" or "CONFIDENTIAL" or "PROTECTED," (2) agrees that any information not marked, as required by these bidding instructions, as a "TRADE SECRET" is not a trade secret as defined by the Trade Secrets Act, and (3) agrees that, notwithstanding any claims or markings otherwise, any prices, commissions, discounts, or other financial figures used to determine the award, as well as the final contract amount, are subject to public disclosure. In determining whether to release documents, the State will detrimentally rely on Bidder's marking of documents, as required by these bidding instructions, as being either "CONFIDENTIAL" or "TRADE SECRET" or "PROTECTED". By submitting a response, Bidder agrees to defend, indemnify & hold harmless the State of South Carolina, its officers & employees, from every claim, demand, loss, expense, cost, damage or injury, including attorney's fees, arising out of or resulting from the State withholding information that Bidder marked as "CONFIDENTIAL" or "TRADE SECRET" or "PROTECTED".

7.4 Posting of Notice of Intent to Award IDC:
Notice of Intent to Award Indefinite Delivery Contract, SE-670, will be posted at the following location:

Room or Area of Posting: N/A

Building Where Posted: N/A

Address of Building: N/A

WEB site address (if applicable): www.midlandstech.edu/procurement

Posting date will be announced at bid opening. In addition to posting the notice, the Owner will promptly send all responsive bidders a copy of the notice of intent to award and the final bid tabulation

7.5 Protest of Solicitation or Award: Any prospective bidder, offeror, contractor or subcontractor who is aggrieved in connection with the solicitation of a contract shall protest within fifteen days of the date of issuance of the applicable solicitation document at issue. Any actual bidder, offeror, contractor or subcontractor who is aggrieved in connection with the intended award or award of a contract shall protest within ten (10) days of the date notification of intent to award is posted in accordance with Title 11, Chapter 35, Section 4210 of the South Carolina Code of Laws. A protest shall be in writing, shall set forth the grounds of the protest and the relief requested with enough particularity to give notice of the issues to be decided, and must be received by the State Engineer within the time provided. Any protest must be addressed to the CPO, Office of State Engineer, and submitted in writing (a) by email to protest-ose@mmo.sc.gov, (b) by facsimile at 803-737-0639, or (c) by post or delivery to 1201 Main Street, Suite 600, Columbia, SC 29201. By submitting a protest to the foregoing email address, you (and any person acting on your behalf) consent to receive communications regarding your protest (and any related protests) at the e-mail address from which you sent your protest.

SE-656
INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION SERVICES INDEFINITE DELIVERY CONTRACT

7.6 Solicitation Information from Sources Other Than Official Source: South Carolina Business Opportunities (SCBO) is the official state government publication for State of South Carolina solicitations. Any information on State agency solicitations obtained from any other source is unofficial and any reliance placed on such information is at the bidder's sole risk and is without recourse under the South Carolina Consolidated Procurement Code.

7.7 Installation Floater/Builder's Risk Insurance: Agency insures its property through the South Carolina Insurance Reserve Fund. The Insurance Reserve Fund will not name a third party as an additional insured nor will it allow the Agency to waive subrogation. Pursuant to Section H of the SE-680, Agency may require Bidder to provide an installation floater or builder's risk insurance when issuing a Delivery Order under the IDC.

7.8 Tax Credit for Subcontracting with Disadvantaged Small Businesses: Pursuant to Section 12-6-3350, a taxpayer having a contract with this State who subcontracts with a socially and economically disadvantaged small business is eligible for an income tax credit equal to four percent of the payments to that subcontractor for work pursuant to the contract. The subcontractor must be certified as a socially and economically disadvantaged small business as defined in SC Code § 11-35-5010 and regulations pursuant to it. The credit is limited to a maximum of fifty thousand dollars annually. A taxpayer is eligible to claim the credit for ten consecutive taxable years beginning with the taxable year in which the first payment is made to the subcontractor that qualifies for the credit. After the above ten consecutive taxable years, the taxpayer is no longer eligible for the credit. A taxpayer claiming the credit shall maintain evidence of work performed for the contract by the subcontractor. The credit may be claimed on Form TC-2, "Minority Business Credit." A copy of the subcontractor's certificate from the Governor's Office of Small and Minority Business (OSMBA) is to be attached to the contractor's income tax return. Questions regarding the tax credit and how to file are to be referred to: SC Department of Revenue, Research and Review. Questions regarding subcontractor certification are to be referred to: SC Division of Small and minority Business Contracting and Certification (SMBCC).

7.9 Performance & Payment Bonds; Pursuant to SC Code § 11-35-3030, when the Agency awards a Delivery Order to the Indefinite Delivery Contractor in excess of $50,000, the Contractor shall provide Performance and Payment Bonds each in the amount of 100% of the delivery order price. See Sections 3.18 & 3.19 of the SE-685 for more details.

7.10 Other Special Conditions:

N/A

THE BIDDER SHALL USE AIA DOCUMENT A310 BID BOND FORM AS REQUIRED IN BID DOCUMENTS.

AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)

BOND AMOUNT:

PROJECT:
(Name, location or address, and Project number, if any)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this day of

(Witness)	*(Contractor as Principal)* *(Seal)*
	(Title)
(Witness)	*(Surety)* *(Seal)*
	(Title)

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

Init.
/

SE-659
CONSTRUCTION SERVICES INDEFINITE DELIVERY CONTRACT REPRESENTATIVE PROJECT BID FORM

Bidders shall submit bids on only Bid Form SE-659.

BID SUBMITTED BY: _____
(Bidder's Name)

BID SUBMITTED TO: Midlands Technical College
(Owner's Name)

FOR: REPRESENTATIVE PROJECT NAME: Midlands technical College CET Building Data Room HVAC Upgrade

REPRESENTATIVE PROJECT NUMBER: H59-N004-FW

IDC PROJECT NUMBER: H59-D943-FW

OFFER

§ 1. In response to the Invitation for Indefinite Delivery of Construction Services and in compliance with the Instructions to Bidders for the above-named Project, the undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into a Contract with the Owner on the terms included in the Bidding Documents, and to perform all Work as specified or indicated in the Bidding Documents, for the prices and within the time frames indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

§ 2. Pursuant to SC Code § 11-32-3030(1), Bidder has submitted Bid Security as follows in the amount and form required by the Bidding Documents:

☐ **Bid Bond with Power of Attorney** ☐ **Electronic Bid Bond** ☐ **Cashier's Check**
(Bidder check one)

§ 3. Bidder acknowledges the receipt of the following Addenda to the Bidding Documents and has incorporated the effects of said Addenda into this Bid:

(Bidder, check all that apply. Note that there may be more boxes than actual addenda. Do not check boxes that do not apply)

ADDENDA: ☐ **#1** ☐ **#2** ☐ **#3** ☐ **#4** ☐ **#5**

§ 4. Bidder accepts all terms and conditions of the Invitation for Bids, including, without limitation, those dealing with the disposition of Bid Security. Bidder agrees that this Bid may not be revoked or withdrawn after the opening of bids, and shall remain open for acceptance for a period of **60** Days following the Bid Date, or for such longer period of time that Bidder may agree to in writing upon request of the Owner.

§ 5. Bidder herewith offers to provide all labor, materials, equipment, tools of trades and labor, accessories, appliances, warranties and guarantees, and to pay all royalties, fees, permits, licenses and applicable taxes necessary to complete the following items of construction work:

§ 6. REPRESENTATIVE PROJECT WORK DESCRIPTION *(as indicated in the Bidding Documents and generally described as follows)***:** Replace existing Liebert unit and condensing unit serving the data center. Add back-up wall mounted mini split system in the data center.

$ _____, which sum is hereafter called the Base Bid.
(Bidder - insert Bid Amount for Representative Project on line above)

The bid price shown above will be used to determine which bidders will receive award of an Indefinite Delivery Contract. The lowest responsive and responsible bidder will also receive a Delivery Order to perform the above described work at the price bid. Award and pricing of subsequent Delivery Orders shall be determined by competitive bidding between Indefinite Delivery Contractors receiving an award of an Indefinite Delivery Contract pursuant to this solicitation.

SE-659
CONSTRUCTION SERVICES INDEFINITE DELIVERY CONTRACT REPRESENTATIVE PROJECT BID FORM

§ 6.1 UNIT PRICES FOR REPRESENTATIVE PROJECT:

BIDDER offers for the Agency's consideration and use, the following UNIT PRICES for use with the REPRESENTATIVE PROJECT. The UNIT PRICES offered by BIDDER indicate the amount to be added to or deducted from the REPRESENTATIVE PROJECT DELIVERY ORDER for each item-unit combination. UNIT PRICES include all costs to the Agency, including those for materials, labor, equipment, tools of trades and labor, fees, taxes, insurance, bonding, overhead, profit, etc. The Agency reserves the right to include or not to include any of the following UNIT PRICES in the Representative Project Delivery Order and to negotiate the UNIT PRICES with BIDDER.

NOTE: These UNIT PRICES are ONLY for the Representative Project Delivery Order and Bidder is not required to honor these on future Deliver Orders under this IDC.

NO.	ITEM	UNIT OF MEASURE	ADD	DEDUCT
1.			$	$
2.			$	$
3.			$	$
4.			$	$
5.			$	$
6.			$	$

§ 7. TIME OF CONTRACT PERFORMANCE AND LIQUIDATED DAMAGES – INDEFINITE DELIVERY CONTRACT

Bidder agrees that the Date of Commencement of any contract awarded pursuant to the Invitation for Bids shall be established in the Agreement for Indefinite Delivery of Construction Services to be executed by the Owner and the successful Bidder. Bidder also agrees that individual Delivery Orders, if any, shall establish the Date of Commencement, the time to complete the Work included in the Delivery Order (or the completion date), and the amount, if any, the Owner shall retain from the compensation to be paid as Liquidated Damages for each calendar day the actual construction time required to complete the Work exceeds the specified or adjusted time for completion as provided in the Contract Documents.

§ 7.1 TIME OF CONTRACT PERFORMANCE AND LIQUIDATED DAMAGES - REPRESENTATIVE PROJECT

a) CONTRACT TIME: Bidder agrees that the Date of Commencement of the Work shall be established in the Delivery Order for this Work to be issued by the Owner. Bidder agrees to substantially complete the Work within **90** Calendar Days from the Date of Commencement, subject to adjustments as provided in the Contract Documents.

b) LIQUIDATED DAMAGES: Bidder further agrees that from the compensation to be paid, the Owner shall retain as Liquidated Damages the amount of $ **500.00** for each Calendar Day the actual construction time required to achieve Substantial Completion exceeds the specified or adjusted time for Substantial Completion as provided in the Contract Documents. This amount is intended by the parties as the predetermined measure of compensation for actual damages, not as a penalty for nonperformance.

SE-659
CONSTRUCTION SERVICES INDEFINITE DELIVERY CONTRACT REPRESENTATIVE PROJECT BID FORM

§ 8. AGREEMENTS

a) Bidder agrees that this bid is subject to the requirements of the laws of the State of South Carolina.

b) Bidder agrees that at any time prior to execution of the Construction Services Indefinite Delivery Contract for this Project, this Project may be canceled for the convenience of, and without cost to, the State.

c) Bidder agrees that neither the State of South Carolina nor any of its agencies, employees or agents shall be responsible for any bid preparation costs, or any costs or charges of any type, should all bids be rejected or the Project canceled for any reason prior to execution of the Construction Services Indefinite Delivery Contract.

§ 9. ELECTRONIC BID BOND

By signing below, the Principal is affirming that the identified electronic bid bond has been executed and that the Principal and Surety are firmly bound unto the State of South Carolina under the terms and conditions of the AIA Document A310, Bid Bond, included in the Bidding Documents.

ELECTRONIC BID BOND NUMBER: _____

SIGNATURE AND TITLE: _____

CONTRACTOR'S CLASSIFICATIONS AND SUBCLASSIFICATIONS WITH LIMITATION

SC Contractor's License Number(s): _____

Classification(s) & Limits: _____

Subclassification(s) & Limits: _____

By signing this Bid, the person signing reaffirms all representation and certification made by both the person signing and the Bidder, including without limitation, those appearing in Article 2 of the Instructions to Bidders, is expressly incorporated by reference.

BIDDER'S LEGAL NAME: _____

ADDRESS: _____

_____

TELEPHONE: _____

EMAIL: _____

SIGNATURE: _____ **DATE:** _____

PRINT NAME: _____

TITLE: _____

SE-680
CONSTRUCTION SERVICES INDEFINITE DELIVERY CONTRACT

AGENCY: Midlands Technical College

PROJECT NAME: IDC-MTC-Mechanical Construction Services

PROJECT NUMBER: H59-D943-FW

AGENCY PROCUREMENT OFFICER: Latitia Trazevant

THIS AGREEMENT is made this the _____ day of _____ in the year Two Thousand Nineteen by and between

NAME: Midlands Technical College

ADDRESS: 1260 Lexington Drive
West Columbia, SC 29170

hereinafter called the "Agency", and

NAME: _____

ADDRESS: _____

_____

hereinafter called the "Contractor."

WHEREAS, the Agency solicited bids for construction services, for the work description below, for projects to be determined, on an as-needed basis:

WORK DESCRIPTION: Mechanical Construction Services to include HVAC, Boiler work subject to the SC Boiler Safety Act, and Plumbing

WHEREAS, Contractor submitted a successful bid to provide the services described above on an as-needed basis.

NOWTHEREFORE, in consideration of the mutual covenants and obligations set forth herein, the Agency and Contractor (hereinafter jointly referred to as the "parties") agree as follows:

A. Contract Term:

1. The effective date of this agreement shall commence as of the date at the top of this page and the term shall extend until _____, 20_ (not to exceed two (2) years). The parties may not renew this agreement for an additional term nor may they extend the duration of this agreement by amendment or waiver.

2. Contractor proposals accepted by the Agency within the time limits of the contract may be completed by the Contractor even though the completion date may extend beyond the term of the contract.

B. Contract Documents:

1. Documents forming a part of the contract are:

- **a.** This Agreement for Indefinite Delivery of Construction Services;
- **b.** Invitation for Construction Services Indefinite Delivery Contract dated **x**;
- **c.** General Conditions to Construction Services Indefinite Delivery Contract (SE-685);
- **d.** Contractors completed IDC Bid Form SE-6**59**;
- **e.** Agency requests for proposals for construction services made pursuant to this contract;
- **f.** Proposals issued by the contractor in response to the Agency's request for proposals;
- **g.** Delivery Orders (SE-690) and Modifications (SE-695) issued by the Agency pursuant to this contract;
- **h.** Project Manual issued with the Invitation for Construction Services Indefinite Delivery Contract, if any;
- **i.** Addenda to the Invitation for Construction Services Indefinite Delivery Contract issued prior to the date of bid opening;
- **j.** The following other documents:

_____
_____

2. The contract is the entire and integrated agreement between the parties and supersedes prior negotiations, representations, or agreements, whether written or oral.

C. The Work:

1. The Agency will request proposals for construction services on an as-needed basis. The scope of services will be within the general description of work set forth above and within the expenditure limits set forth in the Invitation for Construction Services Indefinite Delivery Contract. The Agency will award work by issuing the contractor a Delivery Order using the Construction Services IDC Delivery Order (SE-690). The method for requesting proposals and awarding Delivery Orders shall be in accordance with the procedures set forth in Part 4 of the General Conditions.

2. The Contractor shall not incur any expense chargeable to the Agency on or about the work of any Delivery Order assigned to this contract until the Delivery Order has been awarded and fully executed by both the Agency and the Contractor.

D. Payment:

Contractor shall make application for payment for work performed under Delivery Orders and the Agency shall make payment in the form and manner set forth in Part 4.3 of the General Conditions.

E. Suspension or Termination:

The parties may terminate the contract only in the manner provided in Part 9 of the General Conditions.

F. Dispute Resolution:

The parties shall resolve all disputes in the manner provided in Part 5 of the General Conditions.

G. Representatives:

1. Agency's Representative:

Agency designates the individual listed below as its Representative, which individual has the authority and responsibility set forth in Part 2.2 of the General Conditions:

NAME: Carey Page

TITLE: Associate Director of Operations

ADDRESS: PO Box 2408, Columbia, SC 29202

TELEPHONE: 803-822-3217 **EMAIL:** pagewc@midlandstech.edu

2. Contractor's representative:

Contractor designates the individual listed below as its Contractor's Representative, which individual has the authority and responsibility set forth in Part 3.2 of the General Conditions:

NAME: _____

TITLE: _____

ADDRESS: _____

TELEPHONE: _____ **EMAIL:** _____

3. Neither the Agency nor the Contractor shall change their representatives without ten days written notice to the other party.

H. Insurance and Performance & Payment Bonds:

The Contractor shall purchase and maintain insurance and provide Performance and Payment Bonds as set forth in Parts 3.18 and 3.19 of the General Conditions.

AGENCY:	**CONTRACTOR:**
BY: _____ *(Signature of Representative)*	**BY:** _____ *(Signature of Representative)*
PRINT NAME: Carey Page	**PRINT NAME:** _____
PRINT TITLE: Associate Director of Operations	**PRINT TITLE:** _____
DATE: _____	**DATE:** _____

SE-685
GENERAL CONDITIONS TO CONSTRUCTION SERVICES INDEFINITE DELIVERY CONTRACT

AGENCY: Midlands Technical College

PROJECT NAME: IDC-MTC-Mechanical Construction Services

PROJECT NUMBER: H59-D943-FW

CONTRACTOR: _____

1. GENERAL INFORMATION

1.1 Contract Documents: The Contract Documents are identified in the Construction Services Indefinite Delivery Contract (the "Contract"). The Contract can only be modified by written agreement signed by both the Agency and the Contractor. The Contract Documents do not create a contractual relationship between the Contractor and any separate Contractor having a contract with the Agency; between the Agency and any subcontractor to the Contractor of any tier; or between any persons or entities other than the Agency and the Contractor.

1.2 Delivery Order: A Delivery Order is a written order issued by the Agency to the Contractor under the terms and conditions of the Contract, directing the Contractor to perform the work described therein. The Agency shall issue the Delivery Order on the Construction Services IDC Delivery Order (SE-690).

1.3 Contractor shall not incur any expense chargeable to the Agency on or about the work of any Delivery Order assigned to this contract until the Delivery Order has been awarded and fully executed by both the Agency and the Contractor.

1.4 The Contract is subject to strict expenditure and term limits set forth in SC Code § 11-35-3310 and further explained in the Manual for Planning and Execution of State Permanent Improvements, Part II (the "Manual"). Any modification to the Contract purporting to exceed these strict limits are null and void. The limits applicable to this Contract are set forth in Part I of the Invitation for Construction Services - Indefinite Delivery Contract.

1.5 The Work: As used herein, the "Work" means any work required of or performed by the Contractor pursuant to each and every Delivery Order issued by the Agency under this Contract.

2. AGENCY

2.1 The term "Agency" means the Agency or the Agency's Representative.

2.2 Representative: The Agency's representative designated in Part G(1) of the Construction Services Indefinite Delivery Contract (SE-680) shall have the authority to bind the Agency with respect to all matters regarding the Contract and requiring the Agency's approval or authorization.

2.3 Information to the Contractor: The Agency shall furnish, with reasonable promptness, information requested by the Contractor that is necessary for the performance of the Contract Services and under the Agency's control. Any information or documentation provided by the Agency to the Contractor relating to the Project or Site is provided only for the convenience of the Contractor. The Agency makes no representation or warranty to as to the sufficiency, completeness, or accuracy of such information.

2.4 Utility Access and Use:

☒ If this box is checked, the Agency shall allow the Contractor to use reasonable quantities of water and electricity for construction purposes without charge, as long as these utilities are available and in close proximity to the Work area. Contractor shall be conscientious in controlling excessive or frivolous use of the utilities or the Agency may charge the Contractor for wasteful usage.

2.5 Sanitary Facilities: *(Agency, check box that applies to this contract)*

☒ The Contractor may use those sanitary facilities designated by the Agency in each Delivery Order as available for use.

☐ The Contractor may not use the Agency's sanitary facilities. The Contractor shall provide sanitary facilities at the job site and maintain same in a clean and sanitary condition for the use of its employees and employees of its subcontractors for the duration of construction. The sanitary facilities shall conform to the requirements of the South Carolina Department of Health and Environmental Control.

2.6 Permits, Assessments, and Easements: The Agency shall secure and pay for all building permits, zoning permits, assessments, and easements except as required by any Delivery Order issued under the terms of the contract

2.7 Agency's Architect-Engineer (A/E): The Agency may retain an independent A/E to prepare design documents for the work of a specific Delivery Order. In such event, the A/E will be a representative of the Agency during the performance of such work through final completion of such work. In the absence of an independent A/E, the Agency will assign one of its employees to act as A/E for the work of a particular Delivery Order. The Contractor shall cooperate with the A/E in the performance of its duties. The A/E will perform the following duties:

a. The A/E will make periodic visits to the site during contract administration to become familiar with the progress of the work and to determine if the work is generally progressing in accordance with the contract documents.

b. The A/E will make recommendations to the Agency as to acceptance or rejection of the work and, upon the Agency's concurrence, communicate the acceptance or rejection of the work to the Contractor.

c. The A/E will review and approve or reject shop drawings and samples submitted by the Contractor showing details/finishes of the work proposed to be installed.

d. The decision of the A/E in all matters relating to design and interpretation of contract documents shall, subject to the provisions of Part 5 (Dispute Resolution) be final.

e. The A/E will not be responsible for construction means, methods, techniques, procedures and safety measures in the performance of the work nor acts or omissions of the Contractor, subcontractors or any other entity performing work on the site.

f. The A/E will review requests for payment, and make recommendations to the Agency for approval or rejection of all or part of the request.

g. The A/E will prepare change orders or change directives for review and approval by the Agency.

2.8 Construction by Agency: The Agency may do work with its own forces or award separate contracts for work on the same project as may be awarded by Delivery Order under this contract. The Contractor shall allow access to the site by the Agency's work force or separate Contractor(s), and shall cooperate in coordinating the progress of the work with the Agency. The Agency shall have the responsibility to coordinate the activities of the various Contractors working at the project location.

3. CONTRACTOR

3.1 The term "Contractor" means the Contractor or the Contractor's Representative.

3.2 Representative: The Contractor's representative designated in Part G(2) of the Construction Services Indefinite Delivery Contract (SE-680) shall have the authority to bind the Contractor with respect to all matters regarding the Contract and requiring the Contractor's approval or authorization.

3.3 Supervision and Performance of the Work: The Contractor shall supervise, perform, and direct the Work, using the professional skill, care, and attention reasonably required for similar projects. The Contractor shall be solely responsible for and have control over means, methods, techniques, sequences, and procedures and for coordinating the Work, unless the Contract Documents give other specific instructions concerning these matters. The Contractor agrees to faithfully and fully perform the terms of this Contract, and any Delivery Order issued under this Contract and shall complete the Work in accordance with the Contract Documents and deliver the Work to the Agency free and clear of all liens and claims. The Contractor shall, at all times during the progress the Work, employ enough skilled workers and have on hand and maintain an adequate supply of materials and equipment to complete the Work in accordance with the construction schedules agreed to in applicable Delivery Orders.

3.4 Employee Discipline: The Contractor shall enforce discipline and good order among the Contractor's and subcontractors' employees, and other persons carrying out the Work. Contractor shall be responsible to the Agency for acts and omissions of the Contractor's employees, subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

3.5 Safety: The Contractor shall comply with all federal and state work site safety requirements and shall be responsible for initiating, maintaining, and supervising reasonable safety precautions and programs in connection with the performance of the Contract Services. The Contractor shall take reasonable precautions for safety of, and shall provide reasonable and appropriate protection to prevent damage, injury or loss to (1) employees on the Work and other persons who may be affected thereby; (2) the Work and materials and equipment to be incorporated therein; and (3) other property at the site of the Work or adjacent thereto.

3.6 Waste Materials and Rubbish: The Contractor shall keep the premises and surrounding areas free from accumulation of waste materials or rubbish caused by the Work. Upon Final Acceptance of the Work, the Contractor shall, to the Agency's satisfaction, remove from and about the site, all waste materials, rubbish, surplus material, and Contractor's tools, equipment, machinery.

3.7 Recycling: The Contractor shall give preference to the use of products containing recycled content in the performance of the Work. The Contractor shall cooperate with any recycling program established for the site of the work of any Delivery Order or available through the state or a political subdivision of the state.

3.8 Access to the Work: The Contractor shall provide the Agency with unrestricted access to the Work in preparation and progress wherever located.

3.9 Use of Site: The Contractor shall confine its operations to the portions of the site identified in each Delivery Order or otherwise approved by the Agency, and shall not unreasonably encumber the portions of the site used for the Work with materials, equipment, or similar items. The Contractor and all subcontractors shall use only such entrances to the Site as are designated by the Agency. During occupied hours, Contractor shall limit construction operations to methods and procedures that do not adversely affect the environment of occupied spaces within the Site, including but not limited to creating noise, odors, air pollution, ambient discomfort, or poor lighting.

3.10 Correction of the Work:

3.10.1 The Agency shall have the right and authority to reject Work that does not conform to the Contract Documents. The Contractor shall promptly correct Work rejected by the Agency for failing to conform to the requirements of the Contract Documents, whether or not fabricated, installed or completed. The provisions of this Section 3.10 apply to Work done by subcontractors as well as to Work done by direct employees of the Contractor.

3.10.2 If the Contractor fails to correct the Work, or any portion thereof, that is not in accordance with the requirements of the Contract Documents or fails to carry out Work or provide information in accordance with the Contract Documents, the Agency may make written demand upon the Contractor to cure its defaults within seven days. Within seven days after receipt of the Agency's demand, the Contractor shall cure its defaults unless the default is such that it is not capable of cure within seven days. If the default is such that it is not capable of cure within seven days, the Contractor shall reach an agreement with the Agency on a plan to cure its defaults within five days after receipt of the Agency's demand. The Contractor shall commence and diligently and continuously pursue the cure of such defaults in accordance with the agreed plan. If the Contractor fails to cure its defaults as heretofore provided, the Agency may order the Contractor, in writing, to stop the Work, or any portion thereof, until the Contractor has eliminated the cause for such order or has provided the Agency with a plan for corrective action acceptable to the Agency. The right of the Agency to stop the Work shall not give rise to a duty on the part of the Agency to exercise this right for the benefit of the Contractor or any other person or entity.

3.10.3 Correction after Substantial Completion: If, within one year after the date of Substantial Completion of the Work, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Agency to do so. The Contractor's obligation set forth in this Part 3.10.3 is in addition to the Contractor's obligations under Part 3.12.

3.10.4 Nothing contained in this Part 3.10 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of such time period as described in this Section 3.10 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

3.11 Manufacturers' Warranties: At Final Acceptance of the Work, the Contractor shall furnish the Agency two original complete sets of all manufacturers' warranties, guarantees, parts lists, and literature applicable to equipment, systems, fittings, and furnishings included in the Work (collectively referred to as "*Manufacturers' Warranties*"), completed in favor of the Agency. These Manufacturers' Warranties are in addition to and not in lieu of the Contractor's warranty set forth in Part 3.12, and the Agency is entitled to look to the Contractor for remedy in all cases where the Contractor's warranty applies regardless of whether a Manufacturer's Warranty also applies. The Agency shall acknowledge receipt of the sets of Manufacturers' Warranties on the set itself, and the Contractor shall cause six (6) copies of an acknowledged set to be made and furnished to the Agency. All Manufacturers' Warranties will be for applicable periods and contain terms not less favorable to the Agency than those terms that are standard for the applicable industries, and will either be issued in the first instance in the name of and for benefit of the Agency, or be in a freely assignable form and be assigned to the Agency without limitations.

3.12 Contractor Warranty: The Contractor warrants to the Agency that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from faults and defects not inherent in the quality required or permitted, that the materials, equipment and Work will conform with the requirements of the Contract Documents, and that the Work will be free from any encumbrances, liens, security interests, or other defects in title upon conveyance of title to the Agency. The Contractor's warranty excludes remedy for damage or defect to the extent caused by (i) abuse by anyone other than the Contractor or those for whose acts the Contractor is responsible, (ii) modifications not approved or executed by the Contractor or subcontractors, (iii) improper or insufficient maintenance or operation not the fault of the Contractor or those for whose acts the Contractor is responsible, or (iv) normal wear and tear under normal usage. If required by the Agency, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment and the recommended maintenance thereto to meet the requirements of this Part.

3.13 After completion of the Work but no later than the date of Substantial Completion, the Contractor shall submit operation and maintenance manuals, recommended spare parts lists, and copies of all warranties to the Agency. As-Built drawings shall be submitted no later than the Final Completion Date.

3.14 Compliance with Law:

3.14.1 The Contractor shall comply with and give all notices required by federal, state, county, and municipal laws, ordinances, regulations, and orders bearing on the performance by the Contractor of the duties or responsibilities under this Contract.

