Atlantic County Vocational School District
5080 Atlantic Avenue
Mays Landing, NJ 08330

TECHNICAL SPECIFICATIONS

SOUTH WING ADMINISTRATIVE AREA ALTERATIONS
Project #22-03

ATLANTIC COUNTY INSTITUTE OF TECHNOLOGY
5080 Atlantic Avenue
Mays Landing, NJ 08330

ARCHITECT

Manders Merighi Portadin Farrell Architects, LLC
1138 East Chestnut Avenue #4
Vineland, NJ 08360

MEP ENGINEERS

Biagi, Chance, Cummins, London, Titzer, Inc.
1138 East Chestnut Avenue #7A
Vineland, NJ 08360

Project Number 20.023

June 3, 2022

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The Board of Education of the Special Services School District and the Vocational School District of the County of Atlantic

REQUEST FOR BIDS
PUBLIC WORKS PROJECT
BID ADVERTISEMENT

The Atlantic County Vocational School District hereby advertises for competitive bids for the following project in accordance with N.J.S.A. 18A:18A-21(a) (b) for:

Atlantic County Institute of Technology (ACIT)
5080 Atlantic Avenue
Mays Landing, NJ 08330

Project Number 22-03
South Wing Administrative Area Alterations

Drawings and Specifications (electronic format only) can be obtained from the Architect's ShareFile site at https://mmpfa.sharefile.com but ONLY after the bidder has been added to the official bidders list.

To be added to the bidders list please send an email with your First Name, Last Name, Company Name, Contact Information, and a primary contact Email to Mrs. Arlene Feaster at afeaster@mmpfa.com. If you do not receive a response within 2 hours, resubmit your request. Once added to the bidders list, if you are not already in our system you will receive an email from ShareFile with instructions on setting up your account for which you will need to create your own unique password. If you have used our ShareFile previously your prior email and password remains valid. Once added to the bidders list and validated with ShareFile, you will be granted access to the project's bid documents folder. Note: You MUST establish an account with our ShareFile site in order to access the electronic bid documents. They will not be distributed by any other means.

Bids must be sealed and delivered to the Office of the School Business Administrator/Board Secretary of the **Atlantic County Vocational School District** on or before date and time indicated below. See instructions for the submission of bids under the **Special Notice** included in this advertisement. **No bids shall be received after the time designated in the advertisement.** (N.J.S.A. 18A:18A-21(b)). The Board of Education does not accept electronic (e-mail) submission of bids.

The envelope to bear the following information:

Title: **ACIT – South Wing Administrative Area Alterations**
Name and Address of the Bidder,
Bid Date: **Thursday, June 23, 2022**
Time: **10:00 AM**

The bid opening process will begin on the above advertised date and time in the **Board Conference Room at 5080 Atlantic Avenue, Mays Landing, NJ 08330.** On the advertised date and time, the School Business Administrator / Board Secretary shall publicly open all bids.

Statement of Ownership: Pursuant to N.J.S.A. 52:25-24.2, Bidders shall submit a statement setting forth the names and addresses of all persons and entities owning ten (10%) percent or more of its stock or interest on any type at all levels of ownership.

A Non-Collusion Affidavit and a Contractor Questionnaire/Certification also must be submitted with the bid. The bid package will also include other documents that must be completed and returned with the bid. Failure to comply with the instruction to Bidders and to complete the required forms, may be cause for disqualification and rejection of the bid.

All bidders are required to comply with the requirements of N.J.S.A. 10:5-31 et seq., Affirmative Action Against Discrimination (N.J.A.C. 17:27-1 et seq.). An Initial Project Workforce Report will be required from the successful contractor. (Form AA-201).

Contractors bidding on this project are to comply with the requirements of the Prevailing Wage Rate Determination pursuant to N.J.S.A. 34:11-56.25.
A bidder on a public works project for a Board of Education where the cost of the work exceeds $20,000.00 must first have been qualified by the Department of the Treasury, Division of Property Management and Construction, pursuant to N.J.S.A. 18A:18A-27 through 33, and shall submit with his bid a Prequalification Affidavit, a copy of a valid and active NOTICE OF CLASSIFICATION, a certified copy of a Total Amount of Uncompleted Contracts Form and an Affidavit that subsequent to the latest such statement submitted by him, there has been no material adverse change in his qualification information except as set forth in said Affidavit

Each bid shall be accompanied by a bid bond, cashier's check or certified check made payable to the Atlantic County Vocational School District, for ten percent (10%) of the amount of the total bid, however, not to exceed $20,000.00.

Corporate bidders are required by law (Chapter 33, Laws of 1977) to submit a list of names and addresses of all stockholders owning 10% or more of their stock.

The bid package will also include other documents that must be completed and returned with the bid. Failure to comply with Instructions to Bidders and to complete and submit all required forms, may be cause for disqualification and rejection of the bid.

All contractors named in this bid, shall possess a valid Contractor's Registration Certificate pursuant to N.J.S.A. 34:11-56.48 et seq., at the time the bid is received by the Atlantic County Vocational School District.

The Board of Education reserves the right to reject any or all bids pursuant to N.J.S.A. 18A:18A-18, 18A:18A-2(s), (t), (x), (y), 18A:18A-4(a-c), 18A:18A-22, and to waive any informalities.

Lauren Flynn, Business Administrator/Board Secretary

ADMINISTRATIVE OFFICE ALTERATIONS

ETHICS IN PURCHASING

Statement to Vendors

School District Responsibility

Recommendation of Purchases
It is the desire of the Board of Education to have all Board employees and officials practice exemplary ethical behavior in the procurement of goods, materials, supplies, and services.

School district officials and employees who recommend purchases shall not extend any favoritism to any vendor. Each recommended purchase should be based upon quality of the items, service, price, delivery, and other applicable factors in full compliance with N.J.S.A. 18A:18A-1 et seq.