3.14.2 The Contractor shall promptly remedy any violation of any such law, ordinance, rule, regulation, or order that comes to its attention to the extent that the same results from its performance of the Work. The Contractor shall promptly, and in no event later than the close of the next business day following receipt, give notice to the Agency by telephone, with confirmation in writing, of receipt by the Contractor of any information relating to violations of laws, ordinances, rules, regulations, and orders.

3.15 Subcontractors:

3.15.1 The Contractor shall furnish in writing to the Agency for its approval the names of the subcontractors to whom the Contractor plans to award any portion of the Contract Services.

3.15.2 Contracts between the Contractor and subcontractors shall require each subcontractor, to the extent of the Contract Services to be performed by the subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by the Contract Documents, assumes toward the Agency.

3.15.3 The Contractor shall be responsible to the Agency for acts and omissions of the subcontractors, their agents and employees, and any other persons performing portions of the Contract Services, to the same extent as the acts or omissions of the Contractor hereunder.

3.16 Publicity: Contractor shall not publish any comments or quotes by State employees, or include the State in either news releases or a published list of agencies, without the prior written approval of the Agency.

3.17 Indemnification

3.17.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Agency and the Agency's agents and employees from and against claims, damages, losses and expenses, including, but not limited to, reasonable attorney's fees, arising out of or resulting from performance of the work of a Delivery Order, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), including loss of use resulting therefrom, but only to the extent caused by negligent acts or omissions of the Contractor, a subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder.

3.17.2 In claims against any person or entity indemnified under Part 3.17.1 by an employee of the Contractor, a subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this Part 3.17 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for Contractor or a subcontractor under workers' or workmen's compensation acts, disability benefit acts, or other employee benefit acts.

3.18 Insurance

3.18.1 Commercial General Liability, Business Automobile Liability, and Worker's Compensation: The Contractor shall purchase from and maintain, in a company or companies lawfully authorized to do business in South Carolina, such insurance as will protect Contractor from claims set forth below, which may arise out of or result from Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

(a) claims under workers' compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;

(b) claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;

(c) claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;

(d) claims for damages insured by usual personal injury liability coverage;

(e) claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;

(f) claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;

(g) claims for bodily injury or property damage arising out of completed operations; and

(h) claims involving contractual liability insurance applicable to the Contractor's obligations under Part 3.17, Indemnification.

3.18.1.1 The insurance required by Part 3.18.1 shall be written for not less than the limits of liability specified below or required by law, whichever is greater. Coverage shall be written on an occurrence basis and shall be maintained without interruption from the date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work set forth in Part 3.10 or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

(a) COMMERCIAL GENERAL LIABILITY:
(1) General Aggregate (per project) $1,000,000
(2) Products/Completed Operations $1,000,000
(3) Personal and Advertising Injury $1,000,000
(4) Each Occurrence $1,000,000
(5) Fire Damage (Any one fire) $50,000
(6) Medical Expense (Any one person) $5,000

(b) BUSINESS AUTO LIABILITY (including All Owned, Non-owned, and Hired Vehicles):
(1) Combined Single Limit ..... $1,000,000 OR
(2) Bodily Injury & Property Damage (each) $750,000

(c) WORKER'S COMPENSATION:
(1) State Statutory
(2) Employers Liability ..... $100,000 per Acc.
$500,000 Disease, Policy Limit
$100,000 Disease, Each Employee

In lieu of separate insurance policies for Commercial General Liability, Business Auto Liability, and Employers Liability, the Contractor may provide an umbrella policy meeting or exceeding all coverage requirements set forth in this Part 3.18.1. The umbrella policy limits shall not be less than $5,000,000.

3.18.1.2 Prior to commencement of the Work, and thereafter upon replacement of each required policy of insurance, Contractor shall provide to the Agency a written endorsement to the Contractor's general liability insurance policy that:

(i) names the Agency as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations;

(ii) provides that no material alteration, cancellation, non-renewal, or expiration of the coverage contained in such policy shall have effect unless all additional insured have been given at least ten (10) days prior written notice of cancellation for non-payment of premiums and thirty (30) days prior written notice of cancellation for any other reason; and

(iii) provides that the Contractor's liability insurance policy shall be primary, with any liability insurance of the Agency as secondary and noncontributory.

3.18.1.3 Before commencement of the Work, and thereafter upon renewal or replacement of each required policy of insurance, Contractor shall provide to the Agency a signed, original certificate of liability insurance (ACORD 25). Consistent with this Part 3.18.1, the certificate shall identify the types of insurance, state the limits of liability for each type of coverage, name the Agency as Certificate Holder, provide that the general aggregate limit applies per project, and provide that coverage is written on an occurrence basis. Both the certificates and the endorsements must be received directly from either the Contractor's insurance agent or the insurance company. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, naming the Agency as an additional insured for claims made under the Contractor's completed operations, and otherwise meeting the above requirements, shall be submitted with the Contractor's final request for payment for the Work and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Part 3.18.1. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

3.18.1.4 A failure by the Agency either (i) to demand a certificate of insurance or written endorsement required by Part 3.18.1, or (ii) to reject a certificate or endorsement on the grounds that it fails to comply with Part 3.18.1, shall not be considered a waiver of Contractor's obligations to obtain the required insurance.

3.18.2 Property Insurance:

3.18.2.1 Builder's Risk Insurance: Unless otherwise specified in the Delivery Order, at the time of execution of a Delivery Order and before commencing work under that Delivery Order, Contractor shall purchase property insurance written on a builder's risk "all risk" or equivalent policy form on a replacement cost basis. Contractor shall maintain such property insurance until the Agency has made final payment for the work of the Delivery Order or until no person or entity other than the Agency has an insurable interest in the property required by this Paragraph 3.18.2 to be covered, whichever is later. This insurance shall include and be in an amount sufficient to cover at all times during the performance of the work of the Delivery Order, the interests of the Contractor, Subcontractors and Sub-subcontractors in the Delivery Order Project. The property insurance shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, false work, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

3.18.2.2 Equipment Breakdown Insurance: In the event the Contractor installs and runs and/or operates (whether for testing or other purposes) heating, air conditioning, and electrical machinery and equipment, the Contractor shall purchase and maintain equipment breakdown (boiler and machinery) insurance, which shall specifically cover such objects during installation and until final acceptance by the Agency. This insurance shall include interests of the Agency, Contractor, and subcontractors at any tier in the Work, and the Agency and Contractor shall both be named insured.

3.18.2.3 Before an exposure to loss may occur, the Contractor shall file with the Agency a copy of each policy that includes insurance coverage required by this Part 3.18.2. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project.

3.18.2.4 Waiver of Subrogation: The Agency and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, for damages caused by fire or other causes of loss to the extent the property insurance provided by the Contractor pursuant to this Section 3.18.2 covers and pays for the damage, except such rights as they have to proceeds of such insurance held by the Contractor. The Agency or Contractor, as appropriate, shall require of the subcontractors, sub-subcontractors, agents and employees, each of the other, by appropriate written agreements, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of

indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

3.19 Performance and Payment Bonds: Prior to beginning work on a Delivery Order, the Contractor shall deliver to the Agency a Performance Bond and a Labor & Material Payment Bond if the Contractor's agreed upon compensation for the Work of the Delivery Order exceeds $50,000 or the Agency requests such bonds. Each bond shall be in the amount of 100% of the amount of the Delivery Order. The Contractor's Performance Bond shall be in the form of the SE-355, Performance Bond, and the Labor & Material Payment Bond shall be in the form of the SE-357, Labor & Material Payment Bond. The surety company providing the Bonds shall have, at a minimum, a "Best Rating" of "A" as stated in the most current publication of "Best's Key Rating Guide, Property - Casualty." Contractor's failure to provide bonds as herein required shall be an event of default justifying the Agency, in its sole discretion, in terminating this Contract for cause.

3.20 Shop Drawings and Samples:

3.20.1 Contractor shall prepare or cause to be prepared shop drawings for fabricated items. Shop drawings shall consist of drawings, diagrams, illustrations, schedules, brochures, and other data which are prepared by the Contractor, sub-Contractor, manufacturer, supplier, or distributor and depict that portion of the work. Shop drawings shall be submitted, reviewed, and approved by the Contractor prior to submitting to the Agency and A/E. Shop drawings approved by the Contractor shall bear a stamp denoting that they have been review and are "approved" or "approved as noted" or similar designation. Contractor shall submit the number of sets as specified in the Delivery Order plans or specifications or in the absence of a specification submit enough copies for the Agency to retain two copies plus the number desired to be returned to the Contractor. The Agency and A/E will review the shop drawings with reasonable promptness but only for conformity with the design.

3.20.2 Contractor shall submit samples as required by the Delivery Order. Samples are physical examples furnished by the Contractor of sufficient size and quantity to provide a good representation of the material proposed to be installed. Samples submitted will not be returned unless requested by Contractor and agreed to by the A/E. The Contractor shall pay shipping costs. The final installed product shall match the approved sample.

3.21 Inspection and Testing of Materials:

3.21.1 The Contractor shall leave uncovered all areas of work that will be covered that are called out in the construction documents to be left uncovered, or the Agency or A/E requests to be left uncovered prior to being inspected. The Contractor shall give adequate notice to the Agency and A/E of the time requested for an inspection of areas to be covered.

3.21.2 If the Contractor covers areas that were to be left uncovered, the Contractor shall cause the area to be uncovered for inspection. After being inspected, the Contractor shall repair the area with craftsmen skilled in the appropriate trades needed for the repair at no additional cost to the Agency.

3.22 Substitutions:

3.22.1 The Contractor shall submit proposed substitutions to the Agency for the Agency's approval prior to execution of each Delivery Order.

3.22.2 Reference in the Contract Documents to a designated material, product, thing, or service by specific brand or trade name followed by the words "or equal" and "or approved equal" shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition. The Contractor may use the products of other another manufacturer's provided it is an 'approved equal' that meets or exceeds the specification for the specified product. The Contractor must submit adequate information about the product to show that the submitted product meets the level of quality as the product specified.

3.22.3 The Contractor shall not substitute any product, article, appliance, equipment, or material that is specified without prior written approval of the Agency.

3.23 Receiving and Storing Materials and Equipment: The Contractor shall have an authorized person or persons to receive all items delivered to the site of the Work and shall properly unload, check for completeness of shipment, and in-transit damage. The Contractor shall properly handle and store materials, supplies, equipment etc. in accordance with the contract documents or manufacturer's printed instructions for each product.

3.24 Schedule and Reports: Promptly after the Agency issues a Delivery Order, the Contractor shall present a construction schedule in a form satisfactory to the Agency. At intervals agreed upon in the Delivery Order, the Contractor shall update the schedule showing the actual progress of the work and adjustment in completion dates. If the work falls behind schedule, the Contractor shall present a plan for completion of the work by the scheduled date for completion.

3.25 Time for Completion:

3.25.1 Each Delivery Order signed by the Agency and Contractor shall set forth the time for completion of the Work specified therein. Contractor shall make a request for extension of time within seven days of the event giving rise to the request. The Contractor shall adequately document delays of the work that are due to circumstances beyond the control of the Contractor and shall submit the documentation to the Agency with any request for an extension. In the event of ongoing delay, the Contractor shall notify the Agency in its request for an extension of time that the cause of delay is ongoing. In such case, the Contractor shall supplement its request the cause of delay ends or the project is completed, whichever is sooner.

3.25.2 The Agency will review each request for time extension and equitably adjust the time for completion where (1) the event of delay actually impacted the critical path of the project and was beyond the control of the Contractor, and (2) completion of the Work was actually delayed.

4. CONTRACT ADMINISTRATION

4.1 Delivery Order - Cost Proposal: From time to time, the Agency will request a cost proposal for specific work and provide the Contractor adequate project information necessary to prepare a cost proposal. The Contractor shall prepare a cost proposal to complete the Work as requested. Unless specified by the Agency in its request, the cost proposal shall include the time frame for completion of the work. The Contractor shall submit the cost proposal to the Agency within one week of the request or as otherwise agreed upon by the Agency. The cost proposal shall be prepared according to the following method: *(Agency, check box that applies to this contract)*

☐ **Unit Prices –** Unless the Contractor proposes to provide work at a lower price, the Contractor shall use the unit prices, as bid, times the number of units required for the Work to arrive at an extended price for that item of Work. The total of all extended prices becomes the Contractors price for the cost proposal. The unit prices include all labor, supervision, material, equipment, taxes, overhead (including but not limited to insurance), delivery, setup, installation, and profit. The Contractor may not add any additional mark-up to its price. If the Contractor chooses to subcontract some or all of the Work, the Contractor must still use the unit prices bid for pricing the subcontracted work. If the Contractor proposes not to use the unit prices bid as the basis for the price of its work or subcontracted work, it must document that the proposed price is lower than the price would be if the Contractor used the unit prices.

☒ **Low Bid** – The Agency shall competitively bid the Work against all eligible Indefinite Delivery Contractors. The Delivery Order bid price shall include all labor, supervision, material, equipment, taxes, overhead (including but not limited to insurance), delivery, setup, installation, and profit. Under this pricing method, the Agency will award the Delivery Order to the lowest bidder.

4.2 Changes in the Work of a Delivery Order:

4.2.1 Any changes in the work must be approved by the Agency and executed by using the SE-695, Construction Services IDC Delivery Order Modification. The SE-695 must be signed by the Contractor and Agency. Except when the Delivery Order was awarded on the basis of competitive bids, the cost of any change order shall be calculated using the same method as pricing the Delivery Order.

4.2.2 At the Owner's request, the Contractor shall prepare a proposal to perform the work of a proposed Change Order setting forth the amount of the proposed adjustment, if any, in the Contract Sum; and the extent of the proposed adjustment, if any, in the Contract Time. The Owner's request shall include any revisions to the Drawings or Specifications necessary to define the changes in the Work. Within fifteen days of receiving the request, the Contractor shall submit the proposal to the Owner and Architect along with all substantiating documentation.

4.2.2 In the absence of a total agreement concerning the item(s) for a change order, a Construction Change Directive shall be used.

4.2.3 Agreed Overhead and Profit Rates:

For any adjustment to the Delivery Order for which overhead and profit may be recovered, other than those made pursuant to Unit Prices stated in the Contract Documents, the Contractor agrees to charge and accept, as full payment for overhead and profit, the following percentages of costs attributable to the change in the Work. The percentages cited below shall be considered to include all indirect costs including, but not limited to: field and office managers, supervisors and assistants, incidental job burdens, small tools, and general overhead allocations. The allowable percentages for overhead and profit are as follows:

.1 To the Contractor for work performed by the Contractor's own forces, 17% of the Contractor's actual costs.

.2 To each Subcontractor for work performed by the Subcontractor's own forces, 17% of the subcontractor's actual costs.

.3 To the Contractor for work performed by a subcontractor, 10% of the subcontractor's actual costs (not including the subcontractor's overhead and profit).

4.3 Payments:

4.3.1 Contractor may submit monthly applications for payment for the Work of Delivery Orders scheduled to last two months or more in duration. Contractor shall submit only one application for payment for the Work of Delivery Orders scheduled to last less than two months in duration.

☐ 4.3.2 Delivery Orders Awarded by low bid: If the Contractor intends to submit more than one application for payment, the Contractor shall submit to the A/E, within ten days of Delivery Order award, a schedule of values allocating the entire Delivery Order Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the A/E may require. This schedule, unless objected to by the A/E, shall be used as a basis for reviewing the Contractor's Applications for Payment. Contractor shall base its monthly applications for payment on work completed up to the date of the application using the approved schedule of values. The sum of all payments to the Contractor shall not exceed the agreed upon cost of the work set forth in the Delivery Order as adjusted by subsequent modifications to the Delivery Order, if any.

☐ 4.3.2 Contractor shall base its applications for payment on work completed up to the date of the application using the units of measure and prices contained in the *(Agency, check the box(es) if it applies to this Contract)*
☒ Unit price schedule in Contractors bid.

4.3.3 Contractor's applications for payment may include materials suitably stored on site for use in the Work provided the Contractor submits:

a. Proof of purchase & delivery;
b. Documentation showing the location of the material;
c. Certificate of insurance for the material with adequate coverage showing the Agency as the certificate holder.

4.3.4 The Agency will make payments to the Contractor for completed work based on the actual units or quantity of work completed. The Agency will make payments on the undisputed amounts of an application for payment within 21 days of receipt of the application.

4.3.5 Subcontractor Payments (Chapter 6 of Title 29 of the South Carolina Code of Laws, as amended): The Contractor shall pay each subcontractor no later than seven (7) days after receipt of payment from the Agency the amount to which the subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the subcontractor's portion of the Work. By appropriate agreement with its subcontractors, the Contractor shall require each subcontractor to make payments to Sub-subcontractors in a similar manner.

4.3.6 If the Agency does not pay the Contractor within seven (7) days after the time established in Part 4.3.2 the undisputed amount of a payment request, then upon seven (7) additional days written notice to the Agency, the Contractor may stop the Work until the Contractor has received payment of the undisputed amount owing. The Contract Time and the Contract Sum shall be equitably adjusted by the amount of the Contractor's reasonable costs of shut down, delay and start-up, plus interest as provided for in the Contract Documents.

4.3.7 Retainage: The Agency, at its option, may withhold retainage as provided in SC Code § 11-35-3030(4).

4.3.8 Final Payment: Upon final payment by the Agency to the Contractor for the Work of a Delivery Order, all rights, title, and interest in and to all improvements and equipment constructed or installed on the premises shall vest in the Agency at no additional cost, free and clear of all any liens and encumbrances created or caused by the Contractor.

4.3.9 Withholding of Payments: Payments may be withheld to the extent of, and on account of (1) defective Work not remedied, or Work not performed in accordance with the Contract Documents; (2) claims filed by third parties; (3) failure of the Contractor to make payments promptly to the subcontractors for labor, materials, or equipment; (4) persistent failure to carry perform the Work in accordance with the Contract Documents; (5) failure by the Contractor to perform its obligations under the Contract Documents; or (6) a default by the Contractor under the Contract Documents. The Agency shall promptly notify the Contractor of any reason for withholding payment.

4.4 Delivery Order Completion and Closeout: Upon completion of all Work, the Contractor shall notify the Agency of its completion. The Agency shall schedule a Final Inspection and allow the Contractor to demonstrate that all equipment and systems operate as designed. The Agency may elect to have other persons, firms or agencies participate in the inspections. Projects exceeding the Agency's construction procurement certification level shall require an inspection by the Office of State Engineer (OSE) and the State Engineer's issuance of a Certificate of Occupancy. (The Contractor may find Agency construction certification limits on Procurement Services website at https://procurement.sc.gov/agency/audits/cert-limits) Final payment will not be due nor retained funds released until

(1) the Agency agrees that the project is complete, (2) OSE or the Agency, which ever has authority, issues a Certificate of Occupancy (SE-585), and (3) the Agency receives from the Contractor the following:

a. Affidavit of payment of debts and claims;
b. Consent of Surety, if any, to final payment.

5. DISPUTES

5.1 Both parties shall attempt to resolve disputes through good faith negotiations.

5.2 All disputes, claims, or controversies relating to the Contract, that cannot be resolved through good faith negotiations between the parties shall be resolved exclusively by the appropriate Chief Procurement Officer in accordance with Title 11, Chapter 35, Article 17 of the South Carolina Code of Laws, or in the absence of jurisdiction, only in the Court of Common Pleas for, or a federal court located in, Richland County, State of South Carolina. Contractor agrees that any act by the State regarding the Contract is not a waiver of either the State's sovereign immunity or the State's immunity under the Eleventh Amendment of the United States Constitution. As used herein, "the State" includes the Agency and the State Fiscal Accountability Authority.

5.3 Interest: Payments due to the Contractor and unpaid under the Contract Documents shall bear interest only if and to the extent allowed by Title 29, Chapter 6, Article 1 of the South Carolina Code of Laws. Amounts due to the Agency shall bear interest at the rate of one percent a month or a pro rata fraction thereof on the unpaid balance as may be due.

5.4 Contractor consents that any papers, notices, or process necessary or proper for the initiation or continuation of any claims or controversies relating to the Contract; for any court action in connection therewith; or for the entry of judgment on any award made, may be served on Contractor by certified mail (return receipt requested) addressed to Contractor at the address provided for the Contractor's Representative or by personal service or by any other manner that is permitted by law, in or outside South Carolina. Notice by certified mail is deemed duly given upon deposit in the United States mail.

5.5 Continuation of Work: Pending final resolution of any dispute under this Contract, the Contractor will proceed diligently with the performance of its duties and obligations under the Contract Documents, and the Agency will continue to make payments of undisputed amounts in accordance with the Contract Documents.

6. LIMITATION OF LIABILITY

6.1 Notwithstanding any other provision of the Contract Documents, but subject to a duty of good faith and fair dealing, the Contractor and Agency waive Claims against each other for listed damages arising out of or relating to this Contract. This mutual waiver includes

6.1.1 For the Agency, listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v) costs suffered by a third party unable to commence work, (vi) reasonable attorney's fees, (vii) any interest, except to the extent allowed by Part 5.3 (Interest), (viii) lost revenue and profit for lost use of the property, (ix) costs resulting from lost productivity or efficiency, and (x) damages incurred by the Agency for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

6.1.2 For the Contractor, listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v) reasonable attorney's fees, (vi) any interest, except to the extent allowed by Part 5.3 (Interest); (vii) unamortized equipment costs; and (viii) losses incurred by subcontractors for the types of damages the Contractor has waived as against the Agency.

6.2 This mutual waiver is applicable, without limitation, to all listed damages due to either party's termination in accordance with Part 9. Nothing contained in this Part 6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents. This mutual waiver is not applicable to amounts due or obligations under Part 3.17 (Indemnification).

7. Hazardous Materials

7.1 Contractor's Responsibilities With Respect to Hazardous Materials: The scope of Work the Contractor is to perform pursuant to this Contract excludes any work or service of any nature associated or connected with the discovery, identification, abatement, cleanup, control, or removal of any currently existing Hazardous Materials or Mold on, in, or nearby the site of the Work. When requesting cost proposals, the Agency will identify known Hazardous Materials or Mold on, in, or nearby the site of the Work. The Agency agrees that all duties and obligations in connection with any Hazardous Materials or Mold currently located in, on or nearby the Site or brought into the Site by a party other than the Contractor or its subcontractors, other than those defined in the Delivery Order for the Work affected by the Hazardous Material or Mold, are not the Contractor's responsibility. Should the Contractor become aware, discover or based on

reasonable evidence suspect the presence of Hazardous Materials or Mold beyond those addressed in the Delivery Order for the Work affected by the Hazardous Material or Mold, the Contractor will immediately cease work in the affected area, and will promptly notify the Agency of the conditions discovered. Should the Contractor stop work because of such discovery or suspicion of Hazardous Materials or Mold, then the Contract Time will, should the Agency elect to choose to continue the Work after remedy thereof, be reasonably extended by Change Order to cover the period required for abatement, cleanup, or removal of the Hazardous Materials or Mold. The Contractor will not be held responsible for any claims, damages, costs, or expenses of any kind associated with such period during which work has been stopped as a result of Hazardous Materials or Mold.

7.2 Hazardous Materials Introduced to the Site by Contractor: If the Contractor, its subcontractors, and any party for whom they may be liable, introduces any Hazardous Materials to the Site then the Contractor, at its sole cost and expense, shall be responsible for any response, removal, cleanup, and/or other remedial action required by applicable law. If any Mold occurs within the Site as the result of the negligent implementation of the Project or the improper functioning of the Conservation Measures, then the Contractor, at its sole cost and expense, shall be responsible for any response, removal, cleanup, or other remedial action required by applicable law. Except as to the Contractor's initial response to an emergency, any such remedial action(s) shall require the prior review and approval of the Agency.

8. MISCELLANEOUS PROVISIONS

8.1 Governing Law: This Contract shall be governed by the laws of South Carolina, except its choice of law rules.

8.2 Severability: If any provision of this Contract shall be held to be invalid, illegal, or unenforceable, the validity, legality and enforceability of the remaining provisions shall not be affected or impaired thereby.

8.3 No Waiver: No course of dealing or failure of the Agency and/or the Contractor to enforce strictly any term, right or condition of this Contract shall be construed as a waiver of such term, right or condition. No express waiver of any term, right, or condition of this Contract shall operate as a waiver of any other term, right, or condition.

8.4 Rights Cumulative: Except as otherwise provided in this Contract, (i) rights and remedies available to the Agency and/or the Contractor as set forth in this Contract shall be cumulative with and in addition to, and not in limitation of, any other rights or remedies available to the Parties at law and/or in equity, and (ii) any specific right or remedy conferred upon or reserved to the Agency and/or the Contractor in any provision of this Contract shall not preclude the concurrent or consecutive exercise of a right or remedy provided for in any other provision hereof.

8.5 Notices: Any notices required to be given under this Contract shall be in writing and shall be delivered either by (i) certified mail, return receipt requested, in which case notice shall be deemed delivered three (3) business days after deposit, postage prepaid, in the U.S. mail; (ii) a reputable messenger service or a nationally recognized overnight courier, in which case notice shall be deemed delivered one (1) business day after deposit with such messenger or courier; or (iii) personal delivery with receipt acknowledged in writing, in which case notice shall be deemed delivered when received. All notices shall be sent to the representatives identified in the Part G of the Agreement at the addresses provided therein. The foregoing addresses may be changed from time to time by notice to the other Party in the manner herein provided for.

8.6 Economic Conflict of Interest: A Contractor shall not have or exercise any official responsibility regarding a public contract in which the Contractor, or a business with which he is associated, has an economic interest. A person working for Contractor shall not have or exercise any official responsibility regarding a public contract in which the person, an individual with whom he is associated, or his family members have an economic interest. If Contractor is asked by any person to violate, or does violate, either of these restrictions, Contractor shall immediately communicate such information to the Agency Representative. The State may rescind, and recover any amount expended as a result of, any action taken or contract entered in violation of this provision. The terms "business with which he is associated," "economic interest," "family member," "immediate family," "individual with whom he is associated," "official responsibility" and "person" have the meanings provided in SC Code § 8-13-100.

8.7 Illegal Immigration: Contractor certifies and agrees that it will comply with the applicable requirements of Title 8, Chapter 14 of the South Carolina Code of Laws and agrees to provide to the State upon request any documentation required to establish either: (a) that Title 8, Chapter 14 is inapplicable both to Contractor and its subcontractors or sub-subcontractors; or (b) that Contractor and its subcontractors or sub-subcontractors are in compliance with Title 8, Chapter 14. Pursuant to SC Code § 8-14-60, "A person who knowingly makes or files any false, fictitious, or fraudulent document, statement, or report pursuant to this chapter is guilty of a felony and, upon conviction, must be fined within the discretion of the court or imprisoned for not more than five years, or both." Contractor agrees to include in any contracts with its subcontractors language requiring its subcontractors to (a) comply with the applicable requirements of Title 8, Chapter 14, and (b) include in their contracts with the sub-subcontractors language requiring the sub-subcontractors to comply with the applicable requirements of Title 8, Chapter 14. (An overview is available at www.procurement.sc.gov)

8.8 Drug-Free Workplace: The Contractor certifies to the Agency that Contractor will provide a Drug-Free Workplace, as required by Title 44, Chapter 107 of the South Carolina Code of Laws, as amended.

8.9 False Claims: According to the SC Code § 16-13-240, "a person who by false pretense or representation obtains the signature of a person to a written instrument or obtains from another person any chattel, money, valuable security, or other property, real or personal, with intent to cheat and defraud a person of that property is guilty" of a crime.

8.10 Non-Indemnification: Any term or condition is void to the extent it requires the State to indemnify anyone. It is unlawful for a person charged with disbursements of state funds appropriated by the General Assembly to exceed the amounts and purposes stated in the appropriations (SC Code § 11-9-20). It is unlawful for an authorized public officer to enter into a contract for a purpose in which the sum is in excess of the amount appropriated for that purpose. It is unlawful for an authorized public officer to divert or appropriate the funds arising from any tax levied and collected for any one fiscal year to the payment of an indebtedness contracted or incurred for a previous year. (SC Code § 11-1-40)

8.11 Enforcement and Interpretation of Building Codes: As required by SC Code § 10-1-180), OSE shall determine the enforcement and interpretation of all building codes and referenced standards on state buildings. The Contractor shall refer any questions, comments, or directives from local officials to the Agency and OSE for resolution. When the amount of a Delivery Order exceeds the construction procurement certification of the Agency, the Contractor shall not commence the Work of the Delivery Order before receiving a copy of the Building permit issued by OSE. (The Contractor may find Agency construction certification limits on Procurement Services website at https://procurement.sc.gov/agency/audits/cert-limits)

8.12 Assignment: The Agency and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements and obligations contained in this Contract. Neither party to the Contract shall assign the Contract as a whole, or in part, without written consent of the other and then only in accordance with and as permitted by SC Regulation 19-445.2180. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

8.13 Open Trade (Jun 2015): During the contract term, including any renewals or extensions, Contractor will not engage in the boycott of a person or an entity based in or doing business with a jurisdiction with whom South Carolina can enjoy open trade, as defined in SC Code § 11-35-5300.