Solicitation/Receipt of Gifts – Prohibited
School district officials and employees are prohibited from soliciting and receiving funds, gifts, materials, goods, services, favors, and any other items of value from vendors doing business with the Board of Education or anyone proposing to do business with the Board.

Vendor Responsibility

Offer of Gifts, Gratuities -- Prohibited
Any vendor doing business or proposing to do business with the Board of Education, shall neither pay, offer to pay, either directly or indirectly, any fee, commission, or compensation, nor offer any gift, gratuity, or other thing of value of any kind to any official or employee of the Board of Education or to any member of the official's or employee's immediate family.

Vendor Influence -- Prohibited
No vendor shall cause to influence or attempt to cause to influence, any official or employee of the Board of Education, in any manner which might tend to impair the objectivity or independence of judgment of said official or employee.

Vendor Certification

Vendors or potential vendors will be asked to certify that no official or employee of the Board of Education or immediate family members are directly or indirectly interested in this request or have any interest in any portions of profits thereof. The vendor participating in this request must be an independent vendor and not an official or employee of the Board of Education.

Lauren Flynn, Business Administrator/Board Secretary

Atlantic County Institute of Technology

ADMINISTRATIVE OFFICE ALTERATIONS

INSTRUCTIONS TO BIDDERS

1. Bids are to be submitted to:

Lauren Flynn, School Business Administrator/Board Secretary
Atlantic County Vocational School District
5080 Atlantic Avenue, Mays Landing, NJ 08330

BY: **10:00 AM** PREVAILING TIME ON: **Thursday, June 23, 2022**

by mail or delivery service. Bids that are submitted are to be sealed and will be unsealed and announced at the bid opening meeting.

2. Bid Packages to be Submitted in Duplicate. Bids must be placed in a sealed envelope/package marked as shown below on the front of the envelope/package. Bid packages must be submitted in duplicate on the proposed bid submittal forms as provided, and in the manner designated. The Board of Education requires one original bid package and two duplicate copies of the bid. The extra copies are necessary for processing of the bids. Bidders should also keep a complete copy of the bid packet, exactly as submitted.

Envelope Label Information:

ACIT: Administrative Office Alterations – Project #22-03
Bid Date: **Thursday, June 23, 2022**
Bid Time: **10:00 AM**
Bidder : Name of Company
Address
City, State, Zip

Failure to properly label the bid envelope may be cause for the rejection of the bid.

The Board of Education does not accept electronic (e-mail) submission of bids.

3. **BID OPENING MEETING.** All bids will be publicly received and unsealed by the School Business Administrator/ Board Secretary opened in the Board Conference Room and read. It is the responsibility of each bidder to ensure that their bid is complete. No bids shall be received or accepted by the Board of Education after the advertised bid date and time. (N.J.S.A. 18A:18A:21(b))

BIDDING REQUIREMENTS

4. **AFFIRMATIVE ACTION REQUIREMENTS**

Pursuant to N.J.A.C. 17:27-3.6 (a) (1) after notification of award, but prior to signing a construction contract, the contractor shall submit to the Public Agency Compliance Officer and the Division of Contract Compliance an initial project workforce report (Form AA-201) provided to the public agency by the Division for distribution to and completion by the contractor, in accordance with N.J.A.C.17:27-7.

All bidders should familiarize themselves with N.J.S.A. 10:5-31 et seq. and N.J.A.C. 17:27 et seq. MANDATORY AFFIRMATIVE ACTION LANGUAGE, if awarded a contract, your company/firm will be required to comply with the above requirements.

All relevant questions should be addressed to:

Division of Contract Compliance/EEO
Department of the Treasury / P.O. 209
Trenton, New Jersey 08625-0209

5. AMERICAN GOODS

In accordance with N.J.S.A. 18A:18A-20, only manufactured products of the United States, wherever available, and where possible are to be used with this project.

6. AMERICANS WITH DISABILITIES ACT

The contractor must comply with all provisions of the Americans with Disabilities Act (ADA), P.L 101-336, in accordance with 42 U.S.C. S121 01 et seq.

7. ANTI-BULLYING BILL OF RIGHTS—REPORTING OF HARASSMENT, INTIMIDATION AND BULLYING—CONTRACTED SERVICE

The contracted service provider shall comply with all applicable provisions of the New Jersey Anti-Bullying Bill of Rights Act—N.J.S.A. 18A:37-13.1 et seq., all applicable code and regulations, and the Anti-Bullying Policy of the Board of Education. The district shall provide to the contracted service provider a copy of the board's Anti-Bullying Policy.

In accordance with N.J.A.C. 6A:16-7.7 (c), a contracted service provider, who has witnessed, or has reliable information that a student has been subject to harassment, intimidation, or bullying shall immediately report the incident to any school administrator or safe schools resource officer, or the School Business Administrator/Board Secretary.

8. ANTI-DISCRIMINATION PROVISIONS—N.J.S.A. 10:2-1

N.J.S.A. 10:2-1. Antidiscrimination provisions. Every contract for or on behalf of the State or any county or municipality or other political subdivision of the State, or any agency of or authority created by any of the foregoing, for the construction, alteration or repair of any public building or public work or for the acquisition of materials, equipment, supplies or services shall contain provisions by which the contractor agrees that:

a. In the hiring of persons for the performance of work under this contract or any subcontract hereunder, or for the procurement, manufacture, assembling or furnishing of any such materials, equipment, supplies or services to be acquired under this contract, no contractor, nor any person acting on behalf of such contractor or subcontractor, shall, by reason of race, creed, color, national origin, ancestry, marital status, gender identity or expression, affectional or sexual orientation or sex, discriminate against any person who is qualified and available to perform the work to which the employment relates;

b. No contractor, subcontractor, nor any person on his behalf shall, in any manner, discriminate against or intimidate any employee engaged in the performance of work under this contract or any subcontract hereunder, or engaged in the procurement, manufacture, assembling or furnishing of any such materials, equipment, supplies or services to be acquired under such contract, on account of race, creed, color, national origin, ancestry, marital status, gender identity or expression, affectional or sexual orientation or sex;

c. There may be deducted from the amount payable to the contractor by the contracting public agency, under this contract, a penalty of $50.00 for each person for each calendar day during which such person is discriminated against or intimidated in violation of the provisions of the contract; and

d. This contract may be canceled or terminated by the contracting public agency, and all money due or to become due hereunder may be forfeited, for any violation of this section of the contract occurring after notice to the contractor from the contracting public agency of any prior violation of this section of the contract.

No provision in this section shall be construed to prevent a board of education from designating that a contract, subcontract or other means of procurement of goods, services, equipment or construction shall be awarded to a small business enterprise, minority business enterprise or a women's business enterprise pursuant to P.L.1985, c.490 (C.18A:18A-51 et seq.).

9. BID GUARANTEE (N.J.S.A. 18A:18A-24)

Bidders shall submit with their bid package a bid guarantee made payable to the Atlantic County Vocational School District ("Board"). The guarantee shall be in the form of a certified check, cashier's check or bid bond in the amount of 10% of the bid, but not in excess of $20,000. Such deposit shall be forfeited upon refusal of a bidder to execute a contract. Any bid in the form of a check shall be returned when the contract is executed and surety (performance) bond filed with the Board of Education. The bid guarantee check for unsuccessful bidders, if

requested, will be returned as soon after the bid opening as possible, but in no event later than (10) days after the bid opening.

If the contract award is based on a daily or hourly rate or no total amount of contract can be determined, it shall be assumed the total contract amount will exceed $20,000.00. Therefore, the bid bond amount will be in the amount of $2,000.00 or 10% of $20,000.00

Please note: Uncertified business checks, personal checks or money orders are not acceptable. All bid bonds submitted must be signed and witnessed with original signatures. The Board will not accept facsimile or rubber stamp signatures on the bid bond. **Failure to sign the bid bond by either the Surety or Principal shall be deemed cause for disqualification of the bid.**

The Attorney-in-Fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the Power of Attorney. The Board of Education will only accept bid bonds from companies that are licensed and qualified to do business in the State of New Jersey. Such a list may be available upon request to the State of New Jersey, Department of Banking and Insurance, P.O. 325, Trenton, New Jersey 08625. **Failure to submit a bid guarantee shall be cause for disqualification and rejection of bid.**

Please note: The name, address and phone number of the Bond Underwriter as well as the Bond Number shall be included with all bonds submitted to the Board of Education.

10. BID FORM

All bids are to be written in by typewriter or ink in a legible manner on the official Bid Form.

The Bid Form must be duly signed by the authorized representative of the company, at the end of the Bid Form. **Failure to sign the Bid Form may be caused to disqualify the entire bid.** If the Bid Form contains more than one sheet, then bidders are requested to affix the company name and address on each intervening sheet between the front sheet and the signature sheet which already bear the company information.

The Board of Education will not consider any bid on which there is any alteration to, or departure from, the bid specifications. Bidders are not to make any changes on the Bid Form, or qualify their bid with conditions differing from those defined in the contract documents. If bidders do make changes on the Bid Form, it may be cause to disqualify that particular bid as non-responsive. (N.J.S.A. 18A:18A-2(y)).

The bidder also conveys by submitting a bid that the company he represents is financially solvent, experienced in and competent to perform the type of work so specified.

11. BIDDER'S RESPONSIBILITY FOR BID SUBMITTAL

It is the responsibility of the bidder to ensure that their bid is presented to the Board of Education and officially received before the advertised date and time of the bid. It is understood and agreed upon that any person in the Board of Education will be absolved from responsibility for the premature opening of any bid not properly labeled and sealed. Failure to properly label the bid envelope may be cause for the rejection of the bid.

12. BUSINESS REGISTRATION CERTIFICATE (N.J.S.A. 52:32-44)

Pursuant to N.J.S.A. 52:32-44 as amended, all bidders shall submit with their bid package a copy of their "New Jersey Business Registration Certificate" as issued by the Department of Treasury of the State of New Jersey. Failure to provide the New Jersey Business Registration Certification prior to the award of contract, will be cause for the rejection of the entire bid.

N.J.S.A. 52:32-44 imposes the following requirements on contractors and all subcontractors that **knowingly** provide goods or perform services for a contractor fulfilling this contract: **1)** the contractor shall provide written notice to its subcontractors and suppliers to submit proof of business registration to the contractor; **2)** subcontractors through all tiers of a project must provide written notice to their subcontractors and suppliers to submit proof of business registration and subcontractors shall collect such proofs of business registration and maintain them on file; **3)** prior to receipt of final payment from a contracting agency, a contractor must submit to the contracting agency an accurate list of all subcontractors and suppliers or attest that none was used; and, **4)** during the term of this contract, the contractor and its affiliates shall collect, remit, and notify all subcontractors and their affiliates that they must collect and remit, to the Director of the New Jersey Division of Taxation, the use tax due pursuant to the Sales and Use Tax Act, (N.J.S.A. 54:32B-1 et seq.) on all sales of tangible personal property delivered into this State.

A contractor, subcontractor or supplier or fails to provide proof of business registration or provides false business registration information shall be liable to a penalty of $25 for each day of violation, not to exceed $50,000 for each

business registration copy not properly provided or maintained under a contract with a contracting agency. Information on the law and its requirements are available by calling (609) 292-9292.