9. SUSPENSION OR TERMINATION

9.1 Agency Right of Suspension: The Agency may, at any time, suspend the work, in whole or in part, with or without cause for such period of time as determined by the Agency. Except in the event of suspension due to a default of the Contractor, the contract sum will be equitably adjusted to reflect reasonable costs actually incurred by the Contractor due to delay or interruption resulting from such suspension.

9.2 Agency Right of Termination:

9.2.1 Termination for Cause: If the Contractor defaults, persistently fails or neglects to perform the Work in accordance with the Contract Documents, or fails to perform a provision of the Contract, the Agency shall provide written notice of such default, failure, or neglect to the Contractor. If the Contractor fails to cure such default, failure, or neglect within fifteen days from receipt of the Agency's notice, the Agency may, without prejudice to any other right or remedy the Agency may have, terminate the Contract and take possession of the area at the Site affected by the Work.

9.2.2 Termination for Convenience: The Agency may, for its convenience, terminate all or any portion of the Work under an individual Delivery Order, or terminate this entire Contract, by ten (10) days written notice stating the effective date of the termination. Thereafter, the Agency shall pay the Contractor for Work actually performed before the date of termination. No payments shall be made for Work not actually performed, and no payment shall be made or due for lost profits on account of Work not performed.

9.3 Contractor Right of Termination:

9.3.1 The Contractor may terminate the contract, or Delivery Order, if work is stopped through no fault of the Contractor, or other persons performing work either directly or indirectly for the Contractor, for a period of time exceeding 60 consecutive calendar days due to a court order or other public authority having jurisdiction; or a Declared National emergency which requires the work to be stopped.

9.3.2 Agency Failure to Make Payment: Subject to the Agency's right to withhold payments pursuant to Part 3.4.7, if the Agency fails to make payments to the Contractor as set forth in Part 10 and any other applicable provisions of the Contract Documents, the Contractor may, upon thirty (30) days' prior written notice to the Agency, terminate the Contract and recover from the Agency payment for all Work performed and for proven loss with respect to materials, equipment, tools, and machinery, including reasonable overhead, profit and damages applicable to the Work for the Contract Services performed through the date thereof.

SE-690
CONSTRUCTION SERVICES IDC DELIVERY ORDER

AGENCY: Midlands Technical College

DELIVERY ORDER PROJECT NAME: _____

DELIVERY ORDER PROJECT NUMBER: _____

IDC PROJECT NUMBER: H59-D943-FW

CONTRACTOR: _____

COST INFORMATION:

		DELIVERY ORDER	CONTRACT
1.	Maximum Total Amount of this IDC:		$ 1,000,000.00
2.	Maximum Total Amount Allowed for Delivery Order:	$ 250,000.00	
3.	Amount of this Delivery Order:	$	
4.	Total Amount of Previous Delivery Orders (including Modifications):		$
5.	IDC Total, Including this Delivery Order:		$ 0.00
6.	Balance Remaining for this IDC:		$ 0.00

SCHEDULE:

1.	Date of Commencement:	
2.	Days Allowed:	
3.	Date of Substantial Completion:	

DESCRIPTION OF DELIVERY ORDER SCOPE OF WORK: *(attach Contractor's Proposal)* _____

LIST OF DELIVERY ORDER DOCUMENTS: *(refer to attachments as necessary)* _____

The Agency and the Contractor hereby agree, as indicated by the signatures below, to the scope of work identified in the Contract Documents listed above, the Contractor's Cost Proposal dated the _____ day of _____, 20_____, and this Delivery Order which shall be assigned to the Indefinite Delivery Contract identified above.

NOTICE TO PROCEED is hereby given on this the _____ day of _____, 20_____. The Dates of Commencement and Substantial Completion are as noted above and shall be used for determining completion and the applicability of Liquidated Damages. Liquidated Damages in the amount of $ _____per day will be assessed for failure to complete the Work by the agreed upon date of completion. Failure to commence actual work on this Delivery Order within seven (7) days from the Date of Commencement will entitle the Agency to consider the Contractor non-responsible, and may withdraw this Delivery Order and terminate the Contract in accordance with the Contract Documents.

DELIVERY ORDER WITHIN AGENCY CONSTRUCTION CONTRACT CERTIFICATION:

(Agency MUST check one) **Yes** ☐ **No** ☐

IF "NO", OSE APPROVAL OF DELIVERY ORDER DOCUMENTS: _____ _____

(Signature of OSE Project Manager) *Date*

AGENCY:

BY: _____
(Signature of Representative)

Print Name: Carey Page

Print Title: Associate Director of Operations

Date: _____

CONTRACTOR

BY: _____
(Signature of Representative)

Print Name: _____

Print Title: _____

Date: _____

COMPLETION CONFIRMATION BY AGENCY:

ACTUAL COMPLETION DATE: _____ **LIQUIDATED DAMAGES ASSESSED:** _____

CONFIRMED BY: _____ **DATE:** _____
(Signature of Agency Representative)

TITLE: _____

SE-355
PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that *(Insert full name or legal title and address of Contractor)*

Name: _____

Address: _____

_____

hereinafter referred to as "Contractor", and *(Insert full name and address of principal place of business of Surety)*

Name: _____

Address: _____

_____

hereinafter called the "surety", are jointly and severally held and firmly bound unto *(Insert full name and address of Agency)*

Name: _____

Address: _____

_____

hereinafter referred to as "Agency", or its successors or assigns, the sum of _____ ($), being the sum of the Bond to which payment to be well and truly made, the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated _____ entered into a contract with Agency to construct

State Project Name: Midlands Technical College CET Building Data Room HVAC Upgrade

State Project Number: H59-N004-FW

Brief Description of Awarded Work: Mechanical Construction Services to include HVAC and Plumbing

in accordance with Drawings and Specifications prepared by *(Insert full name and address of A/E)*

Name: GMK Associates, Inc.

Address: 1201 Main Street, Suite 2100

Columbia, SC 29201

which agreement is by reference made a part hereof, and is hereinafter referred to as the Contract.

IN WITNESS WHEREOF, Surety and Contractor, intending to be legally bound hereby, subject to the terms stated herein, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent or representative.

DATED this _____ **day of** _____**, 2**_____ **BOND NUMBER** _____

(shall be no earlier than Date of Contract)

CONTRACTOR	**SURETY**
By: _____ **(Seal)**	**By:** _____ **(Seal)**
Print Name: _____	**Print Name:** _____
Print Title: _____	**Print Title:** _____ *(Attach Power of Attorney)*
Witness: _____	**Witness:** _____

(Additional Signatures, if any, appear on attached page)

SE-355
PERFORMANCE BOND

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Agency for the full and faithful performance of the contract, which is incorporated herein by reference.

2. If the Contractor performs the contract, the Surety and the Contractor have no obligation under this Bond, except to participate in conferences as provided in paragraph 3.1.

3. The Surety's obligation under this Bond shall arise after:

3.1 The Agency has notified the Contractor and the Surety at the address described in paragraph 10 below, that the Agency is considering declaring a Contractor Default and has requested and attempted to arrange a conference with the Contractor and the Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If the Agency, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive the Agency's right, if any, subsequently to declare a Contractor Default; or

3.2 The Agency has declared a Contractor Default and formally terminated the Contractor's right to complete the Contract.

4. The Surety shall, within 15 days after receipt of notice of the Agency's declaration of a Contractor Default, and at the Surety's sole expense, take one of the following actions:

4.1 Arrange for the Contractor, with consent of the Agency, to perform and complete the Contract; or

4.2 Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or

4.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Agency for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by the Agency and the contractor selected with the Agency's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the Bonds issued on the Contract, and pay to the Agency the amount of damages as described in paragraph 7 in excess of the Balance of the Contract Sum incurred by the Agency resulting from the Contractor Default; or

4.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and:

4.4.1 After investigation, determine the amount for which it may be liable to the Agency and, within 60 days of waiving its rights under this paragraph, tender payment thereof to the Agency; or

4.4.2 Deny liability in whole or in part and notify the Agency, citing the reasons therefore.

5. Provided Surety has proceeded under paragraphs 4.1, 4.2, or 4.3, the Agency shall pay the Balance of the Contract Sum to either:

5.1 Surety in accordance with the terms of the Contract; or

5.2 Another contractor selected pursuant to paragraph 4.3 to perform the Contract.

5.3 The balance of the Contract Sum due either the Surety or another contractor shall be reduced by the amount of damages as described in paragraph 7.

6. If the Surety does not proceed as provided in paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond 15 days after receipt of written notice from the Agency to the Surety demanding that the Surety perform its obligations under this Bond, and the Agency shall be entitled to enforce any remedy available to the Agency.

6.1 If the Surety proceeds as provided in paragraph 4.4 and the Agency refuses the payment tendered or the Surety has denied liability, in whole or in part, then without further notice the Agency shall be entitled to enforce any remedy available to the Agency.

6.2 Any dispute, suit, action or proceeding arising out of or relating to this Bond shall be governed by the Dispute Resolution process defined in the Contract Documents and the laws of the State of South Carolina.

7. After the Agency has terminated the Contractor's right to complete the Contract, and if the Surety elects to act under paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the Agency shall be those of the Contractor under the Contract, and the responsibilities of the Agency to the Surety shall those of the Agency under the Contract. To a limit of the amount of this Bond, but subject to commitment by the Agency of the Balance of the Contract Sum to mitigation of costs and damages on the Contract, the Surety is obligated to the Agency without duplication for:

7.1 The responsibilities of the Contractor for correction of defective Work and completion of the Contract; and

7.2 Additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under paragraph 4; and

7.3 Damages awarded pursuant to the Dispute Resolution Provisions of the Contract. Surety may join in any Dispute Resolution proceeding brought under the Contract and shall be bound by the results thereof; and

7.4 Liquidated Damages, or if no Liquidated Damages are specified in the Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. The Surety shall not be liable to the Agency or others for obligations of the Contractor that are unrelated to the Contract, and the Balance of the Contract Sum shall not be reduced or set-off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Agency or its heirs, executors, administrators, or successors.

9. The Surety hereby waives notice of any change, including changes of time, to the contract or to related subcontracts, purchase orders and other obligations.

10. Notice to the Surety, the Agency or the Contractor shall be mailed or delivered to the address shown on the signature page.

11. Definitions

11.1 Balance of the Contract Sum: The total amount payable by the Agency to the Contractor under the Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts to be received by the Agency in settlement of insurance or other Claims for damages to which the Contractor si entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Contract.

11.2 Contractor Default: Failure of the Contractor, which has neither been remedied nor waived, to perform the Contract or otherwise to comply with the terms of the Contract.

SE-357
LABOR & MATERIAL PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, that *(Insert full name or legal title and address of Contractor)*

Name: _____

Address: _____

_____

hereinafter referred to as "Contractor", and *(Insert full name and address of principal place of business of Surety)*

Name: _____

Address: _____

_____

hereinafter called the "surety", are jointly and severally held and firmly bound unto *(Insert full name and address of Agency)*

Name: _____

Address: _____

_____

hereinafter referred to as "Agency", or its successors or assigns, the sum of _____ ($), being the sum of the Bond to which payment to be well and truly made, the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated _____ entered into a contract with Agency to construct

State Project Name: Midlands Technical College CET Building Data Room HVAC Upgrade

State Project Number: H59-N004-FW

Brief Description of Awarded Work: Mechanical Construction Services to include HVAC and Plumbing

in accordance with Drawings and Specifications prepared by *(Insert full name and address of A/E)*

Name: GMK Associates, Inc.

Address: 1201 Main Street, Suite 2100

Columbia, SC 29201

which agreement is by reference made a part hereof, and is hereinafter referred to as the Contract.

IN WITNESS WHEREOF, Surety and Contractor, intending to be legally bound hereby, subject to the terms stated herein, do each cause this Labor & Material Payment Bond to be duly executed on its behalf by its authorized officer, agent or representative.

DATED this _____ day of _____, 2_____ BOND NUMBER _____
(shall be no earlier than Date of Contract)

CONTRACTOR	**SURETY**
By: _____ **(Seal)**	**By:** _____ **(Seal)**
Print Name: _____	**Print Name:** _____
Print Title: _____	**Print Title:** _____ *(Attach Power of Attorney)*
Witness: _____	**Witness:** _____

(Additional Signatures, if any, appear on attached page)

SE-357
LABOR & MATERIAL PAYMENT BOND

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Agency to pay for all labor, materials and equipment required for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to the Agency, this obligation shall be null and void if the Contractor:

2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants; and

2.2 Defends, indemnifies and holds harmless the Agency from all claims, demands, liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Contract.

3. With respect to Claimants, this obligation shall be null and void if the Contractor promptly makes payment, directly or indirectly, for all sums due.

4. With respect to Claimants, and subject to the provisions of Title 29, Chapter 5 and the provisions of §11-35-3030(2)(c) of the SC Code of Laws, as amended, the Surety's obligation under this Bond shall arise as follows:

4.1 Every person who has furnished labor, material or rental equipment to the Contractor or its subcontractors for the work specified in the Contract, and who has not been paid in full therefore before the expiration of a period of ninety (90) days after the date on which the last of the labor was done or performed by him or material or rental equipment was furnished or supplied by him for which such claim is made, shall have the right to sue on the payment bond for the amount, or the balance thereof, unpaid at the time of institution of such suit and to prosecute such action for the sum or sums justly due him.

4.2 A remote claimant shall have a right of action on the payment bond upon giving written notice by certified or registered mail to the Contractor within ninety (90) days from the date on which such person did or performed the last of the labor or furnished or supplied the last of the material or rental equipment upon which such claim is made.

4.3 Every suit instituted upon a payment bond shall be brought in a court of competent jurisdiction for the county or circuit in which the construction contract was to be performed, but no such suit shall be commenced after the expiration of o ne year after the day on which the last of the labor was performed or material or rental equipment was supplied by the person bringing suit.

5. When the Claimant has satisfied the conditions of paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:

5.1 Send an answer to the Claimant, with a copy to the Agency, within sixty (60) days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

5.2 Pay or arrange for payment of any undisputed amounts.

5.3 The Surety's failure to discharge its obligations under this paragraph 5 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a claim. However, if the Surety fails to discharge its obligations under this paragraph 5, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs to recover any sums found to be due and owing to the Claimant.

6. Amounts owed by the Agency to the Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any Performance Bond. By the Contractor furnishing and the Agency accepting this Bond, they agree that all funds earned by the contractor in the performance of the Contract are dedicated to satisfy obligations of the Contractor and the Surety under this Bond, subject to the Agency's prior right to use the funds for the completion of the Work.

7. The Surety shall not be liable to the Agency, Claimants or others for obligations of the Contractor that are unrelated to the Contract. The Agency shall not be liable for payment of any costs or expenses of any claimant under this bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

8. The Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.

9. Notice to the Surety, the Agency or the Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, the Agency or the contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

10. By the Contractor furnishing and the Agency accepting this Bond, they agree that this Bond has been furnished to comply with the statutory requirements of the South Carolina Code of Laws, as amended, and further, that any provision in this Bond conflicting with said statutory requirements shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

11. Upon request of any person or entity appearing to be a potential beneficiary of this bond, the Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

12. Any dispute, suit, action or proceeding arising out of or relating to this Bond shall be governed by the laws of the State of South Carolina.

13. **DEFINITIONS**

13.1 Claimant: An individual or entity having a direct contract with the Contractor or with a Subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of the Contractor and the Contractor's Subcontractors, and all other items for which a mechanic's lien might otherwise be asserted.

13.2 Remote Claimant: A person having a direct contractual relationship with a subcontractor of the Contractor or subcontractor, but no contractual relationship expressed or implied with the Contractor.

13.3 Contract: The agreement between the Agency and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

SE-695

MODIFICATION NO.: _____

CONSTRUCTION SERVICES IDC DELIVERY ORDER MODIFICATION

AGENCY: Midlands Technical College

DELIVERY ORDER PROJECT NAME: _____

DELIVERY ORDER PROJECT NUMBER: _____

IDC PROJECT NUMBER: H59-D943-FW

CONTRACTOR: _____

		DELIVERY ORDER	CONTRACT
COST INFORMATION:			
1.	Maximum Total Amount of this IDC:		$ 1,000,000.00
2.	Maximum Total Amount Allowed for Delivery Order:	$250,000.00	
3.	Current Amount of this Delivery Order:		
4.	Amount of this Modification:		
5.	Adjusted Amount of this Delivery Order	$ 0.00	
6.	IDC Total (Sum of all Delivery Orders, including this DO) Prior to this Modification:		$
7.	IDC Total (Sum of all Delivery Orders) Including this Modification:		$ 0.00
8.	Balance Remaining for this IDC:		$ 0.00

SCHEDULE:		
1.	Date of Commencement:	
2.	Previous Days Allowed	
3.	Additional Days Allowed with this Modification	
4.	Revised Date of Completion:	

DESCRIPTION OF DELIVERY ORDER SCOPE MODIFICATION: *(attach Contractor's Proposal)* _____

LIST OF MODIFICATION DOCUMENTS: *(refer to attachments as necessary)* _____

The Agency and the Contractor hereby agree, as indicated by the signatures below, to the revised scope of work identified in the Modification Documents listed above, the Contractor's Cost Proposal dated the ____ day of _____, 20____, and this Delivery Order Modification, which shall be assigned to the Indefinite Delivery Contract identified above.

DELIVERY ORDER INCLUDING MODIFICATION IS WITHIN AGENCY CONSTRUCTION CONTRACT CERTIFICATION:
(Agency MUST check one) **Yes ☐ No ☐**

IF "NO", OSE APPROVAL OF DELIVERY ORDER DOCUMENTS: _____ _____
(Signature of OSE Project Manager) *Date*

AGENCY:	**CONTRACTOR**
BY: _____ *(Signature of Representative)*	**BY:** _____ *(Signature of Representative)*
PRINT NAME: Carey Page	**PRINT NAME:** _____
PRINT TITLE: Associate Director of Operations	**PRINT TITLE:** _____
DATE: _____	**DATE:** _____

SECTION 01 3000 - ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preconstruction meeting.

B. Site mobilization meeting.

C. Progress meetings.

D. Construction progress schedule.

E. Submittals for review, information, and project closeout.

F. Number of copies of submittals.

G. Submittal procedures.

1.02 REFERENCE STANDARDS

A. AIA G810 - Transmittal Letter; 2001.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

A. S chedule meeting after Notice of Award.

B. Architect will schedule a meeting after Notice of Award.

C. Attendance Required:
   1. Owner.
   2. Architect.
   3. Contractor.

D. 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 the parties to Contract, _____ and Architect.
   6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
   7. Scheduling.

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

3.02 SITE MOBILIZATION MEETING

A. Schedule meeting at the Project site prior to Contractor occupancy.

B. Attendance Required:
   1. Contractor.
   2. Owner.
   3. Architect.
   4. Contractor's superintendent.
   5. Major subcontractors.

C. Agenda:
   1. Use of premises by Owner and Contractor.
   2. Owner's requirements and occupancy prior to completion.
   3. Construction facilities and controls provided by Owner.
   4. Temporary utilities provided by Owner.
   5. Survey and building layout.

6. Security and housekeeping procedures.
7. Schedules.
8. Application for payment procedures.
9. Procedures for testing.
10. Procedures for maintaining record documents.
11. Requirements for start-up of equipment.
12. Inspection and acceptance of equipment put into service during construction period.

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

3.03 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum monthly intervals.

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

C. Attendance Required:
1. Contractor.
2. Owner.
3. Architect.
4. Contractor's superintendent.
5. Major subcontractors.

D. Agenda:
1. Review minutes of previous meetings.
2. Review of work progress.
3. Field observations, problems, and decisions.
4. Identification of problems that impede, or will impede, planned progress.
5. Review of submittals schedule and status of submittals.
6. Maintenance of progress schedule.
7. Corrective measures to regain projected schedules.
8. Planned progress during succeeding work period.
9. Maintenance of quality and work standards.
10. Effect of proposed changes on progress schedule and coordination.
11. Other business relating to work.

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

3.04 CONSTRUCTION PROGRESS SCHEDULE

A. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

B. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
1. Include written certification that major contractors have reviewed and accepted proposed schedule.

C. Within 10 days after joint review, submit complete schedule.

D. Submit updated schedule with each Application for Payment.

3.05 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
1. Product data.
2. Shop drawings.
3. Samples for selection.
4. Samples for verification.

B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

C. Samples will be reviewed only for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below .

3.06 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer's instructions.
   6. Manufacturer's field reports.
   7. Other types indicated.

B. Submit for Architect's knowledge as contract administrator or for Owner. No action will be taken.

3.07 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit Correction Punch List for Substantial Completion.

B. Submit Final Correction Punch List for Substantial Completion.

C. When the following are specified in individual sections, submit them at project closeout:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   4. Bonds.
   5. Other types as indicated.

D. Submit for Owner's benefit during and after project completion.

3.08 NUMBER OF COPIES OF SUBMITTALS

A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

B. Extra Copies at Project Closeout: See Section 01 7800.

C. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
   1. After review, produce duplicates.
   2. Retained samples will not be returned to Contractor unless specifically so stated.

3.09 SUBMITTAL PROCEDURES

A. Shop Drawing Procedures:
   1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related work.
   2. Do not reproduce the Contract Documents to create shop drawings.
   3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.

B. Shop Drawing Procedures:
   1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
   2. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.

C. Transmittal Form: AIA G810.

D. Transmit each submittal with a copy of approved submittal form.

E. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

F. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

G. 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 in accordance with the requirements of the Work and Contract Documents.

H. Schedule submittals to expedite the Project, and coordinate submission of related items.

I. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

J. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

K. Provide space for Contractor and Architect review stamps.

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

M. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

N. Submittals not requested will not be recognized or processed.

END OF SECTION

DIVISION 01 3010
MTC GENERAL
REQUIREMENTS

1. GENERAL

1.1. This document defines the general requirements that govern all work at Midlands Technical College (MTC). It is a part of the Contract and shall have full force and effect and shall be as a part thereof.

1.2. Scope of Work of this construction project includes:

1.2.1. Contractor will provide construction work to the Northeast campus located in Columbia, SC at 151 Powel Road, Columbia, SC, as described in this paragraph, the referenced drawings and specifications, as directed by Owner/Operations Department. Work will include but not be limited to:

1.2.1.1. Replace existing Liebert unit and condensing unit serving the data center. Add back-up wall mounted mini split system in the data center.

2. PERSONNEL:

2.1. The Contractor is fully responsible for the performance and conduct of his employees at all times while on MTC campuses. The Contractor shall be responsible for selecting personnel who are well qualified to perform the required services, for supervising techniques used in their work and for keeping them informed of all improvements, changes, methods of operations.

2.2. The Contractor shall not allow any employee to perform work under this contract while under the influence of alcohol, drugs, or any other incapacitating agent. Use of any possession of alcoholic beverage and / or illegal drugs is prohibited on all State property. Violators will be dealt with according to law.

2.3. All personnel employed by the Contractor or any representative of the Contractor entering the site(s) shall comply with all security regulations which may be in effect during the contact period and shall be subject to such checks as may be deemed necessary. The Owner has authority to bar an individual from entry onto the site. Such action by the Owner shall not excuse the Contractor from fulfilling all requirements under this contract and shall not be the cause of any claim for additional compensation by the Contractor or claim by the individual.

2.4. No weapons of any type (guns, rifles, etc.) are brought on site or any MTC College property.

3. UTILITIES

3.1. When available, the Owner will provide utilities for use by the Contractor. The Contractor

will provide for all connections, extensions, adaptations, and safety precautions needed in these connections. Utilities in this paragraph are limited to: (1) electrical, (2) water, (3) sanitary, and (4) storm sewer (if applicable). Contractor shall use all appropriate conservation measures. Temporary power, when needed, shall be the Contractor's responsibility.

4. SCHEDULES:

4.1. If the scope of work or specifications require a schedule, a bar type progress chart will be submitted within 5 working days, identifying the proposed construction schedule. Thereafter a revised chart should be submitted as least every two weeks identifying the original schedule, amended schedule (if any) as well as completed work.

5. OWNER'S USE OF PREMISES

5.1. The Owner may continue to use the areas adjacent to the Work site for their intended purpose. The walk paths, sidewalks, and parking areas in the area of the project must be kept clear of materials, dirt, debris, etc., to allow for College traffic. If this is not possible, an approved alternate route of travel must be provided by the Contractor.

5.2. Occupancy of buildings: The building(s) will remain occupied during the work. The Contractor is responsible for taking necessary precautions to protect building, contents and personnel from damage to injury from their operations and from water entry into building during operations.

5.3. Any requests received by the Contractor from occupants to change the sequence or work must be referred to the Owners project manager for determination. No changes will be made unless agree to in writing by both the contractor and Owner prior to the execution of any agreed upon changes to work sequence.

6. CONTRACTOR'S USE OF PREMISES

6.1. No job sign is required. If indicated on the Campus Map, furnish and install material delivery signs as shown. Signs shall be of approved size and color with lettering of approved style and contrasting color so as to be easily visible and readable.

6.2. An on-site Construction Office is not required for this work.

6.3. Contractor's personnel shall use Contractor provided facilities (toilet, water, vending and break) for all workers.

6.4. See Campus Map for site access and Contractor parking. Trucks may not drive on campus sidewalks. Except for permitted deliveries to the facility, and vehicles used in pursuit of the work (as opposed to transport of personnel or materials), vehicles of Contractor and Contractor's personnel shall park only in the area designated.

6.5. Lay-Down Areas: Prior to beginning operations, Contractor shall obtain approval of

Owner for areas to be used as material storage, hoisting, holding, dumping, porta-pots, etc. Work will be restricted to approved locations.

6.6. Dumpsters located on the College Campuses are not for the disposal of construction debris. The Contractor shall be responsible for the disposal construction materials unless specified otherwise in the scope of work.

6.7. Contractor may work on the premises at any time. The Owner will be notified in writing if work is planned after normal working hours, on weekends or on holidays. Normal work hours are 7:00 AM until 5:00 PM. Work bid on a lump sum price will include a scheduled completion date and the contractor will be responsible for completing the work by the scheduled date at the bid price unless the Owner causes a delay which must be agreed in writing when a change or delay is made to the contractor.

6.8. Excessively noisy operations shall not be conducted between 8:00 am and 10:00 pm, and otherwise as required by the Owner from time to time. Work at times other than Owner's normal work hours shall be coordinated in advance so the Owner may notify appropriate parties.

6.9. The Contractor shall schedule utility interruptions with Owner at least 48 hours in advance. Scheduled interruptions shall be at the Owner's convenience. Do not interrupt any utility service without prior approval for each specific instance. Reschedule any interruption which must be handled other than as originally coordinated.

6.10. Before starting excavation, establish location and extent of underground utilities occurring in the area where digging will occur by careful hand excavation.

6.11. Immediately report damage to any existing utility encountered. Repair all damage to any active utility. Repair shall be handled as an emergency unless approved by the Owner for handling otherwise. The Contractor shall be responsible for all damage to all underground utilities.

7. DIFFERING SITE CONDITIONS:

7.1. The Contractor must promptly and before the conditions are disturbed, notify the Owner in writing of any of the following:

7.2. Subsurface or latent physical conditions at the site differing materially from those indicated in this Contract document and the contract specifications and drawings.

7.3. Previously unknown physical conditions at the site of an unusual nature differing materially from those which may be ordinarily encountered and generally recognized as inherent in work of the character required in this Contract. The Contractor shall take proper measures to prevent damages to underground utilities located in the area of this project. The Contractor shall contact the Owner prior to penetrating the ground for a utility location check.

7.4. The Owner will promptly investigate the conditions. If the conditions are found to differ

materially from those indicated or anticipated and will cause a change in the date of completion of the work quantity of materials called for in the work of this contract, the Contractor will be entitled to an equitable adjustment.

7.5. No claims for adjustment under the previous clause will be considered after completion of the work or following application for payment.

7.6. Parking Limitations: Contractor is to confine his operations at the site(s) to only those designed parking areas. There may not be adequate parking for Contractor and his personnel at each site(s).

7.6.1. The Contractor shall not park on the grass or block entrances/exits to buildings. The Contractor will be held responsible for damage to shrubs, lawn and landscape damaged by their personnel. Temporary parking permits are required and will be provided by Operations or Campus Police.

8. EXIT DOOR ACCESS AND EMERGENCY EGRESS

8.1. The Contractor shall keep fire exits free of obstructions at all time. When work occurs within the exit access corridors or within the exit itself, alternate routes for emergency exiting shall be identified by the Owner and appropriate temporary signage posted by the Contractor for the duration of exit access interruption.