13. CERTIFICATE FROM SURETY COMPANY (N.J.S.A. 18A:18A-25)

Each bidder must submit with his bid a certificate from a surety company stating that the surety company will provide the contractor with a performance bond in an amount equal to the amount of the contract (N.J.S.A. **18A: 18A-25). Such surety company must be licensed and qualified to do business in the State of New** Jersey. All certificate (consent) of surety documents must be signed with original signatures.

The Board will not accept facsimile or rubberstamp signatures. The certificate (consent) of surety, together with a power of attorney must be submitted with the bid.

Failure to submit or failure to sign the certificate (consent) of surety shall be cause for disqualification and rejection of bid.

14. CHALLENGES TO BID SPECIFICATIONS (N.J.S.A. 18A:18A-15)

Any prospective bidder who wishes to challenge a bid specification shall file such challenges in writing with the School Business Administrator/Board Secretary no less than three (3) days prior to the opening of bids. Challenges filed after that date shall be considered void and having no impact on the Board of Education or the award of a contract.

15. CHANGE ORDERS (N.J.A.C. 6A:26-4.9 et seq.) (N.J.A.C. 5:30-11.1 et seq.)

Board of Education Approval Required; Prior to Issuance of Change Order (N.J.A.C. 5:30-11.2)

Change orders may be approved by the Board of Education in an amount up to twenty percent (20%) when necessitated by one of the following:

- Emergencies consistent with N.J.S.A. 18A:18A-7;
- Unforeseeable physical conditions; or
- Minor modification to the project/scope that achieve cost savings, improve service or resolve construction conditions.

Division of Finance (NJDOE) Approval

All other change orders shall be approved by the Division of Finance (NJDOE) when extraordinary circumstances exist such as:

- Change order amounts greater than twenty percent (20%);
- Change orders that eliminate or affect the project scope; or
- Change orders that affect the number, size, configuration, location or use of educational spaces.

Contractors are prohibited to perform any change order unless so directed in writing by the Board of Education.

16. CONTRACTOR/VENDOR REQUIREMENTS—OFFICE OF THE NEW JERSEY STATE COMPTROLLER

Contractors/vendors doing business with the board of education are reminded of the following legal requirements pertaining to the Office of the New Jersey State Comptroller:

A. Access to Relevant Documents and Information—N.J.S.A. 52:15C-14 (d)

Private vendors or other persons contracting with or receiving funds from a unit in the Executive branch of State government, including an entity exercising executive branch authority, independent State authority, public institution of higher education, or unit of local government or board of education shall upon request by the State Comptroller provide the State Comptroller with prompt access to all relevant documents and information as a condition of the contract and receipt of public monies. The State Comptroller shall not

disclose any document or information to which access is provided that is confidential or proprietary. If the State Comptroller finds that any person receiving funds from a unit in the Executive branch of State government, including an entity exercising executive branch authority, independent State authority, public institution of higher education, or unit of local government or board of education refuses to provide information upon the request of the State Comptroller, or otherwise impedes or fails to cooperate with any audit or performance review, the State Comptroller may recommend to the contracting unit that the person be subject to termination of their contract, or temporarily or permanently debarred from contracting with the contracting unit.

B. Maintenance of Contract Records—N.J.A.C. 17:44-2.2

Relevant records of private vendors or other persons entering into contracts with covered entities are subject to audit or review by OSC pursuant to N.J.S.A. 52:15C-14(d).

The contractor/vendor to whom a contract has been awarded, shall maintain all documentation related to products, transactions or services under this contract for a period of five years from the date of final payment. Such records shall be made available to the New Jersey Office of the State Comptroller upon request.

17. CONTRACTS

A. Award of Contract; Rejection of Bids

The contract shall be awarded, if at all, to the lowest responsible bidder as determined by the Board of Education, pursuant to N.J.S.A. 18A:18A-18(c), 18A:18A-2(s), (t), (x), (y), 18A:18A-4(a), 18A:18A-22. The specifications in this bid will be incorporated into the contract and or purchase order. The Board of Education reserves the right to reject any or all bids as authorized by the Public School Contracts Law, and to waive any informalities the Board feels are in the best interests of the Board. Pursuant to N.J.S.A. 18A:18A- 36 (a), the Board of Education shall award the contract or reject all bids within sixty (60) days of the advertised date and time noting the exception highlighted in the law.

B. Equal Prices

Pursuant to N.J.S.A. 18A:18A-37(d) when two or more bidders submit equal prices and the prices are the lowest responsible bids, the Board may award the contract to the vendor whose response, in the discretion of the Board, is the most advantageous, price and other factors considered.

C. Return of Contracts and Related Contract Documents

Upon notification of award of contract by the Board of Education, the contractor shall sign and execute a formal contract agreement between the Board of Education and the contractor, ***when required***. Failure to sign the required Board of Education prepared contract shall result in rejection of the bid and forfeiture of all or part of the bid deposit. If a formal contract is not required by the Board of Education, an approved and signed Board of Education purchase order will constitute a binding agreement. If either a formal contract or purchase order is required then the contractor shall also sign, execute and return the document along with the following:

1. Performance Bond in the total amount of the contract.
2. Insurance Certificate with the Board of Education named as an additional insured.
3. Affirmative Action Form AA-201 - Initial Project Workforce Report - Yellow copy.
4. Other required documents as may be outlined in bid specifications.

The above documents may also be required for submission with the official Notice to Proceed. The contracts and related documents shall be returned to:

School Business Administrator/Board Secretary

within ten (10) days of receipt of notification. Failure to execute the contract and return said contract and related required documents within the prescribed time may be cause for the annulment of award by the Board with the bid security becoming property of the Board of Education.

D. Alterations of Contract

The Board of Education reserves the right to alter or amend the contract by adding to or subtracting from the work herein specified, such additions or omissions being done under the general conditions of these specifications and the terms of the Contract. No changes shall be permitted from the specifications except that the same be in writing and the amount of the extra compensation or credit stipulated therein. Refer to Change Order Section #15.

E. Term of Contract

The contractor, to whom the contract is awarded, will be required to do and perform the work/services and to provide and furnish the materials in connection therewith in accordance with the plans and specifications on or before the date listed in the Technical Specifications.

F. Purchase Order Required

No contractor shall commence any public works project until he is in receipt of an approved purchase order authorizing work to begin. (See Notice (Authorization) to Proceed)

18. CONTRACTOR'S REGISTRATION EVIDENCE

A. Valid Certificate – Receipt of Bid

All contractors must adhere to the provisions of the Public Works Contractor Registration Act – N.J.S.A. 34:11-56.48 et seq. The PWCRA requires that "No contractor shall bid on any contract for public work unless the contractor is registered pursuant to this act." The law requires that all contractors and sub-contractors named in the bid possess a valid certificate at the time the bid is received by the contracting unit, in this case the Board of Education.

B. Submission of Certificate – Receipt of Bid; Prior to Award

All bidders shall submit with the bid package or prior to the award of contract, a current Public Works Contractor Registration Certificate that was issued prior to the receipt of the bid.

The contractor who most likely is to be considered for the contract award, must submit a copy of the current Public Works Contractor Registration Certificate, and if applicable, copies of certifications of all listed subcontractors, prior to the award of contract. **If the contractor fails to provide copies of certificates prior to the award of contract, the bid may be rejected as non-responsive.**

For more information contact: Contractor Registration Unit
Division of Wage and Hour Compliance
New Jersey Department of Labor & Workforce Development
PO Box 389, Trenton, New Jersey 08625-0389
Tel: 609-292-9464 / Fax: 609-633-8591

19. DEBARMENT, SUSPENSION, OR DISQUALIFICATION – (N.J.A.C. 17:19-4.1)

The Board of Education will not enter into a contract for work with any person, company or firm that is on the State Department of Labor and Workforce Development; Prevailing Wage Debarment List, or the State of New Jersey Consolidated Debarment Report (**www.state.nj.us/treasury/debarred**) or the Federal System for Award—SAM.gov.

All bidders are required to submit a sworn statement indicating whether or not the bidder is, at the time of the bid, included on the State Department of Labor and Workforce Development; Prevailing Wage Debarment List or the State of New Jersey Consolidated Debarment Report, or the Federal Debarred Vendor List--Excluded Parties List System, through the System for Award Management portal—SAM.gov.

20. DOCUMENTS, MISSING/ILLEGIBLE

The bidder shall familiarize himself with all forms provided by the Board that are to be returned with the bid. If there are any forms either missing or illegible, it is the responsibility of the bidder to contact the School Business Administrator/Board Secretary during regular business hours or the architect of the project as outlined in the bid advertisement for duplicate copies of the forms. This must be done before the bid date and time. The Board accepts no responsibility for duplicate forms that were not received by the bidder in time for the bidder to submit with his bid.

*Forms provided by the Board of Education that must be returned with bid are referenced in the proceeding checklist.

21. DOCUMENT SIGNATURES – ORIGINAL; BLUE INK

All original documents returned to the Board shall be signed in ink (blue) with an original signature. Failure to sign and return all required documents with the bid package may be cause for disqualification and for the bid to be rejected pursuant to N.J.S.A. 18A:18A-2(y) (non-responsive). The Board will not accept facsimile or rubber stamp signatures.

Checklist of Required Documents (Forms Provided in Bid Package)

- Acknowledgement of Addenda
- Bid Form
- Affirmative Action Questionnaire or Certificate of Employee Information Report
- Notice of Classification Form
- Chapter 271 Political Disclosure Form
- Contractor Questionnaire/Certification
- Contractor's Registration Certification

- Equipment Certification
- Iran Disclosure of Investment Activities
- Non-Collusion Affidavit
- Prequalification Affidavit
- Prevailing Wages Certification
- Stockholders' /Partnership Disclosure Affidavit/Ownership Declaration
- Subcontractor's Disclosure Statement
- DPMC Form 701 Total Uncompleted Projects
- Bid bond, certified check or letter of credit

Reminder – Original Bid and Two Copies of Bid Package

22. EQUIPMENT CERTIFICATION (N.J.S.A. 18A:18A-23)

Each bidder shall provide a certification showing that he owns, leases or controls all the necessary equipment required by the specifications. If the bidder is not the actual owner or lessee of any such equipment, he shall submit a certificate stating the source from which the equipment will be obtained and shall obtain a certificate from the owner and person in control of the equipment, definitely granting to the bidder the control of the equipment required during such time as may be necessary for the completion of that portion of the contract for which it is necessary.

The certificates are to be submitted with the bid. If the contract involves the installation of a manufactured system which requires the contractor to have special knowledge or training, or to be specifically certified by the manufacturer to install their system, this form is used to submit such required evidence of the bidder's approval from the manufacturer.

23. EXAMINATION OF SPECIFICATIONS, ACKNOWLEDGEMENT

The bidder, by submitting a bid, acknowledges that he has carefully examined the bid specifications, documents, addenda (if any), and the site; and that from his investigation, he has satisfied himself as to the nature and location of the work, the general and local conditions and all matters which may in any way affect

the work or its performance, and that as a result of such examination, he fully understands the intent and purpose thereof, his obligations thereunder, and that he will not make any claim for, or have any right to damages, because of the lack of any information.

Each bidder submitting a bid for a service contract shall include in his bid price all labor, materials, equipment, services, and other requirements necessary, or incidental to, the completion of the work, and other pertinent work as hereinafter described, in accordance with the bid specifications and documents.