9. INSURANCE

9.1. Contractor shall add the following wording to their Liability Insurance as required by the State of South Carolina and Midlands Technical College. *"Midlands Technical College, including its current and former trustees, officers, directors, employees, volunteer workers, agents, assigns and students."*

10. MATERIALS

10.1. Unless specified otherwise, all materials incorporated into the work shall be new and of first quality.

10.2. The Contractor shall closely coordinate all deliveries. Owner will not be responsible for any material delivered to Owner or for any charges arising from Owner's acceptance or refusal of deliveries.

10.3. The Contractor shall coordinate deliveries of significantly large, dangerous or otherwise unusual materials with Owner beforehand.

10.4. The Contractor shall store materials in a manner that will properly protect them from all contamination and hazards until used or removed from site. Labeled materials shall be kept in original containers until used.

10.5. The Contractor shall handle materials in such a manner as to deliver them to the point of use free of all damage, contamination, corrosion, etc.

10.6. In handling, storing, and/or disposing of any materials or chemicals considered hazardous or dangerous by South Carolina Department of Health and Environmental Control (SCDHEC), Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), or National Fire Protection Agency (NFPA) and where these governing bodies require special handling, storage, or disposal of the material or chemical, abide by the procedures set forth by the governing body. If the material or chemical is encountered by demolition, excavation, or accident, and the Bidding Documents did not indicate its presence, or probable presence, immediately notify the Owner and proceed as directed. In such an event compensation will be handled by Change order.

10.7. The Contractor shall not order/purchase materials, equipment or products that are required to be submitted for Owner/Architect review. Submittals will be specified by the Owner/Architect and must be approved in writing before the Contractor procures the items identified in the submittal listing. It is the Contractor's responsibility to ensure the timeliness of the submittal process allowing adequate time for the Owner to review and approve the submittal documents.

11. SAFETY

11.1. Vehicles are to be locked when parked and unattended. Do not leave vehicles or equipment unattended with motor running or ignition keys in place.

11.2. Do not leave tools, materials, or trash unattended, unless secured in a safe manner.

11.3. Open fires are prohibited.

12. SECURITY

12.1. Contractor personnel are to limit fraternization with faculty, staff and students to the work of this Contractor only as necessary to coordinate activities of this Contract.

12.2. The Contractor is required to keep the site safe from intrusion(s) by public or College personnel. The Contractor shall notify the Owner immediately of unsafe conditions and incidents. Contractor's employees will not fraternize with occupants. If a problem occurs with a particular occupant the Contractor shall contact the Owner's designated representative.

12.3. The Owner and Occupants are not responsible for equipment, tools or materials lost from the result of being left unattended, misplaced or unsecured. Contractor's materials and tools are subject to theft. It is suggested that materials be kept in one location where practical and under lock and key.

13. SUBMITTALS

13.1. Submittals will be required by the technical sections of the design documents issued to the Contractor by the Owner in the contract documents. This paragraph governs the form of

the required submittals.

13.2. Make submittals of shop drawings, product data, samples and other items required by the Contract Documents in accordance with the provisions of this paragraph, and revise and resubmit as necessary to establish compliance with the specified requirements. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted. Verify that each item, and the submittal for it, conform in all respects with the specified requirements. Determine and verify field measurements, field construction criteria, catalog numbers and similar data, and conformance with specifications. By affixing the contractor's signature to each submittal, certify that this coordination has been performed.

13.3. Begin no fabrication or work which requires submittals until return of submittals with Architect's approval.

14. SHOP DRAWINGS

14.1. Shop Drawings will be submitted for approval when required by the technical section(s) of the contract documents.

14.2. Shop Drawings will include fabrication, erection, and setting drawings, schedule drawings, manufacturer's scale drawings, wiring and control diagrams, cut sheets of products, entire catalogs, pamphlets, descriptive literature, and performance and test data.

14.3. Shop Drawing(s), other than printed materials, (i.e. catalogs, pamphlets, etc.) shall be submitted in form approved by Owner. Upon approval, any reproducible shop drawing will be returned to the Contractor, who will then distribute to subcontractor(s) and manufacturer(s) as necessary and two "approved" print copies to Owner.

14.4. The Contractor shall allow ten working days for approval of all shop drawings. Sprinkler shop drawings, if applicable to the project, should be submitted to the Division of State Fire Marshall for their review and approval as required by codes and laws.

14.5. Make shop drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection to the work.

14.6. If not specified otherwise for a particular item or a particular division in the technical specifications submit shop drawings in the form of one sepia transparency of each sheet. Blueprints only will not be acceptable. Review comments by the Architect will be shown on the sepia transparency when it is returned to the Contractor. The Contractor may make and distribute such copies as are required for his purpose.

15. MANUFACTURERS' LITERATURE (PRODUCT DATA)

15.1. The Contractor shall clearly show which portions of the data sheet contents are being submitted for review, especially when contents of submitted literature from manufacturers includes data not pertinent to the submittal.

15.2. The Contractor shall modify the manufacturer's standard schematic drawings and diagrams to delete information that is not applicable to the Work. Supplement standard information to provide information specifically applicable to the Work.

15.3. If not specified otherwise for a particular item or a particular division in the technical specifications, submit the number of copies that are required to be returned, plus two copies that will be retained by the Architect. Coordination Drawings: Coordination Drawings are required where work of trades involves scheduling sequences of materials, finishes or testing when necessary for proper coordination of trades, timely progress of the work or necessary sequencing of work by time, by area or by trade for the convenience of the occupants, if indicated by the Owner.

16. SAMPLES

16.1. If not specified otherwise for a particular item or a particular division in the technical specifications, submit required samples, free of all charges and encumbrances, at the Architect's office, the Owner's office, the project site, or the Owner's warehouse, as arranged with the Architect in each instance. Sample shall be accurate in every detail as a representation of the finished article in the Work, and shall be retained by the Architect for duration of the Work. Upon completion, arrange to have the sample picked up at no expense to the Architect or to the Owner and removed from the Architect's or Owner's premises.

16.2. The Contractor shall accompany each submittal with a letter of transmittal showing all information required for identification and checking, and listing all deviations from the requirements of the Contract Documents. Also list all changes in the Work required to accommodate any deviations proposed in the submittal.

16.3. Approval by the Architect does not relieve the Contractor from responsibility for errors that may exist in the submittal, or for deviations which are not specifically listed prior to approval.

16.4. Any changes in the Work required to accommodate deviations from the Contract Documents shall be made at no additional cost to the Owner unless specifically approved by a Change order issued in conjunction with approval of the deviation

16.5. The Contractor shall deliver all submittals to the Architect for consideration as soon as possible after award of Contract.

16.6. The Contractor shall make submittals of all related materials and equipment at the same time.

17. WORKMANSHIP

17.1. State design and construction must comply with the codes and standards, along with their published errata and other requirements listed in this Chapter. If there is any conflict between the codes, standards, and/or regulations listed herein, the more stringent

requirement controls. Designers and Agency reviewers should ensure they have the latest errata for indicated editions to International Codes, other codes and standards.

17.2. Codes editions in force at the time of first submittal govern throughout the project, unless: (1) Otherwise permitted by OSE; or (2) Design is delayed for more than 6 months and OSE adopts editions that are more current in the interim. No project may use a code that is older than one previous adopted edition.

17.3. In accordance with SC Code Ann §§ 1-34-10 thru 70 & § 10-1-180, OSE has adopted the following codes:

A. International Building Code (IBC), 2015 Edition,
B. International Existing Building Code (IEBC), 2015 Edition,
C. International Fire Code (IFC), 2015 Edition,
D. International Energy Conservation Code (IECC), 2009 Edition,
E. International Fuel Gas Code (IFGC), 2015 Edition,
F. International Mechanical Code (IMC), 2015 Edition,
G. International Plumbing Code (IPC), 2015 Edition, with the following insertions:
   1. Section 305.4.1, insert "18" and insert "18"
   2. Section 903.1, insert "8"
H. International Private Sewage Disposal Code (IPSDC), 2015 Edition,
I. International Property Maintenance Code (IPMC), 2015 Edition,
J. International Residential Code for One and Two Family Dwellings (IRC), 2015 Edition, with the following insertions: 1. P2603.5.1, insert "12" and insert "24"
K. International Wildland – Urban Interface Code (IUWIC), 2015 Edition,
   Note: The IUWIC does not supersede existing statutory requirements.
L. International Code Council Performance Code (ICCPC), 2015 Edition, upon State Engineer's approval.
M. International Swimming Pool and Spa Code (ISPSC), 2015 Edition,

N. Standard for Bleachers, Folding and Telescopic Seating, and Grandstands, ICC 300-2015 Edition
O. National Electrical Code (NEC) [NFPA-70], 2014 Edition

P. National Electrical Safety Code, IEEE-C2-2012 Edition

Q. Latest edition of the American National Standards Institute, Inc. (ANSI) document A117.1, Accessible and Useable Buildings and Facilities. Note that this standard is the standard adopted by the South Carolina Accessibility Act but this requirement does not relieve the Agency or the design professional from the Federal Statutory requirements that design and construction comply with the Americans With Disabilities Act Accessibility Guidelines for Buildings and Facilities. See *http://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-ada-standards/ada-standards*

R. State Fire Marshal rules, regulations, and policies. See ***http://www.scfiremarshal.llronline.com***

S. South Carolina Elevator, Code, & Regulations.[1]: See

http://www.llr.state.sc.us/Labor/ElevatorAmusement/index.asp?file=bungee.htm

T. State of SC Telephone Equipment Room and Communications/Data Systems Policies as formulated by the Division of State Information Technology (DSIT).

U. Governors executive Order No. 82-19 (April 1982) – State of SC Building Standards in Floodplain Areas.

V. The South Carolina Modular Buildings Construction Act S.C. Code § 23-43-10 et. Seq.

17.4. All items shall be installed in a workmanlike manner in accordance with best-recognized practice in the field concerned. Manufactured items shall be installed in strict accordance with manufacturer's printed directions, specifications, and/or recommendations for an installation of highest quality. All working parts shall be properly adjusted after installation and be left in perfect working order. Unless otherwise indicated, items exposed to weather, or subject to flooding or wetting shall be installed so as to shed and not hold water. Items shall in all cases be installed plumb and true and/or in a proper relationship to surrounding materials.

17.5. The State Engineer shall determine the enforcement and interpretation of all the codes and referenced standards on State Buildings.

18. PROGRESS INSPECTIONS

18.1. The Contractor shall notify Architect prior to covering up any work. Provide adequate time notification for an inspection with the Architect's representative.

18.2. The Contractor shall provide labor, tools, and materials for immediate correction of any discrepancy noted at the time of the inspection.

18.3. The Contractor shall correct deficiencies and have the work found deficient re-inspected prior to covering up the work inspected.

19. RECORD DOCUMENTS

19.1. Contractor shall maintain one set of plans and specifications onsite in a secure area that is protected from deterioration or loss. Job set of blue or black line white-prints of contract drawings, shop drawings shall be kept clean and undamaged and presentable for scanning/reproduction. The Contractor shall provide access to the record documents for the Architect and Owner’s reference during normal working hours.

19.2. Record Product data and Record Maintenance Manuals collectively shall show name, address and telephone number (if available) of the manufacturer and supplier of every non-generic item used in the Work, as well as the names, addresses, telephone number, and person to contact for every subcontractor, fabricator, and supplier used in the Work, together with the **specific** nature of the work performed or supplies furnished by each. One complete set of approved Record Product data submittals will be required. Three sets of Maintenance Manuals will be required; two shall be complete but the third need not

duplicate submittals in the record product data submittal.

19.3. Mark the job set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where shop drawings are used, record a cross-reference at the corresponding location on the contract drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date. **Post changes within 24 hours, or before work is covered up.** Mark job sets with colored erasable pencil; use various colors to distinguish between variations in separate categories of the work. Mark new information that is important to the Owner, but was not shown on contract drawings or shop drawings. Note related change order numbers where applicable. As-built drawings include but are limited to; site work, civil, architectural, mechanical, electrical, plumbing, fire protection, communication, ventilation, etc.

19.4. Show job set of record drawings, by dimension accurate to within one inch, the actual location of all elements of the Work (such as but not limited to piping, conduit, terminal boxes, etc.,) concealed underground or in construction, referenced to visible and accessible features of the structure or permanent surface improvements. Include items above ceilings. Clearly identify the item by accurate note.

19.5. The Architect and/or Owner will inspect the final as-built drawings for accuracy and neatness.

19.6. If changes to the as-built drawings are required, the Architect and/or Owner will return them to the Contractor with a list of the required changes. Make required changes and promptly deliver the final project record drawings to the Architect/Owner.

19.7. Maintain one complete copy of the project manual, including addenda, and one copy of other written construction documents such as change orders and modifications issued in printed form during construction. Mark these documents to show substantial variations in actual work performed in comparison with the rest of the Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related record drawings information and product data. Upon completion of the Work, submit record Specifications to the Architect/Owner for the Owner's records.

19.8. Maintain one copy of each product data submittal. Mark these documents to show significant variations in the actual Work performed in comparison with information submitted. Include variations in products delivered to the site, and from the manufacturer's installation instructions and recommendations. Give particular attention to concealed products and portions of the Work which cannot otherwise be readily discerned later by direct observation. Note related Change orders and mark-up of record drawings and Specifications. Upon completion of mark-up, submit complete set of record Product data to the Architect/Owner for the Owner's records.

19.9. These requirements shall be observed as minimum requirements for maintenance manuals required in this and other sections of the specifications. Additional requirements imposed by other sections shall be observed as to the specific section by which imposed. The

requirements imposed by this and other sections do not require separate sets of manuals in order to satisfy both; submit the minimum number of manuals required to comply with the most demanding and include all information needed to comply with both.

19.10. Organize operating and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual heavy-duty 3-ring vinyl-covered binders of proper capacity, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Include the following types of information:

A) Manufacturer's name and address,
B) Supplier's name and address,
C) Model number of each item included,
D) All nameplate data for each item; identify item by use/location for each nameplate for multiple items; show for each nameplated component of item,
E) Spare parts list,
F) Copies of warranties,
G) Wiring diagrams,
H) Shop Drawings and Product data,
I) Fixture lamping schedule,
J) Filter schedule,
K) Inspection procedures,
L) All applicable maintenance procedures,
M) All recommended maintenance cycles,
N) All operating procedures, and
O) Emergency instructions.

19.11. Provide three copies of each maintenance manual including all such pertinent information as is applicable, collectively including each item of equipment or material installed in the Work which can be operated and/or maintained, or, if non-generic, replaced.

20. CLEANING

20.1. Store items in an orderly arrangement and in a place suitable to the Owner. Daily, and more often if necessary, restack, tidy, or otherwise service stored materials to maintain orderly arrangement.

20.2. Maintain the site in a neat and orderly condition at all times. Do not allow accumulation of scrap, debris, waste material, or other items not required for this work.

20.3. Provide suitable containers for trash of any nature generated by the Contractor's operations or his personnel and dispose of said trash daily. Immediately recover any such trash carried or blown beyond the site of the work. Owner's trash cans and dumpsters are not for Contractor's use. All waste materials and trash shall be disposed of off-campus.

20.4. Contractor's personnel shall ensure their routes of travel and College-owned facilities, especially sidewalks, floors, door handles, fixtures, etc., are not inordinately fouled by substances such as grease, mud, tar, etc., which makes use of the facility less pleasant for others. Immediately clean up any such substances resulting from Contractor's presence. Cleaning by Owner, if necessary, will be done without further notice. Damage which

requires a special effort on the Owner's part to clean up, repair, or replace will be at the Contractor's expense.

20.5. Remove all leftover materials, waste, scrap and debris generated by Contractor or his personnel.

20.6. Remove all traces of soil, grease, mastic, waste materials, adhesives, dust, dirt, and other foreign materials from sight-exposed surfaces.

21. PROTECTION OF EXISTING PROPERTY

21.1. The Contractor shall be responsible for all damages caused by the Contractor, the Contractor's subcontractors, or the Contractor's or subcontractors' suppliers, suppliers' shippers, and/or delivery men to trees, shrubs, sod, soil, utilities, buildings, sidewalks, gates, roadways, bodies of water, or any other property of the Owner.

21.2. The Contractor shall remedy damages by returning the property to its "pre- construction" state. Any College property damaged shall be repaired, reconstructed, or replaced by the Contractor or at the Contractor's expense to quality standards set by the Architect.

21.3. Damages which disrupt the Owner's conduct of business or the usefulness of Owner's facilities which remain in use during the term of this Contract shall be repaired immediately, as an emergency, or as otherwise approved by the Owner,

21.4. If the Contractor does not diligently pursue repairs to damaged property, the Owner may pursue repairs by the Owner's own forces or by another contract. All costs incurred by the Owner pursuant to such repairs will be passed on to the Contractor by Change order.

21.5. The Architect shall make the final determination as to the acceptability of the results of any action necessary by the Contractor to return the property to its "pre- construction" state.

21.6. Guarantee under the Contractor's General Warranty any property replaced or repaired by the Contractor.

22. OPERATING AND MAINTENANCE INSTRUCTIONS

22.1. Prior to Substantial Completion arrange for each installer of equipment that requires operation or regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Provide adequate time for proper instruction. Do not short-schedule too many too close together. Include a detailed review of each of the following items which is applicable:

A) Maintenance manuals,
B) Record documents,
C) Spare parts and materials,
D) Tools,

E) Lubricants,
F) Fuels,
G) Identification systems,
H) Control sequences,
I) Hazards,
J) Cleaning,
K) Warranties and bonds,
L) Maintenance agreements and similar continuing commitments, and
M) Other items/matters applicable to the item in question.

22.2. As part of instruction for operating equipment, demonstrate each of the following procedures which is applicable:

A) Start-up,
B) Shut down,
C) All operating adjustments and procedures,
D) All maintenance procedures,
E) All diagnostic procedures,
F) Emergency operations,
G) Safety procedures,
H) Noise and vibration adjustments,
I) Economy and efficiency adjustments,
J) Effective energy utilization, and
K) Other procedures applicable to the item in question.

23. SUBSTANTIAL COMPLETION

23.1. Substantial Completion requires all materials and equipment to be installed and operational to the extent the Owner can use the Work for its intended purpose.

23.2. When the Contractor feels the project is substantially complete, the Contractor shall notify the Architect and the Owner in writing.

23.3. Within a reasonable time after receipt of the list, the Architect will inspect to determine status of completion.

23.4. Should the Architect determine that the work is not substantially complete the Architect promptly will so notify the Contractor.

23.4.1 The Contractor shall remedy the deficiencies and notify the Architect when ready for re-inspection.
23.4.2 The Architect will re-inspect the Work.

23.5. When the Architect concurs that the work is substantially complete:

23.5.1 The Architect will prepare a "Certificate of Substantial Completion" on AIA Form G704, accompanied by the Contractor's list of items to be completed or

corrected, as verified by the Architect.

23.5.2 The Architect will submit the Certificate to the Owner and to the Contractor for their written acceptance of the responsibilities assigned to them in the Certificate.

24. FINAL COMPLETION

24.1. Final Completion shall be achieved no later than thirty (30) days after Substantial Completion, unless a later date is established on the Certificate of Substantial Completion.

24.2. When the Contractor corrects all deficiencies on the punch list generated from the Substantial Completion Inspection Section above, the Contractor shall notify the Architect and Owner in writing.

24.3. Before notifying the Architect of Final Completion status, certify that:

24.3.1 The Contract Documents have been reviewed.
24.3.2 Work has been inspected for compliance with the Contract Documents.
24.3.3 Work has been completed in accordance with the Contract Documents.
24.3.4 All systems have been tested and are operational.
24.3.5 Work is completed and ready for final inspection.

24.4. The Architect will make an inspection to verify status of completion.

24.5. Should the Architect determine that the work is incomplete or defective:

24.5.1 The Architect promptly will so notify the Contractor.
24.5.2 The Contractor shall remedy the deficiencies promptly, and notify the Architect when ready for re-inspection.
24.5.3 The Architect will re-inspect the work.

24.6. When the Architect determines that the work is acceptable under the Contract Documents the Architect will request the Contractor to make closeout submittals.

25. CLOSEOUT SUBMITTALS

25.1. Before applying for **final** payment, furnish to the Owner:

25.2. A hard-backed binder (3-hole punch/tabbed binder) containing the following:

A) a typewritten materials list, in triplicate, showing every manufacturer item/material used in the job. Include catalog number, manufacturer's name and address, distributor's name and address. Type lists neatly and index according to respective specification sections of work,

B) a list of all subcontractors, including fabricators, used in the work, and the nature of the work performed by each. Show company name, address, and telephone number. If Company has more than one office, show data for the office handling the work and

the home office,

C) a properly executed Contractor's General Warranty form, and
D) all other warranties, forms, certifications, and other documents required by the technical specifications.

25.3. Project Record Documents described within these General Requirements.

25.4. All keys and control or security components that are not a permanent part of installed equipment.

26. WARRANTY

26.1. The Contractor warrants to Owner that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractors warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage. If required by the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

26.2. The period of the warranty shall be for one year (365 calendar days) from the date of Substantial Completion for all work described in the contract documents and any approved change orders. The Contractor is required to honor any special warranties which may be required in the scope of work as described in the specifications and contract documents.

SECTION 01 4000 - QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittals.

B. Quality assurance.

C. References and standards.

D. Testing and inspection agencies and services.

E. Control of installation.

F. Tolerances.

G. Manufacturers' field services.

H. Defect Assessment.

1.02 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.

C. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.

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

D. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

E. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.

1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.03 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.04 TESTING AND INSPECTION AGENCIES AND SERVICES

A. Owner will employ and pay for services of an independent testing agency to perform other specified testing.

B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

PART 3 EXECUTION

2.01 CONTROL OF INSTALLATION

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

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

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

E. Have Work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

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

2.02 TOLERANCES

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

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

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

2.03 TESTING AND INSPECTION

A. Testing Agency Duties:
   1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
   2. Perform specified sampling and testing of products in accordance with specified standards.
   3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   4. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
   5. Perform additional tests and inspections required by Architect.
   6. Submit reports of all tests/inspections specified.

B. Limits on Testing/Inspection Agency Authority:
   1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency may not approve or accept any portion of the Work.
   3. Agency may not assume any duties of Contractor.
   4. Agency has no authority to stop the Work.

C. Contractor Responsibilities:
   1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
   2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
   3. Provide incidental labor and facilities:
      a. To provide access to Work to be tested/inspected.
      b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
      c. To facilitate tests/inspections.

d. To provide storage and curing of test samples.

4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

D. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.

E. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

2.04 MANUFACTURERS' 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, start-up of equipment, test, adjust and balance of equipment and _____ as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

2.05 DEFECT ASSESSMENT

A. Replace 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 an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 5000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary sanitary facilities.

B. Temporary Controls: Barriers, enclosures, and fencing.

C. Vehicular access and parking.

D. Waste removal facilities and services.

1.02 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. Use of existing facilities is not permitted.

C. Maintain daily in clean and sanitary condition.

1.03 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.04 FENCING

A. Construction: Commercial grade chain link fence.

1.05 EXTERIOR ENCLOSURES

A. Provide temporary insulated weather tight 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. Provide access doors with self-closing hardware and locks.

1.06 INTERIOR ENCLOSURES

A. Provide temporary partitions and ceilings as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.

B. Construction: Framing and reinforced polyethylene sheet materials with closed joints and sealed edges at intersections with existing surfaces:

1.07 VEHICULAR ACCESS AND PARKING - SEE SECTION 01 5500

A. Coordinate access and haul routes with governing authorities and Owner.

B. Provide and maintain access to fire hydrants, free of obstructions.

C. Provide means of removing mud from vehicle wheels before entering streets.

D. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.08 WASTE REMOVAL

A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

B. Provide containers with lids. Remove trash from site periodically.

C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

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

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 6000 - PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Re-use of existing products.

B. Transportation, handling, storage and protection.

C. Product option requirements.

D. Substitution limitations and procedures.

1.02 SUBMITTALS

A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.

B. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

2.02 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.

2.03 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.

B. Substitutions will be considered when a product, through no fault of the Contractor, becomes unavailable or unsuitable due to regulatory change.

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

D. A request for substitution constitutes a representation that the submitter:

1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
2. Will provide the same warranty for the substitution as for the 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.

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 the Contract Documents.

3.02 TRANSPORTATION AND HANDLING

A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

D. Transport and handle products in accordance with manufacturer's instructions.

E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

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

G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Provide off-site storage and protection when site does not permit on-site storage or protection.

G. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

H. Comply with manufacturer's warranty conditions, if any.

I. Do not store products directly on the ground.

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

K. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

L. Prevent contact with material that may cause corrosion, discoloration, or staining.

M. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

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

END OF SECTION

SECTION 01 7000 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.

C. Pre-installation meetings.

D. Cutting and patching.

E. Cleaning and protection.

F. Starting of systems and equipment.

G. Demonstration and instruction of Owner personnel.

H. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

1.02 RELATED REQUIREMENTS

A. Section 01 5000 - Temporary Facilities and Controls: Temporary exterior enclosures.

B. Section 01 5000 - Temporary Facilities and Controls: Temporary interior partitions.

C. Section 07 8400 - Firestopping.

1.03 PROJECT CONDITIONS

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

B. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.

1. Provide dust-proof enclosures to prevent entry of dust generated outdoors.
2. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.

C. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

D. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.

1.04 COORDINATION

A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Notify affected utility companies and comply with their requirements.

C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

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

F. Coordinate completion and clean-up of work of separate sections.

G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of 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. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

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 any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

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

D. Prepare agenda and preside at meeting:
   1. Review conditions of examination, preparation and installation procedures.
   2. Review coordination with related work.

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

3.04 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.05 ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as shown.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of alterations work constitutes acceptance of existing conditions.

B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
   1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 5000 in locations indicated on drawings.

C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
   1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
   2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.

D. Remove existing work as indicated and as required to accomplish new work.
   1. Remove items indicated on drawings.
   2. Relocate items indicated on drawings.
   3. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.

E. Services (Including but not limited to HVAC and Electrical): Remove, relocate, and extend existing systems to accommodate new construction.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
   2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
   3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
      a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
      b. Provide temporary connections as required to maintain existing systems in service.
   4. Verify that abandoned services serve only abandoned facilities.
   5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.

F. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.

G. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
   1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.
   2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
   3. Where a change of plane of 1/4 inch (6 mm) or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.

H. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.

I. Refinish existing surfaces as indicated:
   1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
   2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.

J. Clean existing systems and equipment.

K. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.

L. Do not begin new construction in alterations areas before demolition is complete.

M. Comply with all other applicable requirements of this section.

3.06 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. See Alterations article above for additional requirements.

C. Perform whatever cutting and patching is necessary to:
   1. Complete the work.
   2. Fit products together to integrate with other work.
   3. Provide openings for penetration of mechanical, electrical, and other services.
   4. Match work that has been cut to adjacent work.
   5. Repair areas adjacent to cuts to required condition.
   6. Repair new work damaged by subsequent work.
   7. Remove samples of installed work for testing when requested.
   8. Remove and replace defective and non-conforming work.

D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

G. Restore work with new products in accordance with requirements of Contract Documents.

H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.

J. Patching:
   1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
   2. Match color, texture, and appearance.
   3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.07 PROGRESS CLEANING

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

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.08 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

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

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

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

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

G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.09 SYSTEM STARTUP

A. Coordinate schedule for start-up of various equipment and systems.

B. 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.

C. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

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

E. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

F. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

G. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 DEMONSTRATION AND INSTRUCTION

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

B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

D. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of owner personnel.

E. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

3.11 ADJUSTING

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

3.12 FINAL CLEANING

A. Use cleaning materials that are nonhazardous.

B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces,

C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

E. Clean site; sweep paved areas, rake clean landscaped surfaces.

F. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.13 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.

B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.

C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.

D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.

E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.

F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.

G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.

H. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

END OF SECTION

SECTION 23 0100 - GENERAL MECHANICAL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Work under Division 23 shall include furnishing of all labor, accessories, tools, equipment and material required to completely execute installation of the entire heating, ventilating and air conditioning systems as shown on the drawings and as specified. Work shall include but not be limited to the furnishing, unloading, handling distribution, setting, supporting and installation of all components required for the mechanical systems.

B. Drawings shall not be scaled. Refer to architectural and structural drawings for building construction and dimensions and to room finish schedule on architectural drawings for material, finish and construction method of walls, floor and ceiling in order to insure proper rough-in and installation of work.

1.02 REFERENCES

A. FM P7825 - Approval Guide; Factory Mutual.

B. NEMA MG 1 - Motors and Generators.

C. NFPA 70 - National Electrical Code.

D. SSPC-Paint 15 - Steel Joist Shop Paint; Steel Structures Painting Council.

E. ASME American Society of Mechanical Engineers

F. ASTM American Society for Testing Materials

G. NEMA National Electrical Manufacturers Association

H. NFPA National Fire Protection Association

I. OSHA Occupational Safety and Health Act

J. SMACNA Sheet Metal and Air Conditioning Contractors National Association, Inc.

K. IBC International Building Code

L. IMC International Mechanical Code

M. IPC International Plumbing Code

N. IFC International Fire Code

1.03 INTERPRETATION OF CONTRACT DOCUMENTS:

A. Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any item, in the drawings or specifications or both, carries with it the instruction to furnish and install the item, regardless of whether or not this instruction is explicitly stated as part of the indication or description.

B. It shall be understood that the specifications and drawings are complimentary and are to be taken together for a complete interpretation of the work.

C. No exclusions from, or limitations in, the language used in the drawings or specifications shall be interpreted as meaning that the appurtenances or accessories necessary to complete any required system or item of equipment are to be omitted

D. The drawings of necessity utilize symbols and schematic diagrams to indicate various items of work. Neither of these have any dimensional significance nor do they delineate every item required for the intended installations. The work shall be installed in accordance with the diagrammatic intent expressed on the drawings, and in conformity with the dimensions indicated on final architectural and structural working drawings and on equipment shop drawings.

E. No interpretation shall be made from the limitations of symbols and diagrams that any elements necessary for complete work are excluded.

F. Certain details appear on the drawings which are specific with regard to the dimensioning and positioning of the work. These details are intended only for the purpose of establishing general feasibility. They do not obviate field coordination for the intended work.

G. Information as to the general construction shall be derived from structural and architectural drawings and specifications only.

H. The use of words in the singular shall not be considered as limiting where other indications denote that more than one item is referred to.

1.04 PERFORMANCE REQUIREMENTS

A. Work shall be installed to conform with any City or State law, regulation, code, ordinance, ruling or Fire Underwriters requirement applicable to this class of work.

B. All installations for construction purposes shall conform with the Department of Labor "Safety and Health Regulations for Construction".

C. All equipment with electrical components shall bear the UL label.

PART 2 PRODUCTS

2.01 MATERIALS AND MANUFACTURERS:

A. Equipment and materials installed under this contract shall be new and without blemish or defect.

B. Each major component of equipment shall have the manufacturer's name, address, model number and rating on a plate securely affixed in a conspicuous place. The nameplate of a distributing agent will not be acceptable. ASME Code Ratings, UL label, or other data which is die-stamped into the surface of the equipment shall be stamped in a location easily visible.

C. In all cases the contractor shall be completely responsible for changes in dimension of other than first named manufacturer equipment, electrical changes, etc. required for proper function and final performance. Item shall comply with all requirements herein set forth and as required to perform as designed.

2.02 ELECTRICAL EQUIPMENT

A. In general motor starters and adjustable frequency drives are furnished under Division 26. However, if integral controls and electrical components are specified with the equipment and are factory installed, they shall be furnished under Division 23. Refer to the specific equipment specifications to determine if included under Division 23.

B. Within 60 days of award of contract, the person responsible for work in this division shall verify that the appropriate number of contacts have been provided in the staters or drives and if a control power transformer is required.

C. If additional devices are required, it is the responsiblity of this Division to coorodinate and provide the devices required to control the equipment as specified within the starters, adjustable frequency drives and motor control centers provided under Division 23.

2.03 SPECIFIED MATERIALS:

A. Throughout the drawings and specifications, equipment and systems have been selected and are referenced by name, manufacturer, model number, etc. These references are not intended to limit competition. Products by other listed manufacturers will be acceptable.

B. If a listed manufacurer other that the basis of design is used, it is the contractor's responsiblity for changes in dimension, structural, electrical changes, etc. required for proper installation, function and final performance.

2.04 SUBSTITUTION OF SPECIFIED MATERIALS:

A. Throughout the drawings and specifications, equipment and systems have been selected and are referenced by name, manufacturer, model number, etc. These references are not intended to limit competition and in most cases materials and methods of construction equal to that specified will be accepted provided prior approval of any substitute item is obtained from the Architect/Engineer. Only products by the listed manufacturers will be acceptable. Contractors and other manufacturers may submit requests to be listed as an acceptable manufacturer on the specified item by submitting documentation in accordance with the requirements. All bidders will be notified by addendum of any approved substitutions. Under no circumstances will any

substitutes be accepted after that date; and any item installed on the job which has not been approved in accordance with the noted procedure shall be removed and replaced with the appropriate approved item at the contractor's expense.

B. In all cases the contractor shall be completely responsible for changes in dimension of other than first named manufacturer equipment, electrical changes, etc. required for proper function and final performance. Item shall comply with all requirements herein set forth and as required to perform as designed.

PART 3 EXECUTION

3.01 PROTECTION OF EQUIPMENT:

A. Protect all materials and equipment from damage during storage at the site and throughout the construction period.

B. Protection from damage from rain, dirt, sun and ground water shall be accomplished by storing the equipment on elevated supports and covering them on all sides with protective rigid or flexible water proof coverings securely fastened.

C. Piping shall be protected by storing it on elevated supports and capping the ends with suitable material to prevent dirt accumulation in the piping.

3.02 COORDINATION OF WORK

A. All work shall be coordinated to avoid conflict with other contractors.

B. The contractor shall be responsible for checking to insure that the equipment to be installed will fit in the space shown on the drawings. If there is a conflict, the contractor shall notify the Engineer before bid. By submitting a bid the contractor assures that the equipment to be installed will fit or that previsions have been included in the bid to move the equipment to a location where it can be installed without conflict.

C. The Contractor shall review and coordinate the casework and millwork shop drawings to determine the location of sinks, range hoods, refrigerators, lab equipment, etc., and rough-in and install any and all items shown on the plans.

3.03 CONTIGUOUS WORK:

A. If any part of the Contractor's work is dependent for its proper execution or for its subsequent efficiency or appearance on the character or conditions of contiguous work not executed by him, this contractor shall examine and measure such contiguous work and report to the Architect in writing any imperfection therein, or conditions that render it unsuitable for the reception of this work. Should the contractor proceed without making such written report, he shall be held to have accepted such work and the existing conditions and he shall be responsible.

3.04 CERTIFICATES OF INSPECTION AND APPROVAL:

A. Upon completion of work, furnish to the Owner certificates of inspection or approval from the authorities having jurisdiction if certificates of inspection or approval are required by law or regulation.

3.05 SLEEVES AND OPENINGS:

A. Furnish, locate, install, and fireproof all sleeves and openings required for installation of the work.

3.06 ACCESS TO EQUIPMENT AND VALVES:

A. Should any work, such as piping, ducts, conduit, etc. be installed without due regard to the accessibility of devices installed by other contractors, the installation shall be relocated, offset or rerouted without cost to the Owner.

3.07 CUTTING AND PATCHING:

A. Perform all cutting and patching required for installation of the work.

3.08 PROJECT CLOSEOUT:

A. Maintenance Manuals: At the end of construction, furnish to the Architect three (3) bound and indexed sets of maintenance and operating instructions, parts lists, electrical wiring diagrams, balance data, and manufacturer's literature sufficient for operation and complete maintenance of all equipment by the Owner.

B. Approved submittals and shop drawings may be included in the Maintenance Manuals instead of being separately furnished, if desired.

C. It is intended that the documentation provided in maintenance manuals, along with as-built drawings, shall be complete and detailed enough to permit and facilitate troubleshooting, engineering analysis, and design work for future changes, without extensive field investigations and testing. Manuals shall be prepared so as to explain system operation and equipment to those not acquainted with the job.

D. Manuals shall be durably bound and clearly identified on the front cover (and on the spine of thick volumes). Identification shall include the building or project name, applicable trade (such as HVAC, Plumbing, Fire Protection, etc.), approximate date of completion (month and year) and contractor's name.

E. Manuals shall be organized into well defined and easy to locate sections, with index tabs or separators to divide the sections. A complete table of contents shall be provided at the front indicating the section or page number for each system, subsystem, or supplier/manufacturer.

F. Manuals shall include complete information and diagrams on all controls, indicators, sensors, and signal sources. Control diagrams are to show the locations of components and major equipment by room number or other identification when room numbers are not applicable. Locations of out-of-sight components, such as duct mounted sensors, flow switches, etc. should be clearly indicated. Control diagrams must include identification of components by make and model number, operating ranges, recommended set points, reset schedules, and other job-specific data useful for troubleshooting, calibration and maintenance. Complete narrative descriptions of operating sequences of control systems and subsystems shall be included on the prints adjacent to the corresponding schematics. Catalog data and cuts shall be clearly marked to indicate model numbers, sizes, capacities, operating points, and other characteristics of each item used. This should include accessories or special features provided. Where various sizes or variations of a series or model are used, documents should clearly show which are used where. Where quantities are appropriate, schedule of usage should be provided. Maintenance literature shall include complete information for identifying and ordering replacement parts, such as illustrated parts breakdowns.

G. Maintenance manuals must include complete balance data on all systems.

3.09 SPARE FILTERS:

A. Spare filters shall be delivered to Owner's representative.

3.10 WARRANTIES:

A. This Contractor warrants the mechanical systems to be free of defects in materials and workmanship for a period of one year after date of final payment. The effective dates of this warranty apply to all components of the mechanical systems regardless of any equipment manufacturer's warranties which may expire at an earlier date. Any system malfunctions, or any previously undiscovered non-compliance with the plans and specifications, during the warranty period shall be repaired at no cost to the Owner.

B. Deliver to Owner all warranties, guarantees, etc. and obtain written receipts.

END OF SECTION

SECTION 23 0513 - COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Motor Controllers

B. Manual Disconnect Switches

1.02 REFERENCE STANDARDS

A. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association; 2011.
   1. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide wiring diagrams with electrical characteristics and connection requirements.

C. Operation and Maintenance Manuals: Include in manuals the information listed below. For information on how to prepare and submit manuals see section 1780 (Closeout Submittals).
   1. Spare parts lists
   2. Operating instructions
   3. Maintenance instructions, including preventative and corrective maintenance.
   4. Copies of warranties
   5. Wiring diagrams

D. Shop drawings and product data

1.04 QUALITY ASSURANCE

A. Conform to NFPA 70.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect motors stored on site from weather and moisture by maintaining factory covers and suitable weather-proof covering. For extended outdoor storage, remove motors from equipment and store separately.

1.06 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturer warranty for motors larger than 20 horsepower.

PART 2 PRODUCTS

2.01 MANUAL DISCONNECT SWITCHES:

A. Division 23000 contractor shall provide manual disconnect switches where not indicated on Divsion 26000 drawings.

B. Disconnect switches shall be line voltage type with overload protection. Disconnect switches shall be quick make and break, toggle operated, trip free, and shall be provided with a lockoff handle guard and oversized enclosure.

C. Where required for automatic operation by a remote pilot device under the controls section of this specification, disconnect switches shall be provided with a "hand-off-automatic" selector switch in addition to the "on-reset-off" toggle switch.

D. All disconnect switch enclosures shall be NEMA Type 1 unless specified otherwise. All disconnect enclosures directly exposed to weather shall be NEMA Type 3R.

E. Disconnect switches shall be Square D Class 2510 Type F or approved equal by General Electric, Cutler Hammer, or Westinghouse.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install securely on firm foundation. Mount ball bearing motors with shaft in any position.

C. Check line voltage and phase and ensure agreement with nameplate.

END OF SECTION

SECTION 23 0553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nameplates.

B. Pipe Markers.

1.02 REFERENCE STANDARDS

A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2007.

B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2013.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.

C. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

D. Manufacturer's Installation Instructions: Indicate special procedures, and installation.

PART 2 PRODUCTS

2.01 IDENTIFICATION APPLICATIONS

A. Air Handling Units: Nameplates.

B. Heat Transfer Equipment: Nameplates.

C. Major Control Components: Nameplates.

D. Piping: Pipe markers.

2.02 NAMEPLATES

A. Manufacturers:
   1. Advanced Graphic Engraving: www.advancedgraphicengraving.com/#sle.
   2. Brimar Industries, Inc.: www.pipemarker.com/#sle.
   3. Kolbi Pipe Marker Co.: www.kolbipipemarkers.com/#sle.
   4. Seton Identification Products: www.seton.com/#sle.
   5. Substitutions: See Section 01 6000 - Product Requirements.

B. Letter Color: White.

C. Letter Height: 1/4 inch (6 mm).

D. Background Color: Black.

E. Plastic: Conform to ASTM D709.

2.03 PIPE MARKERS

A. Manufacturers:
   1. Brady Corporation: www.bradycorp.com/#sle.
   2. Brimar Industries, Inc.: www.pipemarker.com/#sle.
   3. Kolbi Pipe Marker Co.: www.kolbipipemarkers.com/#sle.
   4. MIFAB, Inc.: www.mifab.com/#sle.
   5. Seton Identification Products: www.seton.com/#sle.

B. Color: Conform to ASME A13.1.

C. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

PART 3 EXECUTION

3.01 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

B. Prepare surfaces in accordance with Section 09 9123 for stencil painting.

3.02 INSTALLATION

A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install plastic pipe markers in accordance with manufacturer's instructions.

C. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

END OF SECTION

SECTION 23 0593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Testing, adjustment, and balancing of refrigerating systems.

1.02 REFERENCE STANDARDS

A. AABC MN-1 - AABC National Standards for Total System Balance; Associated Air Balance Council; 2002.

B. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems; 2008.

C. NEBB (TAB) - Procedural Standards for Testing Adjusting and Balancing of Environmental Systems; 2015, Eighth Edition.

D. SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing; 2002.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
   1. Include at least the following in the plan:
      a. List of water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
      b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
      c. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
      d. Final test report forms to be used.
      e. Expected problems and solutions, etc.
      f. Specific procedures that will ensure that both air and water side are operating at the lowest possible pressures and methods to verify this.
      g. Procedures for formal deficiency reports, including scope, frequency and distribution.

C. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
   1. Revise TAB plan to reflect actual procedures and submit as part of final report.
   2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
   3. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
   4. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
   5. Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. Perform total system balance in accordance with one of the following:
   1. AABC MN-1, AABC National Standards for Total System Balance.
   2. NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems.
   3. SMACNA (TAB).
   4. Maintain at least one copy of the standard to be used at project site at all times.

B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.

C. TAB Agency Qualifications:
   1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
   2. Certified by one of the following:
      a. AABC, Associated Air Balance Council: www.aabchq.com; upon completion submit AABC National Performance Guaranty.
      b. NEBB, National Environmental Balancing Bureau: www.nebb.org/#sle.
      c. TABB, The Testing, Adjusting, and Balancing Bureau of National Energy Management Institute: www.tabbcertified.org/#sle.

D. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

3.02 EXAMINATION

A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
   1. Systems are started and operating in a safe and normal condition.
   2. Temperature control systems are installed complete and operable.
   3. Proper thermal overload protection is in place for electrical equipment.
   4. Fans are rotating correctly.
   5. Air coil fins are cleaned and combed.
   6. Service and balance valves are open.

B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

C. Beginning of work means acceptance of existing conditions.

3.03 PREPARATION

A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Architect to facilitate spot checks during testing.

B. Provide additional balancing devices as required.

3.04 RECORDING AND ADJUSTING

A. Ensure recorded data represents actual measured or observed conditions.

B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

3.05 SCOPE

A. Test, adjust, and balance the following:
   1. Air Cooled Refrigerant Condensers.
   2. Computer Room Air Conditioning Units.
   3. Air Handling Units.

END OF SECTION

SECTION 23 0719 - HVAC PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Piping insulation.

B. Jackets and accessories.

1.02 RELATED REQUIREMENTS

A. Section 23 2113 - Hydronic Piping: Placement of hangers and hanger inserts.

B. Section 23 2300 - Refrigerant Piping

1.03 REFERENCE STANDARDS

A. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.

B. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2014.

C. ASTM C533 - Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation; 2013.

D. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2014.

E. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2015.

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

G. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association; 2006.

H. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

C. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.07 FIELD CONDITIONS

A. Maintain ambient conditions required by manufacturers of each product.

B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.01 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION

A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84, NFPA 255, or UL 723.

2.02 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

A. Manufacturer:

1. Aeroflex USA, Inc: www.aeroflexusa.com.

2. Armacell LLC: www.armacell.us.
3. K-Flex USA LLC: www.kflexusa.com.

B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.
1. Minimum Service Temperature: Minus 40 degrees F (Minus 40 degrees C).
2. Maximum Service Temperature: 220 degrees F (104 degrees C).
3. Connection: Waterproof vapor barrier adhesive.

C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

2.03 JACKETS

A. Aluminum Jacket: ASTM B209 (ASTM B209M) formed aluminum sheet.
1. Thickness: 0.016 inch (0.40 mm) sheet.
2. Finish: Smooth.
3. Joining: Longitudinal slip joints and 2 inch (50 mm) laps.
4. Fittings: 0.016 inch (0.4 mm) thick die shaped fitting covers with factory attached protective liner.
5. Metal Jacket Bands: 3/8 inch (10 mm) wide; 0.015 inch (0.38 mm) thick aluminum.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that piping has been tested before applying insulation materials.

B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Exposed Piping: Locate insulation and cover seams in least visible locations.

C. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.

D. Exterior Applications: Provide vapor barrier jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover with aluminum jacket with seams located on bottom side of horizontal piping. Provide two coats of UV resistant finish for flexible elastomeric cellular insulation without jacketing.

3.03 SCHEDULE

A. Cooling Systems:
1. Condensate Drains from Cooling Coils: 3/4" - FLEXIBLE ELASTOMERIC CELLULAR INSULATION
2. Refrigerant Suction: 3/4" - FLEXIBLE ELASTOMERIC CELLULAR INSULATION
3. Refrigerant Hot Gas: 3/4" - FLEXIBLE ELASTOMERIC CELLULAR INSULATION

END OF SECTION

SECTION 23 2300 - REFRIGERANT PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Piping.

B. Moisture and liquid indicators.

C. Filter-driers.

1.02 RELATED REQUIREMENTS

A. Section 23 0719 - HVAC Piping Insulation.

B. Section 23 8124 - Computer Room Air Conditioners - Floor Mounted.

1.03 REFERENCE STANDARDS

A. ASHRAE Std 15 - Safety Standard for Refrigeration Systems; 2013.

B. ASHRAE Std 34 - Designation and Safety Classification of Refrigerants; 2013.

C. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes; 2013.

D. ASME B31.5 - Refrigeration Piping and Heat Transfer Components; 2013.

E. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2014.

F. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2013.

G. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service; 2013.

H. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2011-AMD 1.

I. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2009.

1.04 SYSTEM DESCRIPTION

A. Where more than one piping system material is specified ensure system components are compatible and joined to ensure the integrity of the system is not jeopardized. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

B. Provide pipe hangers and supports in accordance with ASME B31.5 unless indicated otherwise.

C. Liquid Indicators:
   1. Use line size liquid indicators in main liquid line leaving condenser.
   2. Use line size on leaving side of liquid solenoid valves.

D. Refrigerant Charging (Packed Angle) Valve: Use in liquid line between receiver shut-off valve and expansion valve.

E. Filter-Driers:
   1. Use a filter-drier immediately ahead of liquid-line controls, such as thermostatic expansion valves, solenoid valves, and moisture indicators.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide general assembly of specialties, including manufacturers catalogue information. Provide manufacturers catalog data including load capacity.

C. Shop Drawings: Indicate schematic layout of system, including equipment, critical dimensions, and sizes.

D. Design Data: Submit design data indicating pipe sizing. Indicate load carrying capacity of trapeze, multiple pipe, and riser support hangers.

E. Test Reports: Indicate results of leak test, acid test.

F. Manufacturer's Installation Instructions: Indicate support, connection requirements, and isolation for servicing.

1.06 QUALITY ASSURANCE

A. Designer Qualifications: Design piping system under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in South Carolina.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store piping and specialties in shipping containers with labeling in place.

B. Protect piping and specialties from entry of contaminating material by leaving end caps and plugs in place until installation.

C. Dehydrate and charge components such as piping and receivers, seal prior to shipment, until connected into system.

PART 2 PRODUCTS

2.01 PIPING

A. Copper Tube: ASTM B280, H58 hard drawn, Type K (A), annealed.
   1. Fittings: ASME B16.22 wrought copper.
   2. Joints: Braze, AWS A5.8M/A5.8 BCuP silver/phosphorus/copper alloy.

B. Copper Tube to 7/8 inch (22 mm) OD: ASTM B88 (ASTM B88M), Type K (A), annealed.
   1. Fittings: ASME B16.26 cast copper.
   2. Joints: Flared.

C. Pipe Supports and Anchors:
   1. Provide hangers and supports that comply with MSS SP-58.
      a. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
   2. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch (13 to 38 mm): Malleable iron adjustable swivel, split ring.
   3. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
   4. Wall Support for Pipe Sizes to 3 Inches (75 mm): Cast iron hook.
   5. Vertical Support: Steel riser clamp.
   6. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
   7. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.
   8. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.02 MOISTURE AND LIQUID INDICATORS

A. Indicators: Single port type, UL listed, with copper or brass body, flared or solder ends, sight glass, color coded paper moisture indicator with removable element cartridge and plastic cap; for maximum temperature of 200 degrees F (93 degrees C) and maximum working pressure of 500 psi (3450 kPa).

2.03 FILTER-DRIERS

A. Cores: Molded or loose-fill molecular sieve desiccant compatible with refrigerant, activated alumina, activated charcoal, and filtration to 40 microns, with secondary filtration to 20 microns; of construction that will not pass into refrigerant lines.

B. Construction: UL listed.
   1. Connections: As specified for applicable pipe type.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install refrigeration specialties in accordance with manufacturer's instructions.

B. Route piping in orderly manner, with plumbing parallel to building structure, and maintain gradient.

C. Install piping to conserve building space and avoid interference with use of space.

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

E. Pipe Hangers and Supports:
   1. Install in accordance with ASME B31.5.
   2. Support horizontal piping as indicated.
   3. Install hangers to provide minimum 1/2 inch (13 mm) space between finished covering and adjacent work.
   4. Place hangers within 12 inches (300 mm) of each horizontal elbow.
   5. Provide copper plated hangers and supports for copper piping.

F. Provide clearance for installation of insulation and access to valves and fittings.

G. Flood piping system with nitrogen when brazing.

H. Where pipe support members are welded to structural building frame, brush clean, and apply one coat of zinc rich primer to welding.

I. Fully charge completed system with refrigerant after testing.

3.02 SCHEDULES

A. Hanger Spacing for Copper Tubing.
   1. 1/2 inch (13 mm), 5/8 inch (16 mm), and 7/8 inch (22 mm) OD: Maximum span, 5 feet (1500 mm); minimum rod size, 1/4 inch (6.3 mm).
   2. 1-1/8 inch (29 mm) OD: Maximum span, 6 feet (1800 mm); minimum rod size, 1/4 inch (6.3 mm).
   3. 1-3/8 inch (35 mm) OD: Maximum span, 7 feet (2100 mm); minimum rod size, 3/8 inch (9.5 mm).

END OF SECTION

SECTION 23 8124 - COMPUTER ROOM AIR CONDITIONERS - FLOOR MOUNTED

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Air conditioning units.

B. Controls and control panels.

1.02 REFERENCE STANDARDS

A. ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size; 2017.

B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

C. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide for manufactured products and assemblies. Indicate water, drain, refrigeration, rough-in connections, and electrical characteristics and connection requirements.

C. Shop Drawings: Indicate manufactured products and assemblies. Indicate water, drain, refrigeration, rough-in connections, and electrical characteristics and connection requirements.

D. Manufacturer's Instructions: Indicate assembly, support details, connection requirements, and include start-up instructions.

E. Manufacturer's Field Reports: Indicate conditions at initial start-up including date, and initial set points.

F. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, and maintenance and repair data.

G. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years of experience.

C. Conform to NFPA 90A for the installation of computer room air conditioning units.

D. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.05 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Warranty: Include coverage of refrigeration compressors.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. American Power Conversion Corporation: www.apcc.com/#sle.

B. Compu-Aire, Inc: www.compu-aire.com/#sle.

C. Liebert, a brand of Vertiv Co: www.vertivco.com/#sle.

2.02 AIR CONDITIONING UNITS

A. Description: Packaged, air cooled, factory assembled, pre-wired and pre-piped unit, consisting of cabinet, fans, filters, humidifier, and controls.

B. Assembly: Up-flow air delivery, in draw-through configuration. The supply air shall exit from the top of the cabinet. The return air shall be through the front factory installed grilles. The EC fan

shall be factory mounted in the upper portion of the unit. The fan shall be located to pull air through the filters and cooling coil to ensure even air distribution and maximum coil performance.

C. Refrigerant: Use only refrigerants that have ozone depletion potential (ODP) of zero and global warming potential (GWP) of less than 50.

2.03 CABINET AND FRAME

A. The exterior panels shall be 20 gauge steel and powder-coated with RAL 7021 black color paint to protect against corrosion. The exterior panels shall be insulated with 1/2” to 1" (12.7 to 25.4mm), 1-1/2 lb. (0.68 kg) insulation. Front and side panels shall have captive, quarter-turn fasteners. The cabinet shall be designed so that all components are serviceable and removable using the front and right sides of the unit.

2.04 EVAPORATOR FANS AND MOTORS

A. The unit shall be equipped with one plug fan: integral direct driven fan with backward-curved blades and electronically commutated DC motor; commonly referred to as EC fan. The fan speed shall be variable and automatically regulated by the equipment controls through all modes of operation. The fan shall have a dedicated motor, fault monitoring circuitry, and speed controller, which shall provide a level of redundancy. The impeller shall be made of aluminum and dynamically balanced. The EC fan shall be located within the unit. The EC fan shall also provide greater energy savings than forward curved centrifugal fan and variable speed drives.

2.05 COMPRESSORS

A. The compressor shall be an R-410A scroll-type with variable capacity operation from 20-100%, commonly known as a digital scroll. The compressor solenoid valve shall unload the digital scroll compressor to provide variable capacity operation. The compressor shall have a suction gas cooled motor, EPDM Rubber vibration isolators, internal thermal overloads, automatic reset high pressure switch with lockout after three failure occurrences, rota-lock service valves, low pressure transducer, and crankcase heater. The compressor shall be removable and serviceable from the front of the unit. The crankcase heater and a discharge check valve shall be provided for additional system protection from refrigerant migration during Off cycles.

B. Compressor Sound Jacket: The compressor sound jacket shall reduce the level of sound emitted from the digital scroll compressor. It shall consist of a 3/8 inch closed cell polymeric 4.5 - 8.5 lb/ft3 density jacket that encloses the compressor.

2.06 EVAPORATOR COILS

A. Alternate row circuits, direct expansion cooling coils of seamless copper tubes expanded into aluminum fins in A-frame configuration.

B. Mount coil assembly in stainless steel drain pan.

2.07 CONDENSERS

A. The condenser shall be designed to reject waste heat to outdoor air and to control refrigerant head pressure as indoor equipment loading and outdoor ambient conditions change.

B. The manufacturer shall design and furnish all equipment in the quantities and configurations shown on the project drawings.

C. Standard 60Hz units shall be CSA-certified to the harmonized U.S. and Canadian product safety standard “CSA C22.2 No 236/UL 1995 for Heating and Cooling Equipment” and shall be marked with the CSA c-us logo.

D. The air-cooled condenser shall be a factory-assembled unit, complete with integral electrical panel, designed for outdoor installation. The condenser shall be a draw-through design.

E. Condenser shall consist of microchannel condenser coil(s), propeller fan(s) direct-driven by individual fan motor(s), electrical controls, housing, and mounting legs. The air-cooled condenser shall provide positive refrigerant head pressure control to the indoor cooling unit by adjusting heat rejection capacity. Microchannel coils shall provide superior heat transfer, reduce air-side pressure drop, increase energy efficiency, and significantly reduce the system

refrigerant volume required. EC fans and fan operating techniques shall reduced sound levels. Various methods shall be available to match indoor unit type, maximum outdoor design ambient and maximum sound requirements.

F. CONDENSER ELECTRICAL CONTROLS
   1. Electrical controls and service connection terminals shall be provided and factory-wired inside the attached control panel section. Only high-voltage supply wiring and low voltage indoor unit communication/interlock wiring are required at condenser installation.
   2. EC Fan Speed and Premium Control
   3. The EC fan/Premium Control System shall include an electronic control board, EC fan motor(s) with internal overload protection, refrigerant and ambient temperature thermistors, and refrigerant pressure transducers. The Premium Control Board shall communicate directly with the indoor unit's controls via field-supplied CANbus communication wires and via field-supplied low voltage interlock wires. The control board shall use sensor and communication inputs to maintain refrigerant pressure by controlling each EC fan on the same refrigerant circuit to the same speed. The Premium control board shall be rated to a temperature of -30°F to 125°F. The premium control shall be factory set for (fan speed) (fan speed with Liebert Lee-Temp™) (fan speed with unheated receivers for EEV) control.
   4. Locking Disconnect Switch
   5. A Locking-Type disconnect switch shall be factory-mounted and wired to the electrical panel and be capable of disrupting the flow of power to the unit and controlled via an externally mounted locking and lockable door handle. The locking disconnect shall be lockable in support of lockout/tagout safety programs.
   6. Short Circuit Current Rating
   7. The electrical panel shall provide at least 65,000A SCCR.