24. FALSE MATERIAL REPRESENTATION – (N.J.S.A. 2C:21-34-97(b))

A person commits a crime if the person knowingly makes a material representation that is false in connection with the negotiation, award or performance of a government contract. If the contract amount is for $25,000.00 or above, the offender is guilty of a crime of the second degree. If the contract amount exceeds $2,500.00, but is less than $25,000.00, the offender is guilty of a crime of the third degree. If the contract amount is for $2,500.00 or less, the offender is guilty of a crime of the fourth degree.

25. FORCE MAJEURE

Neither party shall be liable in damages for any failure, hindrance or delay in the performance of any obligation under this Agreement if such delay, hindrance or failure to perform is caused by conditions beyond the control of either party, including, but not limited to, Acts of God, flood, fire, war or the public enemy, explosion, government regulations whether or not valid (including the denial or cancellation of any export or other necessary license), court order, state funding, or other unavoidable causes beyond the reasonable control of the party whose performance is affected which cannot be overcome by due diligence.

Vendors, and/or contractors who have a contract with the Board of Education to provide goods or services cannot unilaterally claim an increase in the cost of the contract because of Force Majeure.

26. INSURANCE AND INDEMNIFICATION

Contractors Insurance: Before commencing the contract work, and as a condition precedent for payment, the Contractor shall purchase and maintain insurance, in conformance with the provisions contained in this Exhibit. This insurance will provide a defense and indemnify the **Board of Education of the Special Services District and the Vocational Technical School District of the County of Atlantic, their**

respective offices, agents and employees against any such claim, damage, loss or expense that is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work: itself) including the loss of use, which arises out of the Contractor's operations under this agreement This insurance shall apply regardless of whether the operations, actions, derelictions or failures to act from which the claim arises, are attributable to the Contractor, any of its consultants, officers, agents, subcontractors, employees, or anyone directly or indirectly employed by any of them including anyone for whose acts of the aforementioned may be liable by operation of statute, government regulation, or applicable case law.

Proof of this insurance shall be provided to the Board before the work: commences as set forth below. In no event shall the failure to provide this proof prior to the commencement of the work, be deemed a waiver by the Board of the Contractor's insurance obligations set forth herein.

If the event the insurance company(ies) issuing the policy(ies) required by this exhibit deny coverage to the Board, the Contractor will defend and indemnify the Board at the Contractor's expense.

The Contractor must obtain the required insurance with the carrier rated A- VII or better by AM Best. The Contractor shall maintain at least the limits of liability as set forth below:

Commercial General Liability Insurance
$ 1,000,000 Each Occurrence Limit (Bodily Injury and property Damage)
$ 2,000,000 General Aggregate
$ 2,000,000 Product/Completed Operations Aggregate
$ 1,000,000 Personal and Advertising Injury Limit.

Contractual Liability that will respond to indemnification clause included in this Agreement and the "Designated Construction Project(s) General Aggregate Limit" endorsement shall be included in the policy.

Comprehensive Automobile Liability Insurance
$ 1,000,000 Combined Single Limit Bodily Injury and Property Damage.
Coverage must include all owned, non-owned and hired vehicles used by the Contractor.

Workers' Compensation and Employers' Liability Insurance
$ 500,000 Each Accident
$ 500,000 Each Employee for Injury by Disease
$ 500,000 Aggregate for Injury by Disease.

If the Subcontractor is a Sole Proprietor, Partnership or ILC, Insurance Policy and Certificate must indicate that the proprietor/ partners/members are “included".

Umbrella
$3,000,000 per occurrence
$3,000,000 Aggregate.

Additional Insured Status and Certificate of Insurance

a. The Board, along with their respective officers, agents and employees, shall be named as Additional Insured for Operations and Products/Completed Operations on the Contractor's Commercial General Liability Policy and the Contractor's Automobile Liability, which must be primary and non-contributory with respect to the Additional Insured. This insurance shall remain in effect as set forth below, in the" Continuation of Coverage" provision.

b. It is expressly understood by the parties to this Contract that it is the intent of the parties that any insurance obtained by the Board is deemed excess, non-contributory and not co-primary in relation to the coverage(s) procured by the Contractor, any of its consultants, officers, agents, subcontractors, employees or anyone directly or indirectly employed by

any of them or by anyone for whose acts any of the aforementioned may be liable by operation of statute, government regulation or applicable case law.

c. A Waiver of Subrogation Clause shall be added to the General Liability and Auto policies in favor of the Board, and this clause shall apply to the Board's officers, agents and employees with respect to all projects during the policy term. It should also apply to the Contractor's Workers' Compensation policy if allowed by state law.

d. Prior to Commencement of work, Contractor shall submit a Certificate of Insurance in favor of the Board and an Additional Insured Endorsement (in a form acceptable to the Board) as required hereunder.

No Limitation on Liability

a. In any and all claims against the Additional Insured by any employee of the Contractor, anyone directly or indirectly employed by the Contractor or anyone for whose acts the Contractor may be liable, the indemnification obligation shall not be limited by any limitation on the amount or type of damage, compensation or benefits payable by or for the Contractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

Cancellation, Renewal and Modification

a. The Contractor shall maintain in effect all insurance coverages required under this Agreement at the Contractor's sole expense. In the event the Contractor fails to obtain or maintain any insurance coverage required under this Agreement, the Board may, at its *sole* discretion, purchase such coverage as desired for the Board's benefit and charge the expense to the Contractor, or, in the alternative, terminate this Agreement.

C**ontinuation of Coverage**

a. The Contractor shall continue to carry Completed Operations Liability Insurance for at least three years after either ninety-(90) days following Substantial Completion of the Work or final payment to the Contractor, whichever is later. The Contractor shall furnish the Board evidence of such insurance at final payment and in each successive year during which the insurance coverage must remain in effect.

27. <u>INTERPRETATIONS AND ADDENDA</u> (N.J.S.A. 18A:18A-21(c) (2))

No interpretation of the meaning of the specifications will be made to any bidder orally. Every request for such interpretations should be made in writing to the School Business Administrator/Board Secretary and must be received at least ten (10) business days prior to the date fixed for the opening of bids to be given consideration. Any and all interpretations and any supplemental instructions will be distributed in the form of written addenda to the specifications. The addenda will be provided in accordance with N.J.S.A. 18A:18A-21(c)(2) to the bidder by certified mail or certified fax no later than seven (7) days, Saturdays, Sundays, or holidays excepted prior to the date for acceptance of the bids. All addenda so issued shall become part of the contract document.

28. <u>IRAN DISCLOSURE OF INVESTMENT ACTIVITIES</u>- (N.J.S.A. 18A:18A-49.4)

Pursuant to Public Law 2012, c. 25, any person or entity that submits a bid or otherwise proposes to enter into or renew a contract must complete the certification below to attest, under penalty of perjury, that neither the person or entity, nor any of its parents, subsidiaries, or affiliates, is identified on the Department of Treasury's Chapter 25 list as a person or entity engaging in investment activities in Iran. The Chapter 25 list is found on the Division's website at

http://www.state.nj.us/treasury/purchase/pdf/Chapter25List.pdf.

Bidders must review this list prior to completing the below certification. If the Director finds a person or entity to be in violation of law, s/he shall take action as may be appropriate and provided by law, rule or contract, including but not limited to, imposing sanctions, seeking compliance, recovering damages, declaring the party in default and seeking debarment or suspension of the party.

In addition, bidders must provide a detailed, accurate and precise description of the activities of the bidding person/entity, or one of its parents, subsidiaries or affiliates, engaging in the investment activities in Iran outlined above by completing the boxes on the lower portion of the enclosed form.

Failure to complete, sign and submit the Disclosure of Investment Activities in Iran form with the bid shall be cause for rejection of the bid.

29. LIABILITY – COPYRIGHT

The contractor (vendor) shall hold and save the Board of Education, its officials and employees, harmless from liability of any nature or kind for or on account of the use of any copyrighted or uncopyrighted composition, secret process, patented or unpatented invention, article or appliance furnished or used in the performance of his contract.

30. LIQUIDATED DAMAGES

The contractor agrees to substantially complete this public works project to the complete satisfaction of the Board of Education by the stated contract completion date or within the number of working days so specified in the contract.

Failure to complete the project within the specified time frame or contract completion date shall lead to the Board of Education assessing liquidated damages against the contractor in accordance with and pursuant to N.J.S.A. 18A:18A-41 and 18A:18A-19.

For each calendar day thereafter that the work included under this contract remains uncompleted in accordance with the provision of the contract or not completed to the satisfaction of the Board of Education, the Board shall assess liquidated damages as follows:

Amount of Contract – Range of Amount	Liquidated Damages
$20,000 and less than $ 50,000	$200.00 per calendar day
$50,001 and less than $ 100,000	$300.00 per calendar day
$100,001 and less than $ 250,000	$500.00 per calendar day
$251,001 and less than $ 500,000	$1,000.00 per calendar day
$500,000 and less than $1,000.00	$2,000.00 per calendar day
$1,000,000 and over	$2,500.00 per calendar day

The Board may assess liquidated damages by deducting the amount from monies which may due or become due to the contract.

The Board may also assess the contractor additional damages for costs the Board may incur because each day the project remains uncompleted. These costs include but are not limited to:

Construction management fees
Architect/engineer fees
District administrative costs
Any inspector or inspectors necessarily employed by the Board of Education on the work, for any number of days in excess of the number allowed in the specifications

The Board of Education may also assess against all monies owed to the contractor, liquidated damages for the violation of any terms and conditions of the contract or agreement by the contractor or the failure to perform said contract or agreement in accordance with its terms and conditions or the terms or conditions of the "Public School Contracts Law," in accordance with and pursuant to N.J.S.A. 18A:18A-19 and 18A:18A-41.

31. MAINTENANCE BONDS

The contractor shall furnish a Maintenance Bond for the total sum of the contract price, indemnifying the Board of Education against defects in construction for a period of two (2) years after the completion of the work, general wear and tear excepted.

The condition of this obligation is such that if the successful contractor shall indemnify and hold harmless the Board of Education from and against all losses, costs, damages and expenses, whatsoever, which the Board may suffer or compelled to pay by reason of the failure of the successful contractor to indemnify the Board against defects in construction for a period of two (2) years after the completion of the work.

32. NON-COLLUSION AFFIDAVIT (N.J.S.A. 52:34-15)

A notarized Non-Collusion Affidavit must be submitted with the bid.

33. NOTICE (AUTHORIZATION) TO PROCEED (N.J.S.A. 18A:18A-36(b))

The contractor shall not perform any work, or provide any services, materials, supplies until a Notice (Authorization) to Proceed is received from the Board of Education (N.J.S.A. 18A:18A-36(b)).

The Board of Education only recognizes the receipt by the contractor of an approved signed purchase order as a Notice to Proceed. No word of mouth, phone, fax, e-mail, letter or other form of communication to proceed is a valid Notice to Proceed.

It is the intention of the Board to officially notify the Contractor, to whom the contract was awarded, through a Notice to Proceed letter issued by the School Business Administrator/Board Secretary. A purchase order will accompany the Notice to Proceed letter. The contractor shall submit certain documents to the Board as so requested in the Notice to Proceed letter.

34. PAYMENTS

Every effort will be made to pay vendors and contractors within thirty (30) to sixty (60) days provided the Board of Education receives the appropriate documentation including but not limited to:

- Signed voucher by vendor
- Packing slips
- Invoices

Payment will be rendered upon completion of services or delivery of full order to the satisfaction of the Board of Education, unless otherwise agreed to by written contract or mandated by State Law*. The Board may, at its discretion make partial payments.

All payments are subject to approval by the Board of Education at a public meeting. Payment may be delayed from time to time depending on the Board of Education meeting schedule.

* See N.J.S.A. 18A:18A-40.1--Public Works Contracts

35. PAYMENT, PARTIAL, WITHHOLDING

A. Contract Thresholds; Partial Payments/Withholding

1. Contracts – Less than $100,000 – Lump Sum Payment
   Public works contracts less than $100,000 shall be paid in one lump total sum, upon completion of the project and to the satisfaction of the Board of Education.

2. Contracts – Exceeding $100,000 – Monthly Payments
   Public works contracts that exceed $100,000 shall be paid with partial payments on a monthly basis on work that was completed to the satisfaction of the Board of Education. (Ref. N.J.S.A. 18A:18A-40.1)

3. Withholding of Monies – Percentage to be Withheld
   The Board of Education shall withhold the following percentages of outstanding balances of monies owed to contractors:
   Balances Exceeding $500,000 -- Two (2%) Per Cent
   Balances Less than $500,000 -- Five (5%) Per Cent

The amounts withheld shall be returned to the contracts upon fulfillment of the terms of the contract. (Ref. N.J.S.A. 18A:18A-40.1)

B. Prompt Payment

The Board of Education will provide payment in accordance with the "Prompt Payment" law as codified in N.J.S.A. 2A:30A-1 et seq. All payments to contractors are subject to approval by the Board of Education at a public meeting.

All bills submitted to the Board for approval and payment pursuant to N.J.S.A. 2A:30A-1 et seq. must comply with the following provisions. The "billing date" shall be the date that the contractor signs the certification on the voucher/purchase order that the work has been performed. These bills include all bills for improvements

to real property and contracts for engineers, architects, surveyors, design or skilled services relating to construction work.

Bills that are required to be approved by an engineering or architecture firm (prior to submission to the Board for approval) for purposes of confirmation of successful completion of construction work, shall be approved or disapproved within twenty (20) days of submission of same to the architect or engineer. If bills are disapproved or monies withheld from payment, the notice of the reason for same shall be given within the same twenty (20) days to the contract.

The Board must approve payment of all bills. For the Board to consider a bill for approval it must be submitted to the School Business Administrator/Board Secretary at least two weeks prior to a scheduled/or re-scheduled Board meeting date. If the Board, or any agent or officer of the Board, determines that the bill is not approved then notice of the disapproval shall be sent to the contractor with five (5) days of the Board meeting on which the bill was listed for approval.

If the bill is approved by the Board, then payment shall be made to the contractor with seven (7) days of the Board meeting as per the "payment cycle."

36. PERFORMANCE BOND/CONTRACT AMOUNT (N.J.S.A. 2A:44-143/2A:44-147)

A. The contractor shall furnish a Performance, Payment and Completion Bond in a sum of at least one hundred percent (100%) of the total amount payable by the terms of his Contract. Such written guarantee shall be made payable to the **Atlantic County Vocational School District** and shall be in the form required by Statute. Attached to the performance bond shall be a Surety Disclosure Statement and Certification which shall be complete in all respects and duly acknowledged according to law.

A model Surety Disclosure Statement and Certification is presented in the Appendix Section of this bid.

B. Such bond shall further carry a stipulation that no advance, premature, excessive or delayed payments by the Owner shall in any way affect the obligation of the Surety on its bond.

C. Such bond shall further stipulate that no payments made to the contractor, nor partial or entire use of occupancy of the work by the Owner shall be an acceptance of any work or materials not in accordance with this Contract and the Surety shall be equally bound to the same extent as the Contractor.

D. It is expressly stipulated that the Surety for the Contractor on the project shall be obligated to make periodic inquiries of the Owner at reasonable times, to determine whether its Principal has performed or was performing the Contract in accordance with all of its terms and conditions, particularly in relation to the progress payments scheduled under said Contract with the Owner.

E. In the event the Contractor defaults or fails to perform or finish the work prescribed under the Contract for any reason whatsoever, it shall become the unqualified obligation the Surety for the defaulting contractor to complete the Contract in accordance with its terms following receipt of notice from the owner of such default.

F. The Board shall only accept one payment and performance bond to cover this public works contract. The performance bond shall contain language as found in N.J.S.A. 2A:44-14. The bond form language is presented in the Appendix Section of this bid.

G. Such Performance, Payment and Completion Bond shall be executed and delivered to the Board of Ed. when so requested by the Notice to Proceed Letter or within ten (10) days after the award of contract.

H. The Board of Education will only accept performance bonds from surety companies that are licensed qualified to do business in the State of New Jersey, and if the amount of the bond is $850,000 but not more than $3.5 million, the surety shall hold a current certificate of authority, issued by the United States Secretary of the Treasury pursuant to 31 U.S.C. 9305. (N.J.S.A. 2A:44-143 (b))

Please note: The name, address, and phone number of the Bond Underwriter as well as the Bond Number shall be included with all bonds submitted to the Board of Education and must be duly signed with original signatures.

37. POLITICAL CONTRIBUTIONS DISCLOSURE – REQUIREMENTS

Pursuant to N.J.A.C. 6A:23A-6.3 (a) (1-4) please note the following:
Award of Contract -- Reportable Contributions -- N.J.A.C. 6A:23A-6.3 (a) (1)
"No board of education will vote upon or award any contract in the amount of $17,500 or greater to any business entity which has made a contribution reportable by the recipient under P.L.1973, c83 (codified at N.J.S.A