G. Cabinet
   1. The condenser cabinet shall be constructed of bright aluminum sheet and divided into individual fan sections by full width baffles. Internal structural support members, including coil support frame, shall be galvanized steel for strength and corrosion resistance. Panel doors shall be provided on two sides of each coil/fan section to permit coil cleaning. An electrical panel shall be contained inside a factory-mounted NEMA 3R weatherproof electrical enclosure.

H. CONDENSER MOUNTING LEGS STANDARD ALUMINUM LEGS
   1. Aluminum legs shall be provided to mount unit for vertical air discharge with rigging holes for hoisting the unit into position. Standard height is 18 in. (457mm).

2.08 FILTERS

A. The filter shall be an integral part of the system and located within the cabinet. The filter shall be deep-pleated, 2 in. (51mm) thick with a MERV 8 rating efficiency based on ASHRAE 52.2-2007. A filter clog switch shall be included. Mesh type, cleanable filters shall be unacceptable.

2.09 REHEAT/HEATING COILS

A. The reheat shall be a low-watt density 304/304 stainless steel finned-tubular electric reheat. The reheat section shall include UL/CSA recognized safety switches to protect the system from overheating. The electric reheat shall be controlled in two stages. The reheat elements shall be accessible from the right side of the cabinet.

2.10 HUMIDIFIER

A. The humidifier shall be of the infrared type, consisting of high intensity quartz lamps mounted above and out of the water supply. The evaporator pan shall be stainless steel and arranged to be serviceable without disconnecting water supply lines, drain lines, or electrical connections. The complete humidifier section shall be pre-piped ready for final connection. The infrared humidification system shall use bypass air to prevent over humidification of the controlled space. The auto flush system shall automatically flush deposits from the humidifier pan. The system shall be field adjustable to change the cycle time to suit local water conditions. A minimum 1 in. (25.4 mm) air gap within the humidifier piping assembly, in compliance with

ASME A112.1.2 section 2.4.2 (backsiphonage testing), shall prevent back flow of the humidifier supply water.

2.11 ELECTRICAL PANEL

A. Control Cabinet: NEMA 250; Type 2 enclosure, UL listed, with piano hinged door, grounding lug, combination magnetic starters with overload relays, circuit breakers and cover interlock, and fusible control circuit transformer.

B. Disconnect Switch: Non-automatic molded case circuit breaker with handle accessible with panel closed and capable of preventing access until switched to "off" position.

2.12 OPTIONS

A. LOCKING DISCONNECT SWITCH
   1. A locking-type fused disconnect switch shall be mounted in the electrical panel and shall be capable of disrupting the flow of power to the unit. The locking type shall consist of a main unit switch operational from outside the unit. The electric panel compartment shall be accessible only with the switch in the Off position. The locking disconnect shall be lockable in support of lockout/tagout safety programs.

B. SHORT-CIRCUIT CURRENT RATING (SCCR)
   1. The electrical panel shall provide at least 65,000A SCCR.
   2. Short-circuit current rating (SCCR) is the maximum short-circuit current a component or assembly can safely withstand when protected by a specific overcurrent protective device(s) or for a specified time.

C. CONDENSATE PUMP
   1. The dual-float condensate pump shall be complete with integral primary and secondary float switches, pump, motor assembly and reservoir. The secondary float shall send a signal to the local alarm and shut down the unit upon high water condition. The condensate pump shall be factory-installed on upflow units and field-installed on downflow units.

D. Plenum Construction
   1. The exterior panels shall be 20 gauge steel and powder-coated with black color paint to protect against corrosion. The exterior panels are insulated with 1/2” to 1" (12.7 to 25.4mm), 1-1/2 lb. (0.68 kg) insulation. Front and side panels shall have captive, quarter-turn fasteners.

E. Three-way Grille
   1. The unit shall be supplied with a three-way air discharge plenum. The plenum shall be 18 in. (457mm) high.

2.13 MICROPROCESSOR CONTROL SYSTEM

A. Logic Circuitry: Microprocessor shall continuously monitor operation of process cooling system; continuously digitally display room temperature and room relative humidity; sound alarm on system malfunction and simultaneously display problem. When more than one malfunction occurs, display fault in sequence with room temperature, remember alarm even when malfunction cleared, and continue to display fault until reset.

B. Malfunctions: Power Loss, Loss of Air Flow, Clogged Air Filter, High Room Temperature, Low Room Temperature, High Humidity, Low Humidity, Compressor No. 1 - Overload, Compressor No. 1 - Low Pressure, Compressor No. 1 - High Pressure, Compressor No. 2 - Overload, Compressor No. 2 - Low Pressure, Compressor No. 2 - High Pressure, and Supply Fan Overload.

C. Light Emitting Diodes Display: Control Power On, System On, Humidification, De-humidification taking place, Compressor No. 1 operating, Compressor No. 2 operating, Heat or Reheat operating, Economy Cooling.

D. Push Buttons: Provide to STOP process cooling system, START process cooling system, SILENCE audible alarm, push-to-test LED indicators, and display room relative humidity.

E. Remote Signalling: Provide termination for remote signalling of system status and alarms.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Coordinate installation of computer room air conditioning units with computer room raised floor installer.

3.02 SYSTEM STARTUP

A. Startup shall be provided by a factory trained representative.

B. Prepare and start systems. Set initial temperature and humidity set points.

END OF SECTION

SECTION 23 8126.13 - SMALL-CAPACITY SPLIT-SYSTEM AIR CONDITIONERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Air cooled condensing units.

B. Indoor ductless fan & coil units.

C. Controls.

1.02 REFERENCE STANDARDS

A. AHRI 210/240 - Standard for Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment; 2008, Including All Addenda.

B. AHRI 520 - Performance Rating of Positive Displacement Condensing Units; 2004.

C. ASHRAE Std 15 - Safety Standard for Refrigeration Systems; 2013.

D. ASHRAE Std 23.1 - Methods of Testing for Rating the Performance of Positive Displacement Refrigerant Compressors and Condensing Units that Operate at Subcritical Temperatures of the Refrigerant; 2010.

E. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.

F. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems; 2018.

G. UL 207 - Standard for Refrigerant-Containing Components and Accessories, Nonelectrical; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.

C. Shop Drawings: Indicate assembly, required clearances, and location and size of field connections.

D. Design Data: Indicate refrigerant pipe sizing.

E. Manufacturer's Instructions: Indicate rigging, assembly, and installation instructions.

F. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.

G. Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

H. Project Record Documents: Record actual locations of components and connections.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years of experience and approved by manufacturer.

1.05 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturers warranty for heat exchangers and compressors.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. LG

B. Mitsubishi

C. Daikin

2.02 SYSTEM DESIGN

A. Split-System Heating and Cooling Units: Self-contained, packaged, matched factory-engineered and assembled, pre-wired indoor and outdoor units; UL listed.
   1. Heating: None.
   2. Cooling: Outdoor electric condensing unit with evaporator coils in a ductless indoor unit.
   3. Provide refrigerant lines internal to units and between indoor and outdoor units, factory cleaned, dried, pressurized and sealed, with insulated suction line.

B. Performance Requirements: See Drawings for additional requirements.

2.03 INDOOR UNITS FOR DUCTLESS SYSTEMS

A. Indoor Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, evaporator coil, and controls; wired for single power connection with control transformer.

B. Evaporator Coils: Copper tube aluminum fin assembly, galvanized or polymer drain pan sloped in all directions to drain, drain connection, refrigerant piping connections, restricted distributor or thermostatic expansion valve.
   1. Construction and Ratings: In accordance with AHRI 210/240 and UL 207.
   2. Manufacturer: System manufacturer.

C. Remote Actuators:

2.04 OUTDOOR UNITS

A. Outdoor Units: Self-contained, packaged, pre-wired unit consisting of cabinet, with compressor and condenser.
   1. Comply with AHRI 210/240.
   2. Refrigerant: R-410A.
   3. Cabinet: Galvanized steel with baked enamel finish, easily removed and secured access doors with safety interlock switches, glass fiber insulation with reflective liner.
   4. Construction and Ratings: In accordance with AHRI 210/240 with testing in accordance with ASHRAE Std 23.1 and UL 207.

B. Compressor: Hermetic, two speed 1800 and 3600 rpm, AHRI 520 resiliently mounted integral with condenser, with positive lubrication, crankcase heater, high pressure control, motor overload protection, service valves and drier. Provide time delay control to prevent short cycling and rapid speed changes.

C. Air Cooled Condenser: Aluminum fin and copper tube coil, AHRI 520 with direct drive axial propeller fan resiliently mounted, galvanized fan guard.

D. Accessories: Filter drier, high pressure switch (manual reset), low pressure switch (automatic reset), service valves and gauge ports, thermometer well (in liquid line).
   1. Provide thermostatic expansion valves.

E. Operating Controls:
   1. Control by room thermostat to maintain room temperature setting.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrates are ready for installation of units and openings are as indicated on shop drawings.

B. Verify that proper power supply is available and in correct location.

C. Verify that proper fuel supply is available for connection.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions and requirements of local authorities having jurisdiction.

B. Install in accordance with NFPA 90A and NFPA 90B.

C. Install refrigeration systems in accordance with ASHRAE Std 15.

END OF SECTION

SECTION 26 0500 - GENERAL ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Work included in these specifications and included on the drawings shall include furnishing all labor, materials, supplies, and equipment to perform all work required including cutting, channeling, chasing, excavating and backfilling, demolition (if any) to install a complete and working electrical system(s) in accordance with these sections of the specifications and the accompanying drawings. This shall include all required preparation work, demolition, raceways, coordination, etc. required to install the electrical system.

B. It is recognized that separate subcontracts may be instituted by the General Contractor or the Division 26 Contractor with other contractors and/or suppliers. It is the responsibility of the Division 26 Contractor to completely inform, coordinate and advise those subs as to all of the other requirements, conditions and information associated with providing and installing the total job.

C. The electrical work shall include, but in no way be limited to the following:
   1. Raceways Systems
      a. Power
      b. Lighting
   2. Empty Raceways
      a. Fire Alarm System Additions
   3. Lighting Systems
      a. Interior
   4. Power Systems
      a. Interior
      b. Exterior
   5. Wiring Devices
   6. Fire Alarm System Additions
   7. Electrical Demolition
   8. Surge Protection System or Devices (TVSS)

1.02 RELATED SECTIONS

A. Drawings and specifications including General Conditions, Supplementary Conditions and Division 01 specification sections, apply to work of this and all sections in Division 26. Division 26 General Provisions described in this section apply to all sections of Division 26.

1.03 SPECIFIED MATERIALS:

A. Throughout the drawings and specifications, equipment and systems have been selected and are referenced by name, manufacturer, model number, etc. These references are not intended to limit competition. Products by other listed manufacturers will be acceptable.

B. If a listed manufacturer other than the basis of design is used, it is the contractor's responsibility for changes in dimension, structural, electrical changes, etc. required for proper installation, function and final performance.

1.04 SUBSTITUTION OF SPECIFIED MATERIALS:

A. In all cases the contractor shall be completely responsible for changes in dimension of other than first named manufacturer equipment, electrical changes, etc. required for proper function and final performance. Item shall comply with all requirements herein set forth and as required to perform as designed.

1.05 REFERENCES

A. The Contractor is responsible for obtaining all required permits and complying with the current editions, or the editions referenced in the other individual sections of these specifications, of all applicable National (NEC, IBC, NFPA), State, County, and Municipal codes and regulations. This shall include, but not be limited to, the following:

1. NFPA 70 - National Electrical Code
2. NFPA - National Fire Protection Association
3. Federal Occupational Safety and Health Act (OSHA)
4. Americans with Disabilities Act (ADA).
5. International Building Code (IBC)
6. International Fire Code (IFC)
7. International Energy Conservation Code (IEEC)

B. Unless noted otherwise, the contractor shall comply with the latest edition and update of any and all codes and standards.

C. Compliance with Underwriters Laboratories: All products installed under the contract shall have the Underwriters Laboratories (UL) label where such marking is available. Products which are not UL labeled will not be acceptable if labeled products are available from another approved manufacturer.

D. The above listed requirements are required of the electrical contractor by this contract whether these requirements are shown on the drawings, mentioned in the specifications or not.

E. All work and equipment installed that does not comply with the codes and standards noted above shall be corrected and/or replaced (at engineer's option).

F. The contractor(s) shall submit all items necessary to obtain all required permits to the appropriate Federal/State/County/City agencies, obtain all required permits, and pay for any and all required fees.

1.06 DEFINITIONS

A. Concealed - Embedded in masonry or installed within other building elements including but not necessarily limited to crawl spaces, spaces above ceilings, in walls, in chases, shafts . It shall also include conduit installed in the ground beneath a floor slab. Not visible.

B. Exposed - Installed in such a manner that it can be seen. All exposed materials shall be installed in a neat manner. If in the engineer's opinion the installed materials are not installed in a neat manner, it shall be removed and reinstalled to the satisfaction of the engineer.

C. Furnish - When used in the Division 26 plans and/or specifications the word "furnish" shall mean to purchase a piece of equipment or material and to have said equipment/material transported to the project site (or other location if so directed). All items to be furnished shall include any and all mounting hardware, support, and accessory required for installation and proper operation. Unless otherwise noted, when a piece of equipment or material is to be furnished by the contractor, it shall also be installed.

D. Provide - When used in the Division 26 plans and/or specifications the word "provide" shall mean to furnish and install complete and ready for use and to put into operation. Include any and all options, accessories, and mounting/installation hardware required for a complete and operating system or element of the electrical system.

E. Install - When used in the Division 26 plans and/or specifications the word "install" shall mean to unload and transport the equipment/material to the installation point of the job site. Any and all mounting hardware (whether specified or called for by name / model number, or not) shall be included. Perform every operation necessary, including any and all final adjustments, etc. required for proper operation.

F. Controlled - When used in the Division 26 plans and/or specifications, the word “controlled” shall mean to govern delivery of operating voltage or power to equipment or systems by means of, but not limited to, feeders, disconnects, breakers, switches, starters, etc..

1.07 COORDINATION OF WORK IN OTHER SECTIONS

A. The Division 26 contractor is responsible for including any and all work related to the electrical that is noted in any part of the specifications or any part of the drawings, including Divisions 01, 48 and any other sections.

B. If any piece of equipment is shown on any part of the drawings ("A" (Architectural) drawings, "M" (Mechanical) drawings, "P" (Plumbing) drawings, or "E" (Electrical) drawings), it is the

responsibility of the Division 26 Contractor to furnish and install electrical service as required to that equipment. Do a complete review of all contract documents and include electrical service for all such equipment whether or not it is also shown in Electrical documents. Electrical service shall comply with all requirements of the equipment shop drawings and all codes.

C. The Division 26 Contractor will supply power to equipment at the voltage indicated on the Division 26 drawings. The Division 26 Contractor and all other contractors will be held responsible for coordinating the equipment voltages, control equipment, wiring, and locations and type of terminations/connections and/or disconnects required to comply with the National Electrical Code, International Building Code, all local codes, and the equipment manufacturer's requirements. If equipment is furnished to the project at a voltage other than that shown on the Division 26 drawings, the contractor supplying the equipment and all other subcontractors will be held responsible for making any necessary adjustments to correct the conflict, to the satisfaction of the Electrical Engineer.

1.08 INTERPRETATION OF THE DRAWINGS AND SPECIFICATIONS (CONTRACT DOCUMENTS):

A. Refer to the section of the specifications which cover General Conditions, Division 01, and Instructions to bidders. These sections and their requirements are a part of this contract and are binding on this section of the work.

B. Electrical Drawings are diagrammatic in nature except where specific dimensions, or specific details are shown on the electrical, mechanical, or architectural drawings. The Electrical Contractor shall refer to other drawings for exact locations of equipment, building dimensions, architectural details and conditions affecting the electrical work; however, field measurements take precedence over dimensioned drawings. The Electrical Contractor shall provide all labor and materials and all incidental elements; junction and pull boxes, filters, pull wires, connectors, support materials, fuses, disconnect switches, lamps, and labels, to install, connect, start-up and result in a complete and working system in accordance with the drawings and specifications. Unless noted otherwise on the plans or in these specifications, all final connections are the responsibility of the Division 26 Contractor.

C. In order to show the electrical work required under this contract on the drawings, it is necessary to utilize symbols and schematic diagrams/details. These symbols and schematic diagrams/details do not have any dimensional significance nor do they delineate every item required for the intended installations. The work shall be installed in accordance with the intent diagrammatically expressed on the drawings, and in conformity with the dimensions indicated on the final architectural and structural working drawings and on equipment shop drawings. No interpretation shall be made from the limitations of symbols and diagrams that any elements necessary for complete work are excluded.

D. When the details of specific and/or general installation requirements show specific dimensioning and/or positioning requirements of the items to be installed, these dimensions shall be field verified and followed. It is the intent of these details to only establish the general feasibility of the work required. These details in no way delete, reduce, or substitute the requirement of field coordination for the indicated work.

E. The contractor is responsible for coordinating the installation of all electrical work with the work of other contractors and/or trades. This contractor shall refer to the other drawings (demolition, site, civil, architectural, kitchen, structural, plumbing, mechanical, etc.) to assure that the installed electrical work is installed in a coordinated fashion. Conflicts on installation work due to the lack of proper coordination of this contractor shall result in the work being removed and coordinated and properly reinstalled. Report to the Engineer any and all discrepancies that the contractor(s) find in the field between the electrical drawings and the other drawings.

F. The installation of any and all equipment/systems is subject to clarification as indicated in the review comments of the Engineer on the shop drawings. The contractor shall be aware that if the equipment of an approved equal manufacturer is to be installed, the equipment, controls, functions, conduit routing, power requirements, etc. may be different. It is the responsibility of the electrical contractor to coordinate the installation requirements of the equipment to be installed with the electrical plans of the specified equipment/systems. If there are any additional

equipment, power service, conduit, conductors, controls, etc. required to install the approved equal equipment, these additional requirements shall be furnished and installed.

G. The electrical drawings are such that the electrical service to equipment furnished and installed under other sections of the contract documents (examples, but not limited to: elevators, kitchen equipment, HVAC equipment, water heaters, fans, pumps, motors, etc) is coordinated for the specified equipment only. If the equipment installed under other divisions of the contract documents is not the specified equipment and is an approved equal to the specified equipment, it is possible that the equipment will require different electrical service/interface than that shown on the electrical plans for the specified equipment. In this case, it is the responsibility of the approved equal installing contractor / manufacturer to coordinate the electrical service/interface requirements with the electrical contractor. If the electrical service/interface requirements of the substituted equipment are greater than the specified equipment and result in an increased electrical cost, it is the responsibility of the furnishing/installing contractor to pay the electrical contractor for the increase in electrical cost.

H. Submission of a proposal and ultimate acceptance of an agreement or contract for execution of this section of work will be construed as evidence that the Electrical Contractor and each interested Subcontractor and/or vendor has carefully read and accepts all conditions set forth in each Division under specification Divisions titled "Instructions To Bidders" and Division 01, "General Conditions", in so far as such conditions may affect both the bidding for and execution of this section of work.

1.09 ELECTRICAL SYSTEMS

A. All electrical systems shown on the plans or specified in the Construction Manual shall have equipment furnished and installed so that the system is a complete and functioning system that complies with the intent of the specifications, whether each and every element of each and every system is specified or not. Any and all equipment, options, and system elements necessary for proper operation shall be furnished and installed, whether specifically called for (specified by name or catalog number) or not.

1.10 SPECIAL ELECTRICAL REQUIREMENTS

A. Provide all wiring, connectors, fittings, connections, and all accessories for the complete installation of, and final connections to, equipment furnished under other divisions of the specifications and where indicated on the electrical drawings or otherwise specified.

B. The Electrical Contractor shall coordinate with all other contractors the electrical service provided as shown on the electrical plans with respect to voltage, phase, and ampacity. This coordination shall take place before any equipment is ordered and is for the purpose of the contractor providing equipment that requires electrical connection ordering the correct equipment to match the electrical service provided. Any changes in the characteristics of the circuits that serve any electrically operated equipment shall be made.

C. Make all final connections to all equipment, provided under the electrical contract and equipment provided under other sections, except where noted on the plans to provide "rough-in only". Where connections are to be made by someone other than the Division 26 contractor, coordinate with the equipment supplier to determine the rough-in requirements. In the case where rough-in is installed now but equipment unknown or is to be installed in the future, install outlet box sized for the conductors installed, install conductors and leave 8" of pigtails for each conductor. Tape all conductors, leave a note in the box as to the panel the circuit is connected, and install a cover plate over the outlet box. In the panel that the circuit terminates, do not connect the circuit to a breaker, tag the circuit with information as to the location of the outlet box, and leave enough pigtail in the panel so that connection can be made to any breaker space in the panel.

D. The Electrical Contractor is hereby alerted that certain features of control, other functions, or systems may be specified in this division by performance, and as such, all elements of wiring or other materials and devices for the complete installation may not be shown on the drawings. The Electrical Contractor shall provide for the final and complete installation of all features called for by drawings or specifications.

E. Note that the Mechanical Division includes furnishing all motors for equipment furnished and installed by Division 23. In addition, unless otherwise shown on the electrical drawings, starters for Division 23 equipment shall also be provided by Division 23. The Division 26 work shall include installing all of the individually mounted, stand alone starters and the power wiring from the electrical system through ALL motor starters to the final connection to the motors. The only exception for this requirement of the Division 26 scope furnishing and installing starters shall be where the Division 23 equipment has a control panel that includes the starter and/or disconnect. Coordinate with Division 23.

F. Where equipment is prewired, the power wiring shall extend to the power terminals of the pre-wired equipment. Control wiring for the mechanical equipment and temperature control wiring is covered under Division 23 and is not a part of Division 26 unless specifically noted.

G. All safety disconnect switches shall be provided under Division 26 except where the Division 23 equipment is equipped with factory installed disconnects. Where the switch designation calls for the switch to be fused, the electrical contractor shall furnish and install fuses that are sized in accordance to the equipment nameplate of the equipment served.

H. In order to comply with the seismic codes, all recessed light fixtures shall be supported with four (4) hanger wires which shall be tied to the structure.

1.11 DIMENSIONS ON DRAWINGS, IN FIELD, VERIFICATION

A. The contractor shall be responsible for visiting the site in order to become familiar with existing conditions and coordinating the required work as needed. No increase in contract cost will be considered due to the contractor not being aware of existing conditions.

B. Do not scale drawings. Confirm all dimensions in the field. Coordinate all installations with shop drawings and other contractors work. Where discrepancies are found on the contract documents, the contractor shall include in the project cost any and all materials, items and labor required to make any and all changes required to install the work correctly. Where discrepancies are found on the project the contractor shall stop work in that area and contact the engineer.

1.12 SUBMITTALS

A. Required submittals are listed with each section of the electrical specifications.

1.13 RECORD DRAWINGS

A. The electrical contractor shall keep a set of construction drawings during the length of the project on which he shall note any and all changes from the original drawings. Of special importance is noting the actual location of all service entrances into the building and where conduit stub outs have been installed. This record set of drawings shall be updated daily. The drawings shall be neat, orderly and marked in a way to be clearly interpreted. The record drawings shall be turned over to the Architect to update drawing files for a final set of drawings for the owners record.

B. When the submitted information has been deemed satisfactory and all information has been transferred by the architect to the drawing files, they shall be labeled as "RECORD DRAWINGS" and copies turned over to the owner. Only then will final approval and payment be approved.

1.14 QUALITY ASSURANCE

A. The contractor performing the electrical work shall employ craftsmen who are thoroughly experienced and trained in the installation of electrical systems and general installation coordination. All work shall be done in the highest level of standards for the trade. Any work installed at a level that is less than the highest level of standards for the trade shall be removed and reinstalled in the manner described above.

B. All equipment shall be installed in compliance with the manufacturer's published installation recommendations and requirements, with any and all required accessories and mounting hardware, and/or as approved by the Engineer. The manufacturer's published installation

requirements and recommendations shall become a part of the Owner's Manual (See Paragraph 1.15)

1.15 OPERATING AND MAINTENANCE MANUALS:

A. The Manuals generally include all project submittals updated to reflect actually installed conditions; operating instructions; maintenance schedules; training material; warranty and bonds; and contact information for sales, warranty and service of equipment. Refer to Division 01 of the specifications for complete requirements.

B. Provide manuals for each product or system.

1.16 TRAINING AND INSTRUCTIONS:

A. The Contractor shall provide training and instructions by knowledgeable representatives of the products installed to fully train and instruct representatives of the using agency in the location, function and operation of devices, equipment and systems installed under Division 26. The instruction shall include maintenance procedures for all such items. See specific sections in the Project Manual for devices, equipment and systems for detailed requirements for training and instructions.

1.17 DELIVERY, STORAGE, AND PROTECTION

A. Where equipment is purchased by the electrical contractor to be installed in conformance with the contract documents, the contractor shall follow the following procedure as it relates to delivery, storage, and installation:
   1. Coordinate any and all information with any and all contractors who are to do work to accommodate the division 26 equipment/work.
   2. Coordinate delivery of equipment.
   3. Unload the equipment from delivery trucks.
   4. Inspect equipment for damage. Report damage immediately and arrange for the equipment to be repaired or replaced. No claims for time extensions or additional work related to the damage will be accepted if not made within ten days of the delivery of the equipment.
   5. Inspect the equipment to assure correct make, model number, voltage, etc.
   6. Provide for safe handling and field storage up to the time of permanent placement in the project.
   7. Provide for any and all field assembly and internal connection as may be necessary for proper operation.
   8. Install in place including any and all required mounting supports, connectors, fittings, connections, and accessories required for complete system operation.

1.18 MANUFACTURER'S FIELD SERVICES:

A. Provide manufacturers field services where required under the specific sections of the Project Manual using authorized and trained manufactures representatives of the equipment or systems in question. The field services shall include the following as a minimum:
   1. Inspect the installation to verify that the installation meets or exceeds all manufacturer's requirements and recommendations for proper operation.
   2. Start/energize the equipment and verify that the equipment/system is operating and functioning as required by these specifications and the manufacturer's requirements.
   3. Provide written certification that field services have been performed and that equipment/system is operating and functioning as required by these specifications and the manufacturer's requirements. Submit the certification as part of the closeout documents.

B. Refer to specific sections of the Project Manual and provide all field service requirements listed in addition to these general requirements.

1.19 WARRANTY

A. All work, equipment, and materials shall be new and without defects or blemishes, and guaranteed to be free from defects for a period of one (1) year after the final date of project acceptance as defined by the Architect (NOT THE DATE OF INSTALLATION OR START-UP).

All installation and installation materials shall also be guaranteed for the one (1) year period. This shall cover such items as equipment pads, supports, leaks from around equipment installation, etc and is intended to cover everything installed or provided under this division of the contract.

B. Manufactured pieces of equipment shall have their guarantee also backed by the equipment manufacturer.

C. During the guarantee period there shall be no charge to the Owner for items and work done under the guarantee clause (Service calls). This shall apply to replacement equipment, equipment shipping charges, mileage, labor, all taxes, etc.

D. Refer to the other sections of the Project Manual for warranty requirements that may exceed these general requirements and follow those requirements for the equipment, devices, materials or systems in question.

PART 2 PRODUCTS

2.01 GENERAL:

A. All products shall be of new manufacturer (unless the plans and/or other sections of this specification call for existing or other identified products to be used), age of less than one year, and the latest model of a manufacturer. A new product shall not be used if the manufacturer has introduced a product as a replacement. All materials and apparatus for the work shall be furnished, delivered, erected, connected and finished in every detail, and shall be so selected and arranged as to fit into the building spaces in compliance with all code requirements.

B. All equipment that is provided by the contractor, subcontractors, or specialty subcontractor (fire alarm, etc) to be installed at the project site, shall be purchased, installed and maintained by the local (to the project site) authorized, licensed, factory distributor/installer/supplier. The contractor shall include with the submittals, verification in writing from the manufacturer, that the supplier and/or distributor is a factory authorized and licensed by the manufacturer to provide, install, and maintain (throughout the entire length of the warranty period) the equipment. THERE SHALL BE NO EXCEPTIONS TO THIS REQUIREMENT.

C. By providing equipment to the project, a manufacturer guarantees to provide replacement parts for the equipment for a period of five (5) years, even if the item provided goes out of manufacturing.

D. Manufacturer's catalog numbers listed are not necessarily complete and are for general identification only. It is the responsibility of the Contractor to provide complete catalog numbers and to provide all accessories for installation as implied by the accompanying description of the equipment, material or device, the demonstrated use on the drawings, and the specifications contained herein. Products provided shall be a standard product which has a history of successful installation and operation for a minimum period of two years. Prototype or custom made equipment is not acceptable unless so specified herein.

E. Manufacturer's instructions shall be obtained by the Contractor and used for the installation of all equipment and devices where such manufacturer's instructions are available.

F. Where a substituted product is used instead of the specified product, the contractor will assume any and all responsibility for the product to fit, function and perform as well as the specified product. The opinion of the engineer will be binding and shall govern all parties as to a substituted product performing as well as the specified product.

G. Completeness: Provide all boxes, off-sets, bends, raceways, devices, raceway supports, installation brackets and supports, flexible connections, wiring connectors, labels and terminals for the complete installation and operation of all products. Each unit of product shall be assembled and installed and all surfaces shall be clean and free of dents, scratches, and abrasions or marred areas.

2.02 IDENTIFICATION

A. All equipment shall be marked and/or identified so that maintenance crews can locate equipment.

B. All equipment items; switchboards, distribution, power, receptacle and lighting panelboards, transformers, disconnects, motor control centers, switches, lighting contactors and wiring gutters, of the electrical system shall be labeled. Each distribution switch and circuit breaker in a switchboard, or individually mounted, shall be labeled. These labels shall be engraved, black laminated plastic labels, with 1/2 inch white letters. For equipment connected to the emergency power system, the labels shall be red laminated plastic with white letters. Attach the labels to the equipment with two sheet metal screws or rivets.

C. Circuit breakers in distribution panels (panels with hinged doors) shall be labeled by means of a typed circuit breaker directory. For all breakers serving lighting, receptacle, and HVAC circuits, the contractor shall include on the panel schedule by the breaker number the room number(s) served by the circuit. The room number(s) shall be the same number(s) as the room number(s) on the door, not the space number as shown on the plans. See Section 26 2416.

D. Wire and cable identification shall be made so that all wire and cable can be identified by means of color coding as noted in Section 26 0553. Wiring marker for use in wire and terminal identification shall be white cloth backed with a rubber based, pressure sensitive adhesive labels. Each wire or cable in a feeder at its terminal points, and in each pull-box, junction box, and panel gutter through which it passes shall be identified. Where two or more feeders enter or leave a device or enclosure, the cable shall be tagged to indicate destination of cable run. Each common wire, common circuit or common loop of a system, fire alarm, sound system, or TV system, shall be identified.

E. Device plates for local toggle switches, toggle switch-type motor starters, pilot lights, and the like, whose function is not readily apparent shall labeled suitably describing the equipment controlled or indicated. These labels shall be engraved, black laminated plastic labels, with 1/4 inch white letters. For equipment connected to the emergency power system, the labels shall be red laminated plastic with white letters. Attach the labels to the equipment cover plates with glue recommended by the manufacturer.

F. Where used with an empty raceway for wires of a future system, each box or cabinet shall be identified on the inside by means of indelible markings indicating the system for which it is installed. Label any junction box, which includes wiring, with indelible markings on the outside showing system and voltage.

PART 3 EXECUTION

3.01 GENERAL

A. Before any work is started, the electrical contractor shall coordinate the work of other contractors that will affect the work of the electrical contractor. The electrical contractor shall inspect the work of all other trades to determine if the other work is ready for the electrical contractor to start his work.

B. Any and all electrical installations shall be coordinated with other trades, contractors and the Owner.

C. The contractor shall make himself familiar with existing conditions, site information, etc. so that conflicts are avoided.

D. All work shall be installed per all applicable code, rules, regulations, shop drawings and manufacturer's installation recommendations.

E. The electrical contractor shall be responsible for returning to original, pre-construction condition, any paved areas, sidewalks, planting, walls, and other areas disturbed during electrical installation work.

F. The electrical equipment shall be installed as close as possible to the location as shown on the plans. If during the installation, it is required to install equipment in locations other than the one shown on the plans, the contractor shall make a sketch of the proposed changes, submit it to the Engineer, and after the Engineer has given approval, then proceed with the installation.

G. Working spaces and clearances shall not be less than the required minimums in the National Electric Code (NEC).

3.02 EXAMINATION

A. The Electrical Contractor is responsible for visiting and examining the site to determine those portions of the site or present buildings affected by this work so as to become familiar with existing conditions and difficulties that will attend the execution of the work, before submitting proposals.

B. Submission of a proposal will be considered as evidence that such examination has been made and later claims for labor, equipment, or materials because of difficulties encountered, which could have been foreseen had such examination been made, will not be recognized.

3.03 ADDITIONS RENOVATIONS AND REMODELING

A. All electrical work shall be coordinated and phased so as to assure electrical service to any other buildings or parts of buildings that require use during construction.

B. All existing electrical system elements shall be protected from damage during any and all additions, renovations, and remodeling.

C. All new electrical equipment and installations shall be installed and connected to existing work or existing electrical system elements in a neat and careful manner. Any existing electrical work or system elements that are disturbed or damaged shall be replaced or repaired to the pre-construction condition.

3.04 LOCATIONS OF EQUIPMENT REQUIRING ELECTRICAL SERVICE AND CONNECTIONS:

A. Coordinate the exact installed location of equipment that requires electrical connections that is furnished and installed by other contractors. The electrical drawings try to show the correct location of all of these items, but it is the responsibility of the electrical contractor to coordinate with all other contractors to determine the exact installed location of all equipment furnished and installed by other contractors and wired by the electrical contractor. Such coordination shall include, but not limited to exact location, location of electrical connection, type of connection required, and electrical characteristics.

3.05 OPENINGS, CUTTING AND PATCHING:

A. Contractor shall arrange for openings in the building structure or components to allow for installation of electrical work or transport of electrical equipment as the project progresses.

B. Any cut portion of the building, wall, sidewalk, paved drives, ceiling, floors, roofs, etc., install any raceway or apparatus or transport equipment, shall be restored in a manner such that the end product complies with the specification for that type of work. Where existing work is cut, restore to the original (pre-construction) condition. The electrical contractor shall be responsible for returning to original, pre-construction condition, any of the above noted areas or other areas disturbed during electrical installation work.

C. Structural, load bearing, or supporting device shall not be cut without approval in writing from the Architect.

3.06 LOCATIONS OF OUTLET BOXES FOR EQUIPMENT AND GENERAL WIRING:

A. All outlets for lighting, power, and equipment, not specifically dimensioned are located diagrammatically on the drawings.

B. Lighting fixtures shall be located in accordance with reflected ceiling plans or tile pattern outlines. If neither is indicated, lighting fixtures shall be symmetrical within the space in which they are located. The Contractor shall be responsible for coordinating with the architectural and mechanical plans and to the shop drawing of the equipment to be installed for the exact location of the outlets required for equipment installation.

C. Lighting fixtures and convenience outlets shall be located so that they will be symmetrical with architectural details.

D. Equipment outlets shall be located so as to serve the equipment directly. It is the Contractor's responsibility to coordinate outlet location with equipment so that all outlets are accessible and disconnect switches have clearance for operation.

E. Where outlets are shown to be installed over casework or counters, the Contractor shall be responsible for coordinating the outlet box installation with the architectural details so that the bottom of the box is installed 6" above the counter/casework. Where a back splash is to be installed on the counter/casework, install the bottom of the box 4" above the top of the back splash.

F. If so directed by the Architect / Engineer / Owner, any outlet box may be moved 10 feet in any direction.

3.07 PAINTING:

A. Exposed conduit, ungalvanized troughs, metal frames and support racks and wooden surfaces provided under this section shall be painted. Paint color shall match and be the same paint as the room finish paint unless noted elsewhere on the plans or in the specifications. Clean surfaces completely of all oil, wax, rust and old paint prior to repainting. Paint shall be applied to backup boards before switches, troughs, and devices are installed. Paint shall include a primer and two coats of finished paint. Touch-up scratched, or marred surfaces of lighting fixtures and equipment with paint obtained from the equipment manufacturer especially for that purpose.

3.08 ELECTRICAL SYSTEM TESTING:

A. At the time of the final inspection, or at such times as parts of the system may be completed, all electrical systems shall be tested for compliance with the specifications. The Contractor shall provide all personnel and equipment; current, voltage and resistance measuring instruments, ladders and lights to assist the Engineer in conducting the tests. Authorized representatives of the manufacturer shall be present to demonstrate compliance with specifications of their specific system.

B. The Contractor shall remove equipment covers as directed for inspection of internal wiring. Accessible ceiling shall be removed as directed for inspection of equipment above the ceilings. After inspection and correction of any problems found, the Contractor shall replace all cover plates, access plates and removable ceiling.

C. The life safety system shall be demonstrated to function in accordance with the specifications. Each device shall be tested for proper operation.

3.09 CLEANING:

A. At completion of the work the Contractor shall clean all exposed elements of the electrical system so that all markings deteriorating the original finish appearance are removed. All lighting fixtures, lenses, and reflectors shall be cleaned inside and out and all lamps shall be left clear of dust, dirt, and grime.

B. The Contractor shall specifically examine the interiors of panelboard cans, equipment cabinets, lighting fixtures, junction boxes, and like components where conduit and wire connections have been made, and all resulting wire ends, insulation cuttings, knock-out plugs, metal filings and any other trash shall be removed so that interiors and exteriors are left free of all debris.

END OF SECTION

SECTION 26 0501 - ELECTRICAL DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical demolition.

1.02 ADMINISTRATION

A. It is not possible to delineate the full scope of the demolition work in the construction documents due to the inaccuracy of existing drawings and sometimes lack of drawings or other documentation entirely. Field work by the Architect and Engineer is also limited in scope and yields limited results from factors that include lack of existing documentation and limited access. Therefore the Contractor must make reasonable allowances for work not reflected by the Constructions documents based on the Contractor's experience. Do not completely rely on the Demolition plans to identify circuiting and the safe removal of power from circuits to perform work. It is the responsibility of the Contractor to trace out and verify circuit conditions by taking voltage measurements, using circuit tracers or other methods to verify circuit status.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 EXECUTION

3.01 EXAMINATION

A. All demolition work shall be preformed with due care and diligence so as to prevent the unnecessary destruction and/or damage to systems that shall remain in operation at the conclusion of the project. Determine the exact location of all existing equipment, devices and wiring before commencing work.

B. Preserve all portions of the existing electrical systems which shall remain.

C. Verify field measurements and circuiting arrangements shown on Drawings.

D. Demolition drawings are based on casual field observation and existing record documents. Equipment and circuits have been shown in an approximate way and have not been independently verified by the owner or engineer. Determine all work necessary to renovate, alter, change and repair existing systems based on the actual field conditions. Contractors will be expected to make reasonable assumptions about the work based on their experience with projects of similar scope and size.

E. Conduit and wiring are not shown on the demolition plan but shall be considered fully a part of the work.

F. Existing conduit and wiring may be re-used where they are of the type specified, meet the requirements for the new work as defined by the Contract Documents and remain in good condition.

G. Existing circuitry without a separate grounding conductor shall not be re-used.

H. Report discrepancies to Architect before disturbing existing installation.

I. Beginning of demolition means installer accepts existing conditions and agrees to be fully responsible for any and all damages caused by a failure to exactly locate and preserve any and all existing portions of the electrical system.

3.02 PREPARATION

A. Disconnect electrical systems in walls, floors, and ceilings to be removed.

B. Coordinate utility service outages with utility company.

C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
   1. Obtain permission from Owner at least 24 hours before partially or completely disabling system.
   2. Make temporary connections to maintain service in areas adjacent to work area.

E. 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.
   2. Notify local fire service.
   3. Make notifications at least 24 hours in advance.
   4. Make temporary connections to maintain service in areas adjacent to work area.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

A. Remove, relocate, and extend existing installations to accommodate new construction. Maintain the continuity of service and grounding to the existing circuits and other system elements contained within the area of construction that serve other areas of the facility and conceal them above ceilings and other building elements in the new construction.

B. Remove abandoned wiring to source of supply or to the point on a shared circuit from where the equipment of device is served.

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

D. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.

E. Remove and re-install or protect in place all existing equipment and devices shown to remain on or in walls, ceilings and floors which are exposed to demolition and construction activities and which may be damaged by dust, dirt, debris and painting. Where new walls are extended extend boxes and wiring to accommodate new finish.

F. Replace existing devices shown to remain in operation and and their associated coverplates which have been damaged.

G. Coordinate disconnect and remove electrical devices and equipment serving utilization equipment that has been removed. Examine the demolition plans of all trades provide electrical demolition services for equipment and devices being removed.

H. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.

I. Provide all cutting and patching to repair any damage caused by construction activities including adjacent construction and finishes damaged during demolition and extension work.

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

K. 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 that remain or that 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 newly revised typed panelboard directories for existing panelboards to reflect new circuit conditions as a result of construction and demolition.

C. Luminaires: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts and broken electrical parts.

D. All equipment, devices and materials removed during demolition work and not indicated to be reused or turned over to the owner, shall become the responsibility of the Contractor for disposal.

END OF SECTION

SECTION 26 0519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Single conductor building wire.

B. Wiring connectors.

C. Electrical tape.

D. Heat shrink tubing.

E. Wire pulling lubricant.

F. Cable ties.

1.02 RELATED REQUIREMENTS

A. Section 26 0526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.

B. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013.

B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2011.

C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010 (Reapproved 2014).

D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2014).

E. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2010.

F. ASTM D4388 - Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes; 2013.

G. FS A-A-59544 - Cable and Wire, Electrical (Power, Fixed Installation); Federal Specification; Revision A, 2008.

H. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

I. NEMA WC 70 - Nonshielded Power Cable 2000 V or Less for the Distribution of Electrical Energy; 2009.

J. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.

K. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

L. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.

M. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.

N. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.

O. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.

P. UL 486D - Sealed Wire Connector Systems; Current Edition, Including All Revisions.

Q. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
3. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. NEMA WC 3 - Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

C. NEMA WC 5 - Thermoplastic-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

1.05 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

1.08 FIELD CONDITIONS

A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F (-10 degrees C), unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Architect and obtain direction before proceeding with work.

PART 2 PRODUCTS

2.01 CONDUCTOR AND CABLE APPLICATIONS

A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.

B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.

C. Nonmetallic-sheathed cable is not permitted.

D. Underground feeder and branch-circuit cable is not permitted.

E. Service entrance cable is not permitted.

F. Armored cable is not permitted.

G. Metal-clad cable is not permitted.

H. Use stranded conductors for control circuits.

I. Use conductor not smaller than 14 AWG for control circuits.

2.02 CONDUCTOR AND CABLE MANUFACTURERS

A. Cerro Wire LLC: www.cerrowire.com.

B. Encore Wire Corporation: www.encorewire.com.

C. Industrial Wire & Cable, Inc: www.iewc.com.

D. Southwire Company: www.southwire.com.

2.03 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

A. Provide products that comply with requirements of NFPA 70.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.

D. Comply with NEMA WC 70.

E. Comply with FS A-A-59544 where applicable.

F. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

G. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.

H. Conductors for Grounding and Bonding: Also comply with Section 26 0526.

I. Conductors and Cables Installed Exposed in Spaces Used for Environmental Air (only where specifically permitted): Plenum rated, listed and labeled as suitable for use in return air plenums.

J. Conductor Material:
   1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
   2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
   3. Tinned Copper Conductors: Comply with ASTM B33.

K. Minimum Conductor Size:
   1. Branch Circuits: 12 AWG.
      a. Exceptions:
         1) 20 A, 120 V circuits longer than 75 feet (23 m): 10 AWG, for voltage drop.
         2) 20 A, 120 V circuits longer than 150 feet (46 m): 8 AWG, for voltage drop.
   2. Control Circuits: 14 AWG.

L. Conductor Color Coding:
   1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
   2. Color Coding Method: Integrally colored insulation.
      a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.
   3. Color Code:
      a. 480Y/277 V, 3 Phase, 4 Wire System:
         1) Phase A: Brown.
         2) Phase B: Orange.
         3) Phase C: Yellow.
         4) Neutral/Grounded: Gray.
      b. 208Y/120 V, 3 Phase, 4 Wire System:
         1) Phase A: Black.
         2) Phase B: Red.
         3) Phase C: Blue.
         4) Neutral/Grounded: White.
      c. Equipment Ground, All Systems: Green.
      d. Travelers for 3-Way and 4-Way Switching: Pink.
      e. For modifications or additions to existing wiring systems, comply with existing color code when existing code complies with NFPA 70 and is approved by the authority having jurisdiction.
      f. For control circuits, comply with manufacturer's recommended color code.

2.04 SINGLE CONDUCTOR BUILDING WIRE

A. Description: Single conductor insulated wire.

B. Conductor Stranding:
   1. Feeders and Branch Circuits: Stranded.

C. Insulation Voltage Rating: 600 V.

D. Insulation:
   1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2.

2.05 WIRING CONNECTORS

A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

B. Wiring Connectors for Splices and Taps:
   1. Copper Conductors Size 8 AWG and Smaller: Use mechanical connectors or compression connectors.
   2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors.

C. Wiring Connectors for Terminations:
   1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
   2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
   3. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
   4. Provide motor pigtail connectors for connecting motor leads in order to facilitate disconnection.
   5. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.
   6. Stranded Conductors Size 10 AWG and Smaller: Use crimped terminals for connections to terminal screws.
   7. Conductors for Control Circuits: Use crimped terminals for all connections.

D. Mechanical Connectors: Provide bolted type or set-screw type.
   1. Manufacturers:
      a. Burndy: www.burndy.com.
      b. Ilsco: www.ilsco.com/#sle.
      c. Thomas & Betts Corporation: www.tnb.com/#sle.

E. Compression Connectors: Provide circumferential type or hex type crimp configuration.
   1. Manufacturers:
      a. Burndy: www.burndy.com.
      b. Ilsco: www.ilsco.com/#sle.
      c. Thomas & Betts Corporation: www.tnb.com/#sle.

F. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.
   1. Manufacturers:
      a. Burndy: www.burndy.com.
      b. Ilsco: www.ilsco.com/#sle.
      c. Thomas & Betts Corporation: www.tnb.com/#sle.

2.06 WIRING ACCESSORIES

A. Electrical Tape:
   1. Manufacturers:
      a. 3M: www.3m.com/#sle.

b. Plymouth Rubber Europa: www.plymouthrubber.com/#sle.
c. Substitutions: See Section 01 6000 - Product Requirements.

2. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
3. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F (-18 degrees C) and suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
4. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil (0.76 mm); suitable for continuous temperature environment up to 194 degrees F (90 degrees C) and short-term 266 degrees F (130 degrees C) overload service.
5. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil (3.2 mm); suitable for continuous temperature environment up to 176 degrees F (80 degrees C).
6. Varnished Cambric Electrical Tape: Cotton cambric fabric tape, with or without adhesive, oil-primed and coated with high-grade insulating varnish; minimum thickness of 7 mil (0.18 mm); suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
7. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil (2.3 mm).

B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.
1. Manufacturers:
a. 3M: www.3m.com/#sle.

C. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.

D. Cable Ties: Material and tensile strength rating suitable for application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that work likely to damage wire and cable has been completed.

C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.

D. Verify that raceway installation is complete and supported.

E. Verify that field measurements are as indicated.

F. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.03 INSTALLATION

A. Circuiting Requirements:
1. Unless dimensioned, circuit routing indicated is diagrammatic.
2. When circuit destination is indicated without specific routing, determine exact routing required.
3. Arrange circuiting to minimize splices.
4. Include circuit lengths required to install connected devices within 10 ft (3.0 m) of location indicated.

5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
6. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
7. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is not permitted.
    a. Provide no more than six current-carrying conductors in a single raceway. Dedicated neutral conductors are considered current-carrying conductors.
    b. Increase size of conductors as required to account for ampacity derating.
    c. Size raceways, boxes, etc. to accommodate conductors.
8. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.

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

C. Perform work in accordance with NECA 1 (general workmanship).

D. Installation in Raceway:
1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
2. Pull all conductors and cables together into raceway at same time.
3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.

E. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

F. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
1. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conductors and cables to lay on ceiling tiles.
2. Installation in Vertical Raceways: Provide supports where vertical rise exceeds permissible limits.

G. Terminate cables using suitable fittings.

H. Install conductors with a minimum of 12 inches (300 mm) of slack at each outlet.

I. Where conductors are installed in enclosures for future termination by others, provide a minimum of 5 feet (1.5 m) of slack.

J. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.

K. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.

L. Make wiring connections using specified wiring connectors.
1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
3. Do not remove conductor strands to facilitate insertion into connector.
4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.

6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

M. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
   1. Dry Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
      a. For taped connections, first apply adequate amount of rubber splicing electrical tape or electrical filler tape, followed by outer covering of vinyl insulating electrical tape.
      b. For taped connections likely to require re-entering, including motor leads, first apply varnished cambric electrical tape, followed by adequate amount of rubber splicing electrical tape, followed by outer covering of vinyl insulating electrical tape.
   2. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
      a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
      b. For taped connections, follow same procedure as for dry locations but apply outer covering of moisture sealing electrical tape.
   3. Wet Locations: Use heat shrink tubing.

N. Insulate ends of spare conductors using vinyl insulating electrical tape.

O. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.

P. Identify conductors and cables in accordance with Section 26 0553.

Q. Color Code Legend: Provide identification label identifying color code for ungrounded conductors at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.

R. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

S. Where a circuit home run or a feeder is shown on the plans without any conductor or raceway identification, it shall be a minimum of 2 # 12, 1 # 12 Ground, ½" Conduit unless additional information is available as follows:
   1. Where an overcurrent device is shown for the circuit in panelboards or otherwise noted, size the conductor and raceway to match the overcurrent device rating. If the feeder or homerun is shown connected to a transformer, electric motor, mechanical equipment or other equipment for which load information is available on the plans or in the project manual, provide conductors and raceways sized to the load capacity of the equipment. Verify final sizes with the Engineer in such cases.

T. Use suitable wire pulling lubricant for building wire 4 AWG and larger.

U. Use no wire smaller than 12 AWG for power and lighting circuits, and no smaller than 14 AWG for control wiring.

V. Protect exposed cable from damage.

W. Support cables or flexible metal conduits 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. Provide bridle rings or drive rings.

X. Support cables above accessible ceilings to building structural elements, steel channel trapeze hangers, or other manufactured hangers or support systems fastened to or hung from the building structure. It is permissible to use the ceiling wire or separate support wire installed for the purpose to support the final six feet of cable connected to light fixtures. Do not lay cables on ceiling tiles or on duct work, piping or other system elements.

3.04 CONDUCTOR/CABLE IDENTIFICATION

A. Each wire or cable in a feeder at its terminal points, and in each pull box, junction box, and panel gutter through which it passes shall be identified to show the circuit number of the breaker to which it connects. Each common wire, common circuit to common loop of a system, fire alarm, sound system, TV system, or any signal system conductor, shall be identified. Refer to Section 26 0553 for additional instructions.

3.05 FIELD QUALITY CONTROL

A. Inspect wire and cable for physical damage and proper connection.

B. Torque test conductor connections and terminations to manufacturer's recommended values.

C. Perform continuity test on all power and equipment branch circuit conductors. Verify proper phasing connections.

D. Feeder Resistance Testing:
   1. All current carrying phase conductors and neutrals shall be tested as installed, and before connections are made, for insulation resistance and accidental grounds. This shall be done with a 500-volt megger. The procedures listed below shall be followed:
   2. Minimum readings shall be one million (1,000,000) or more ohms for #6 AWG wire and smaller, 250,000 ohms or more for #4 AWG wire or larger, between conductors and between conductor and the grounding conductor.
   3. After all fixtures, devices, and equipment are installed and all connections completed to each panel, the contractor shall disconnect the neutral feeder conductor from the neutral bar and take a megger reading between the neutral bar and the grounded enclosure. If this reading is less than 250,000 ohms, the contractor shall disconnect the branch circuit neutral wires from this neutral bar. He shall then test each one separately to the panel until source of the low reading is found. The contractor shall correct troubles, reconnect, and retest until at least 250,000 ohms from the neutral bar to the grounded panel can be achieved with only the neutral feeder disconnected.
   4. Document test by tabulating the readings with time of day, date, temperature and all pertinent test information. Submit documentation to the engieer prior to the final inspection and as a prerequisite for final acceptance of the project.
   5. At final inspection, the contractor shall furnish a megger and show the engineers and State Construction Office representatives that the panels comply with the above.

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

F. Perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required.

G. Correct deficiencies and replace damaged or defective conductors and cables.

H. Perform inspections and tests listed in NETA STD ATS, Section 7.3.2.

END OF SECTION

SECTION 26 0526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Grounding and bonding requirements.

B. Conductors for grounding and bonding.

C. Connectors for grounding and bonding.

D. Grounding and bonding components.

1.02 SYSTEM DESCRIPTION

A. Furnish all labor, materials, services, equipment and appliances required in conjunction with a grounding system as indicated in the Contract Documents.

B. Bond together system neutrals, service equipment enclosures, exposed non-current carrying metal parts of electrical equipment, metal raceway systems, grounding conductor in raceways and cables, receptacle ground connectors, and plumbing systems.

1.03 RELATED REQUIREMENTS

A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.

B. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.04 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

B. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. NFPA 780 - Standard for the Installation of Lightning Protection Systems; 2014.

E. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.05 PERFORMANCE REQUIREMENTS

A. Grounding System Resistance: 5 ohms.

1.06 SUBMITTALS

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

B. Certificate of Compliance: Indicate approval of installation by authority having jurisdiction.

1.07 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

A. Existing Work: Where existing grounding and bonding system components are indicated to be reused, they may be reused only where they are free from corrosion, integrity and continuity are verified, and where acceptable to the authority having jurisdiction.

B. Do not use products for applications other than as permitted by NFPA 70 and product listing.

C. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.

D. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

E. Grounding Electrode System:

1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
    a. Provide continuous grounding electrode conductors without splice or joint.
    b. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.

F. Bonding and Equipment Grounding:
1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.

G. Lightning Protection Systems, in Addition to Requirements of Section 26 4113:
1. Do not use grounding electrode dedicated for lightning protection system for component of building grounding electrode system provided under this section.
2. Provide bonding of building grounding electrode system provided under this section and lightning protection grounding electrode system in accordance with NFPA 70 and NFPA 780.

2.02 GROUNDING AND BONDING COMPONENTS

A. General Requirements:
1. Provide products listed, classified, and labeled as suitable for the purpose intended.
2. Provide products listed and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 0526:

C. Connectors for Grounding and Bonding:
1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
2. Unless otherwise indicated, use mechanical connectors or exothermic welded connections for accessible connections.

2.03 CONNECTORS AND ACCESSORIES

A. Mechanical Connectors: Bronze.

B. Exothermic Connections:

C. Wire: Stranded copper.

D. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that work likely to damage grounding and bonding system components has been completed.

B. Verify that field measurements are as indicated.

C. Verify that conditions are satisfactory for installation prior to starting work.

D. Verify existing conditions prior to beginning work.

3.02 GENERAL INSTALLATION REQUIREMENTS

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

B. Perform work in accordance with NECA 1 (general workmanship).

C. Make grounding and bonding connections using specified connectors.
   1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
   2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
   3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
   4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
   5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

D. Identify grounding and bonding system components in accordance with Section 26 0553.

E. Ground electrical work in accordance with NEC Article 250, local codes as specified herein, and as shown on the drawings.

F. Provide a separate, insulated equipment grounding conductor in feeder and branch circuits. Terminate each end on a grounding lug, bus, or bushing.

G. Install equipment grounding conductors in raceway with feeder conductors.

H. Where connections are made to motors or equipment with flexible metal conduit, grounding conductor shall be stranded copper conductor within the conduit, bonded to the equipment and to the rigid metal raceway system. Size conductor in accordance with NEC Table 250-94 or as shown on the plans.

I. At each convenience outlet, install a grounding clip attached to the outlet box and leave a sufficient length of #12 wire with green colored insulation to connect to the grounding terminal of the receptacle. Grounding clip shall be equal to Steel City Type G. This requirement may be deleted if automatic grounding clip receptacle meeting NEC Article 250-74, Exception No. 2, is used.

J. Provide bonding to meet requirements described in Quality Assurance.

K. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

3.03 FIELD QUALITY CONTROL

A. Provide field inspection in accordance with Section 01 4000. Inspect grounding and bonding system conductors and connections for tightness and proper installation

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

C. Perform inspections and tests listed in NETA ATS, Section 7.13.

D. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.

E. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

3.04 COORDINATION

A. Coordinate the work under this section with the work under other divisions of the specifications.

END OF SECTION

SECTION 26 0529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Support and attachment components for equipment, conduit, cable, boxes, and other electrical work.

1.02 RELATED REQUIREMENTS

A. Section 26 0534 - Conduit: Additional support and attachment requirements for conduits.

B. Section 26 0537 - Boxes: Additional support and attachment requirements for boxes.

1.03 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2013.

D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 SUBMITTALS

1.05 QUALITY ASSURANCE

A. Comply with NFPA 70.

B. Comply with applicable building code.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:
   1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
   2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
   3. Do not use products for applications other than as permitted by NFPA 70 and product listing.
   4. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
   5. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
      a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
      b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.
      c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
      d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.
   1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
   2. Conduit Clamps: Bolted type unless otherwise indicated.

C. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.

D. Non-Penetrating Rooftop Supports for Low-Slope Roofs: Steel pedestals with thermoplastic or rubber bases that rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly, with support fixtures as specified.
   1. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
   2. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports.
   3. Mounting Height: Provide minimum clearance of 6 inches (150 mm) under supported component to top of roofing.

E. Anchors and Fasteners:
   1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive support and attachment components.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

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

B. Perform work in accordance with NECA 1 (general workmanship).

C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.

D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.

E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.

F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.

G. Secure fasteners according to manufacturer's recommended torque settings.

H. Remove temporary supports.

3.03 FIELD QUALITY CONTROL

A. Inspect support and attachment components for damage and defects.

B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

C. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION

SECTION 26 0534 - CONDUIT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Galvanized steel rigid metal conduit (RMC).

B. PVC-coated galvanized steel rigid metal conduit (RMC).

C. Liquidtight flexible metal conduit (LFMC).

D. Electrical metallic tubing (EMT).

E. Liquidtight flexible nonmetallic conduit (LFNC).

F. Conduit fittings.

G. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables.

B. Section 26 0526 - Grounding and Bonding for Electrical Systems.
   1. Includes additional requirements for fittings for grounding and bonding.

C. Section 26 0529 - Hangers and Supports for Electrical Systems.

D. Section 26 0537 - Boxes.

E. Section 26 0537 - Boxes.

F. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2005.

B. ANSI C80.3 - American National Standard for Steel Electrical Metallic Tubing (EMT); 2005.

C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

D. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2013.

E. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); 2003.

F. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2012.

G. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit; 2005.

H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

I. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.

J. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.

K. UL 360 - Liquid-Tight Flexible Steel Conduit; Current Edition, Including All Revisions.

L. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.

M. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.

N. UL 1660 - Liquid-Tight Flexible Nonmetallic Conduit; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
   2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.

3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.

B. Sequencing:
1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

1.05 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.

B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.

C. Exposed, Exterior: Use galvanized steel rigid metal conduit or PVC-coated galvanized steel rigid metal conduit.

D. Connections to Vibrating Equipment:
1. Dry Locations: Use flexible metal conduit.
2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.
3. Vibrating equipment includes, but is not limited to:
a. Motors.

2.02 CONDUIT REQUIREMENTS

A. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling a mandrel through them.

B. Fittings for Grounding and Bonding: Also comply with Section 26 0526.

C. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.

D. Provide products listed, classified, and labeled as suitable for the purpose intended.

E. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.

B. Fittings:
1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
2. Material: Use steel or malleable iron.
3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.04 PVC-COATED GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit with external polyvinyl chloride (PVC) coating complying with NEMA RN 1 and listed and labeled as complying with UL 6.

B. Exterior Coating: Polyvinyl chloride (PVC), nominal thickness of 40 mil (1.02 mm).

C. PVC-Coated Fittings:
   1. Manufacturer: Same as manufacturer of PVC-coated conduit to be installed.
   2. Non-Hazardous Locations: Use fittings listed and labeled as complying with UL 514B.
   3. Material: Use steel or malleable iron.
   4. Exterior Coating: Polyvinyl chloride (PVC), minimum thickness of 40 mil (1.02 mm).

D. PVC-Coated Supports: Furnish with exterior coating of polyvinyl chloride (PVC), minimum thickness of 15 mil (0.38 mm).

2.05 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

A. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.

B. Fittings:
   1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel or malleable iron.

2.06 ELECTRICAL METALLIC TUBING (EMT)

A. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.

B. Fittings:
   1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel or malleable iron.
      a. Do not use die cast zinc fittings.
   3. Connectors and Couplings: Use compression (gland) type.
      a. Do not use indenter type connectors and couplings.
      b. Do not use set-screw type connectors and couplings.

2.07 LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT (LFNC)

A. Description: NFPA 70, Type LFNC liquidtight flexible nonmetallic conduit listed and labeled as complying with UL 1660.

B. Fittings:
   1. Manufacturer: Same as manufacturer of conduit to be connected.
   2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B; suitable for the type of conduit to be connected.

2.08 ACCESSORIES

A. Conduit Joint Compound: Corrosion-resistant, electrically conductive; suitable for use with the conduit to be installed.

B. Sealing Compound for Sealing Fittings: Listed for use with the particular fittings to be installed.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as shown on drawings.

B. Verify that mounting surfaces are ready to receive conduits.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

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

B. Install conduit in a neat and workmanlike manner in accordance with NECA 1.

C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.

D. Install PVC-coated galvanized steel rigid metal conduit (RMC) using only tools approved by the manufacturer.

E. Install electrical nonmetallic tubing (ENT) in accordance with NECA 111.

F. Install liquidtight flexible nonmetallic conduit (LFNC) in accordance with NECA 111.

G. Conduit Routing:
   1. Unless dimensioned, conduit routing indicated is diagrammatic.
   2. When conduit destination is indicated and routing is not shown, determine exact routing required.
   3. Arrange conduit to maintain adequate headroom, clearances, and access.
   4. Arrange conduit to provide no more than the equivalent of three 90 degree bends between pull points.
   5. Route conduits above water and drain piping where possible.
   6. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
   7. Maintain minimum clearance of 6 inches (150 mm) between conduits and piping for other systems.

H. Conduit Support:
   1. Secure and support conduits in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
   2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
   3. Use conduit clamp to support single conduit from beam clamp or threaded rod.
   4. Use of spring steel conduit clips for support of conduits is not permitted.
   5. Use of wire for support of conduits is not permitted.
   6. Where conduit support intervals specified in NFPA 70 and NECA standards differ, comply with the most stringent requirements.

I. Connections and Terminations:
   1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
   2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
   3. Use suitable adapters where required to transition from one type of conduit to another.
   4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
   5. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
   6. Secure joints and connections to provide maximum mechanical strength and electrical continuity.

J. Penetrations:
   1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
   2. Make penetrations perpendicular to surfaces unless otherwise indicated.
   3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
   4. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
   5. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.

K. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
   1. Where conduits cross structural joints intended for expansion, contraction, or deflection.

L. Provide grounding and bonding in accordance with Section 26 0526.

M. Identify conduits in accordance with Section 26 0553.

3.03 FIELD QUALITY CONTROL

A. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

B. Where coating of PVC-coated galvanized steel rigid metal conduit (RMC) contains cuts or abrasions, repair in accordance with manufacturer's instructions.

C. Correct deficiencies and replace damaged or defective conduits.

3.04 CLEANING

A. Clean interior of conduits to remove moisture and foreign matter.

3.05 PROTECTION

A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

END OF SECTION

SECTION 26 0537 - BOXES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches (1,650 cu cm).

1.02 RELATED REQUIREMENTS

A. Section 26 0526 - Grounding and Bonding for Electrical Systems.

B. Section 26 0529 - Hangers and Supports for Electrical Systems.

C. Section 26 0534 - Conduit:
   1. Conduit bodies and other fittings.

D. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

E. Section 26 2726 - Wiring Devices:

F. Section 26 2813 - Fuses: Spare fuse cabinets.

1.03 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.

C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2012.

D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013.

E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
   2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
   3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
   4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
   5. Coordinate the work with other trades to preserve insulation integrity.
   6. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 BOXES

A. General Requirements:
   1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.

2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
3. Provide products listed, classified, and labeled as suitable for the purpose intended.
4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

B. Outlet and Device Boxes Up to 100 cubic inches (1,650 cu cm), Including Those Used as Junction and Pull Boxes:
1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
2. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as shown on drawings.

B. Verify that mounting surfaces are ready to receive boxes.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

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

B. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide separate boxes for emergency power and normal power systems.

E. Box Locations:
1. Unless dimensioned, box locations indicated are approximate.
2. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 26 0534.

F. Box Supports:
1. Secure and support boxes in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
3. Installation Above Suspended Ceilings: Do not provide support from ceiling grid or ceiling support system.

G. Install boxes plumb and level.

H. Install boxes as required to preserve insulation integrity.

I. Close unused box openings.

J. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.

K. Provide grounding and bonding in accordance with Section 26 0526.

L. Identify boxes in accordance with Section 26 0553.

3.03 CLEANING

A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

3.04 PROTECTION

A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION

SECTION 26 0553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical identification requirements.

B. Identification nameplates and labels.

C. Wire and cable markers.

1.02 RELATED REQUIREMENTS

A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.

B. Section 26 2726 - Wiring Devices - Lutron: Device and wallplate finishes; factory pre-marked wallplates.

1.03 REFERENCE STANDARDS

A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs; 2011.

B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2011.

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. NFPA 70E - Standard for Electrical Safety in the Workplace; 2015.

E. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

1.04 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS

A. Identification for Equipment:
   1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
      a. Panelboards:
         1) Identify ampere rating.
         2) Identify voltage and phase.
         3) Identify power source and circuit number. Include location when not within sight of equipment.
         4) Identify main overcurrent protective device. Use identification label for panelboards with a door. For power distribution panelboards without a door, use identification nameplate.
         5) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
      b. Transformers:
         1) Identify kVA rating.
         2) Identify voltage and phase for primary and secondary.
         3) Identify power source and circuit number. Include location when not within sight of equipment.
      c. Enclosed switches:
         1) Identify voltage and phase.
         2) Identify power source and circuit number. Include location when not within sight of equipment.
   2. Emergency System Equipment:
      a. Use identification nameplate or voltage marker to identify emergency system equipment in accordance with NFPA 70.

B. Identification for Conductors and Cables:

1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 0519.
2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.

C. Identification for Boxes:
1. Use handwritten text using indelible marker to identify circuits enclosed.

2.02 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:
1. Materials:
a. Indoor Clean, Dry Locations: Use plastic nameplates.
b. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.
2. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch (1.6 mm); engraved text.
3. Stainless Steel Nameplates: Minimum thickness of 1/32 inch (0.8 mm); engraved or laser-etched text.
4. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch (0.8 mm); engraved or laser-etched text.

B. Identification Labels:
1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

C. Format for Equipment Identification:
1. Minimum Size: 1 inch (25 mm) by 2.5 inches (64 mm).
2. Legend:
a. System designation where applicable:
1) Emergency Power System: Identify with text "EMERGENCY".
b. Equipment designation or other approved description.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height:
a. System Designation: 1 inch (25 mm).
b. Equipment Designation: 1/2 inch (13 mm).
5. Color:
a. Emergency Power System: White text on red background.

D. Color: Submit to owner for approval and modify where instructed.
1. Red - Emergency Power Equipment

2.03 WIRE AND CABLE MARKERS

A. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.

B. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.

C. Legend: Power source and circuit number or other designation indicated.

D. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.

E. Minimum Text Height: 1/8 inch (3 mm).

F. Color: Black text on white background unless otherwise indicated.

2.04 WIRE PHASE MARKING

A. Description: Plastic colored tape or integrally pigmented colored wire.

B. Locations: Each conductor at panelboard gutters, pull boxes, Starters, and outlet boxes and each load or supply connection where a feeder terminates.

PART 3 EXECUTION

3.01 PREPARATION

A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

3.02 INSTALLATION

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

B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
   1. Surface-Mounted Equipment: Enclosure front.
   2. Flush-Mounted Equipment: Inside of equipment door.
   3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
   4. Elevated Equipment: Legible from the floor or working platform.
   5. Interior Components: Legible from the point of access.
   6. Boxes: Outside face of cover.
   7. Conductors and Cables: Legible from the point of access.

C. Install identification products centered, level, and parallel with lines of item being identified.

D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.

E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

F. Mark all handwritten text, where permitted, to be neat and legible.

END OF SECTION

SECTION 26 2416 - PANELBOARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Power distribution panelboards.

B. Overcurrent protective devices for panelboards.

1.02 RELATED REQUIREMENTS

A. Section 26 0526 - Grounding and Bonding for Electrical Systems.

B. Section 26 0529 - Hangers and Supports for Electrical Systems.

C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

D. Section 26 2813 - Fuses: Fuses for fusible switches and spare fuse cabinets.

E. Section 26 4300 - Surge Protective Devices.

1.03 REFERENCE STANDARDS

A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service; 2013e (Amended 2017).

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

C. NECA 407 - Standard for Installing and Maintaining Panelboards; 2015.

D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

E. NEMA KS 1 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); 2013.

F. NEMA PB 1 - Panelboards; 2011.

G. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less; 2013.

H. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.

I. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

J. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

K. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

L. UL 67 - Panelboards; Current Edition, Including All Revisions.

M. UL 98 - Enclosed and Dead-Front Switches; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
4. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.

B. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.
   1. Clearly indicate whether proposed short circuit current ratings are fully rated or, where acceptable, series rated systems.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store panelboards in accordance with manufacturer's instructions and NECA 407.

B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

C. Handle carefully in accordance with manufacturer's written instructions to avoid damage to panelboard internal components, enclosure, and finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Schneider Electric; Square D Products: www.schneider-electric.us.

2.02 PANELBOARDS - GENERAL REQUIREMENTS

A. Provide products listed, classified, and labeled as suitable for the purpose intended.

B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
   1. Altitude: Less than 6,600 feet (2,000 m).
   2. Ambient Temperature:
      a. Panelboards Containing Circuit Breakers: Between 23 degrees F (-5 degrees C) and 104 degrees F (40 degrees C).

C. Short Circuit Current Rating:
   1. Provide panelboards with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.

D. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.

E. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.

F. Bussing: Sized in accordance with UL 67 temperature rise requirements.
   1. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.

G. Conductor Terminations: Suitable for use with the conductors to be installed.

H. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
   1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
      a. Indoor Clean, Dry Locations: Type 1.
   2. Fronts:
      a. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.
   3. Lockable Doors: All locks keyed alike unless otherwise indicated.

I. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.

2.03 POWER DISTRIBUTION PANELBOARDS

A. Description: Panelboards complying with NEMA PB 1, power and feeder distribution type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.

B. Conductor Terminations:
   1. Main and Neutral Lug Material: Copper, suitable for terminating copper conductors only.
   2. Main and Neutral Lug Type: Mechanical.

C. Bussing:
   1. Phase and Neutral Bus Material: Copper.
   2. Ground Bus Material: Copper.

D. Circuit Breakers:
   1. Provide bolt-on type or plug-in type secured with locking mechanical restraints.

E. Enclosures:
   1. Provide surface-mounted enclosures unless otherwise indicated.

2.04 OVERCURRENT PROTECTIVE DEVICES

A. Fusible Switches:
   1. Description: Quick-make, quick-break, dead-front fusible switch units complying with NEMA KS 1, and listed and labeled as complying with UL 98; ratings, configurations, and features as indicated on the drawings.
   2. Fuse Clips: As required to accept indicated fuses.
   3. Provide externally operable handle with means for locking in the OFF position. Provide means for locking switch cover in the closed position. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.

2.05 SOURCE QUALITY CONTROL

A. Factory test panelboards according to NEMA PB 1.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.

C. Verify that mounting surfaces are ready to receive panelboards.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Perform work in accordance with NECA 1 (general workmanship).

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

C. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.

D. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

E. Provide required supports in accordance with Section 26 0529.

F. Install panelboards plumb.

G. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches (2000 mm) above the floor or working platform.

H. Provide grounding and bonding in accordance with Section 26 0526.

I. Install all field-installed branch devices, components, and accessories.

J. Provide fuses complying with Section 26 2813 for fusible switches as indicated.

K. Provide filler plates to cover unused spaces in panelboards.

L. Identify panelboards in accordance with Section 26 0553.

3.03 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

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

C. Fusible Switches: Perform inspections and tests listed in NETA ATS, Section 7.5.1.1.

D. Correct deficiencies and replace damaged or defective panelboards or associated components.

3.04 ADJUSTING

A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

B. Adjust alignment of panelboard fronts.

C. Load Balancing: For each panelboard, rearrange circuits such that the difference between each measured steady state phase load does not exceed 20 percent and adjust circuit directories accordingly. Maintain proper phasing for multi-wire branch circuits.

3.05 CLEANING

A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.

B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 26 2813 - FUSES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fuses.

1.02 RELATED REQUIREMENTS

A. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

B. Section 26 2816.16 - Enclosed Switches: Fusible switches.

1.03 REFERENCE STANDARDS

A. NEMA FU 1 - Low Voltage Cartridge Fuses; 2012.

B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. UL 248-1 - Low-Voltage Fuses - Part 1: General Requirements; Current Edition, Including All Revisions.

D. UL 248-4 - Low-Voltage Fuses - Part 4: Class CC Fuses; Current Edition, Including All Revisions.

E. UL 248-8 - Low-Voltage Fuses - Part 8: Class J Fuses; Current Edition, Including All Revisions.

F. UL 248-10 - Low-Voltage Fuses - Part 10: Class L Fuses; Current Edition, Including All Revisions.

G. UL 248-12 - Low-Voltage Fuses - Part 12: Class R Fuses; Current Edition, Including All Revisions.

H. UL 248-15 - Low-Voltage Fuses - Part 15: Class T Fuses; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate fuse clips furnished in equipment provided under other sections for compatibility with indicated fuses.
      a. Fusible Enclosed Switches: See Section 26 2816.16.
   2. Coordinate fuse requirements according to manufacturer's recommendations and nameplate data for actual equipment to be installed.
   3. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

A. Product Data: Provide manufacturer's standard data sheets including voltage and current ratings, interrupting ratings, time-current curves, and current limitation curves.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

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

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Bussmann, a division of Eaton Corporation: www.cooperindustries.com.

B. Littelfuse, Inc: www.littelfuse.com.

C. Mersen: ep-us.mersen.com.

2.02 APPLICATIONS

A. Feeders:
   1. Fusible Switches up to 600 Amperes: Class RK1, time-delay.

B. Individual Motor Branch Circuits: Class RK1, time-delay.

2.03 FUSES

A. Provide products listed, classified, and labeled as suitable for the purpose intended.

B. Unless specifically indicated to be excluded, provide fuses for all fusible equipment as required for a complete operating system.

C. Provide fuses of the same type, rating, and manufacturer within the same switch.

D. Comply with UL 248-1.

E. Voltage Rating: Suitable for circuit voltage.

F. Class R Fuses: Comply with UL 248-12.
   1. Class RK1, Time-Delay Fuses:

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that fuse ratings are consistent with circuit voltage and manufacturer's recommendations and nameplate data for equipment.

B. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Do not install fuses until circuits are ready to be energized.

B. Install fuses with label oriented such that manufacturer, type, and size are easily read.

END OF SECTION

SECTION 26 2816.16 - ENCLOSED SWITCHES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Enclosed safety switches.

1.02 RELATED REQUIREMENTS

A. Section 26 0526 - Grounding and Bonding for Electrical Systems.

B. Section 26 0529 - Hangers and Supports for Electrical Systems.

C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

D. Section 26 2813 - Fuses.

1.03 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

C. NEMA KS 1 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); 2013.

D. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.

E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

G. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

H. UL 98 - Enclosed and Dead-Front Switches; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the work with other trades. Avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and within working clearances for electrical equipment required by NFPA 70.
2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
4. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.

B. Shop Drawings: Indicate outline and support point dimensions, voltage and current ratings, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

B. Handle carefully in accordance with manufacturer's written instructions to avoid damage to enclosed switch internal components, enclosure, and finish.

1.08 FIELD CONDITIONS

A. Maintain ambient temperature between -22 degrees F (-30 degrees C) and 104 degrees F (40 degrees C) during and after installation of enclosed switches.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. General Electric Company: www.geindustrial.com.

B. Schneider Electric; Square D Products: www.schneider-electric.us.

C. Siemens Industry, Inc: www.usa.siemens.com.

D. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ENCLOSED SAFETY SWITCHES

A. Description: Quick-make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy duty; ratings, configurations, and features as indicated on the drawings.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
   1. Altitude: Less than 6,600 feet (2,000 m).
   2. Ambient Temperature: Between -22 degrees F (-30 degrees C) and 104 degrees F (40 degrees C).

D. Horsepower Rating: Suitable for connected load.

E. Voltage Rating: Suitable for circuit voltage.

F. Short Circuit Current Rating:
   1. Provide enclosed safety switches, when protected by the fuses or supply side overcurrent protective devices to be installed, with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.

G. Provide with switch blade contact position that is visible when the cover is open.

H. Conductor Terminations: Suitable for use with the conductors to be installed.

I. Provide solidly bonded equipment ground bus in each enclosed safety switch, with a suitable lug for terminating each equipment grounding conductor.

J. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
   1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
      a. Outdoor Locations: Type 3R.

K. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.

L. Heavy Duty Switches:
   1. Comply with NEMA KS 1.
   2. Conductor Terminations:
      a. Lug Material: Copper, suitable for terminating copper conductors only.
   3. Provide externally operable handle with means for locking in the OFF position, capable of accepting three padlocks.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the ratings of the enclosed switches are consistent with the indicated requirements.

C. Verify that mounting surfaces are ready to receive enclosed safety switches.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

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

B. Perform work in accordance with NECA 1 (general workmanship).

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide required supports in accordance with Section 26 0529.

E. Install enclosed switches plumb.

F. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed switches such that the highest position of the operating handle does not exceed 79 inches (2000 mm) above the floor or working platform.

G. Provide grounding and bonding in accordance with Section 26 0526.

H. Identify enclosed switches in accordance with Section 26 0553.

3.03 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 7.5.1.1.

C. Correct deficiencies and replace damaged or defective enclosed safety switches or associated components.

3.04 ADJUSTING

A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

3.05 CLEANING

A. Clean dirt and debris from switch enclosures and components according to manufacturer's instructions.

B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 26 4113 - LIGHTNING PROTECTION FOR STRUCTURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Strike (air) terminals and interconnecting conductors.

1.02 RELATED REQUIREMENTS

A. Section 26 0526 - Grounding and Bonding for Electrical Systems: Electrical system grounds.

B. Surge Protection for Wiring Systems: Specified in individual system requirements.

1.03 REFERENCE STANDARDS

A. NFPA 780 - Standard for the Installation of Lightning Protection Systems; 2014.

B. UL 96 - Lightning Protection Components; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination with Roofing Work: Ensure adequate attachment of strike terminals and conductors without damage to roofing.

B. Preinstallation Meeting: Convene a meeting at least at least two weeks prior to commencement of any work affected by lightning protection system requirements to discuss prerequisites and coordination required by other installers; require attendance by representatives of installers whose work will be affected.

1.05 SUBMITTALS

A. Shop Drawings: Indicate location and layout of air terminals, grounding electrodes, and bonding connections to structure and other metal objects. Include terminal, electrode, and conductor sizes, and connection and termination details.
   1. Include engineering analysis of equalization of potential to metal bodies within the structure.

B. Installation Certification: Submit copy of certification agency's approval.

1.06 QUALITY ASSURANCE

A. Maintain one copy of each referenced system design standard on site.

B. Designer Qualifications: Person or entity, employed by installer, who specializes in lightning protection system design with minimum three years documented experience.

C. Installer Qualifications: Capable of providing the specified certification of the installed system.

D. Products: Listed, classified, and labeled as suitable for the purpose intended.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Lightning Protection Components:
   1. Advanced Lightning Technology (ALT): www.altfab.com.
   2. Harger Lightning and Grounding: www.harger.com.
   3. National Lightning Protection Corporation: www.theprotectionsource.com.

2.02 LIGHTNING PROTECTION SYSTEM

A. Lightning Protection System: Provide complete system complying with NFPA 780, including air terminals, bonding, interconnecting conductors and grounding electrodes.
   1. Provide system that protects:
      a. Roof Mounted HVAC Equipment.
   2. Coordinate with other grounding and bonding systems specified.
   3. Provide copper, bronze, or stainless steel components, as applicable; no aluminum.
   4. Provide system certified by Underwriters Laboratories or the Lightning Protection Institute.

B. Strike Terminals: Provide strike (air) terminals on the following:
   1. Roof mounted equipment.

2.03 COMPONENTS

A. All Components: Complying with applicable requirements of UL 96.

B. Strike (Air) Terminals: Copper, solid, with adhesive bases for single-ply roof installations.

C. Ground Plate: Copper.

D. Conductors: Copper cable.

E. Connectors and Splicers: Bronze.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with referenced system standards and as required for specified certification.

B. Connect conductors using mechanical connectors.

3.02 FIELD QUALITY CONTROL

A. Perform visual inspection as specified in NFPA 780 as if this were a periodic follow-up inspection.

B. Perform continuity testing as specified in NFPA 780 as if this were testing for periodic maintenance.

C. Obtain the services of the specified certification agency to provide inspection and certification of the lightning protection system, including performance of any other testing required by that agency.

END OF SECTION

SECTION 26 4300 - SURGE PROTECTIVE DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surge protective devices for branch panelboard locations.

1.02 RELATED REQUIREMENTS

A. Section 26 0526 - Grounding and Bonding for Electrical Systems.

B. Section 26 2416 - Panelboards.

1.03 ABBREVIATIONS AND ACRONYMS

A. SPD: Surge Protective Device.

1.04 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

C. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.

D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. UL 1449 - Standard for Surge Protective Devices; Current Edition, Including All Revisions.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate size and location of overcurrent device compatible with the actual surge protective device and location to be installed. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to ordering equipment.

1.06 SUBMITTALS

A. Product Data: Include detailed component information, voltage, surge current ratings, repetitive surge current capacity, voltage protection rating (VPR) for all protection modes, maximum continuous operating voltage (MCOV), nominal discharge current (I-n), short circuit current rating (SCCR), connection means including any required external overcurrent protection, enclosure ratings, outline and support point dimensions, weight, service condition requirements, and installed features.

B. Shop Drawings: Include wiring diagrams showing all factory and field connections with wire and circuit breaker/fuse sizes.

1.07 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.08 DELIVERY, STORAGE, AND PROTECTION

A. Store in a clean, dry space in accordance with manufacturer's written instructions.

1.09 WARRANTY

A. Manufacturer's Warranty: Provide minimum five year warranty covering repair or replacement of surge protective devices showing evidence of failure due to defective materials or workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Field-installed, Externally Mounted Surge Protective Devices:
   1. General Electric Company: www.geindustrial.com.
   2. Schneider Electric; Square D Brand Surgelogic Products: www.surgelogic.com.

2.02 SURGE PROTECTIVE DEVICES - GENERAL REQUIREMENTS

A. Description: Factory-assembled surge protective devices (SPDs) for 60 Hz service; listed, classified, and labeled as suitable for the purpose intended; system voltage as indicated on the drawings.

B. Protected Modes:
   1. Wye Systems: L-N, L-G, N-G, L-L.

C. UL 1449 Voltage Protection Ratings (VPRs):
   1. Equivalent to basis of design.

D. UL 1449 Maximum Continuous Operating Voltage (MCOV): Not less than 115% of nominal system voltage.

E. Enclosure Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
   1. Indoor clean, dry locations: Type 1.

F. Mounting for Field-installed, Externally Mounted SPDs: Unless otherwise indicated, as specified for the following locations:
   1. Provide surface-mounted SPD where mounted in non-public areas or adjacent to surface-mounted equipment.

2.03 SURGE PROTECTIVE DEVICES FOR BRANCH PANELBOARD LOCATIONS

A. Unless otherwise indicated, provide field-installed, externally mounted or factory-installed, internally mounted SPDs.

B. List and label as complying with UL 1449, Type 1 or Type 2.

C. Provide SPDs utilizing field-replaceable modular or non-modular protection circuits.

D. Surge Current Rating: Not less than 120 kA per mode/240 kA per phase.

E. UL 1449 Nominal Discharge Current (I-n): 20 kA.

F. UL 1449 Short Circuit Current Rating (SCCR): Not less than the available fault current at the installed location as indicated on the drawings.

G. Diagnostics:
   1. Protection Status Monitoring: Provide indicator lights to report the protection status.
   2. Alarm Notification: Provide indicator light and audible alarm to report alarm condition. Provide button to manually silence audible alarm.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the service voltage and configuration marked on the SPD are consistent with the service voltage and configuration at the location to be installed.

C. Verify that electrical equipment is ready to accept connection of the SPD and that installed overcurrent device is consistent with requirements of drawings and manufacturer's instructions.

D. Verify system grounding and bonding is in accordance with Section 26 0526, including bonding of neutral and ground for service entrance and separately derived systems where applicable. Do not energize SPD until deficiencies have been corrected.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Perform work in accordance with NECA 1 (general workmanship).

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

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide conductors with minimum ampacity as indicated on the drawings, as required by NFPA 70, and not less than manufacturer's recommended minimum conductor size.

E. Install conductors between SPD and equipment terminations as short and straight as possible, not exceeding manufacturer's recommended maximum conductor length. Breaker locations may be reasonably rearranged in order to provide leads as short and straight as possible. Twist conductors together to reduce inductance.

3.03 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 7.19.1.

C. Procure services of a qualified manufacturer's representative to observe installation and assist in inspection, testing, and adjusting. Include manufacturer's reports with field quality control submittals.

3.04 CLEANING

A. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION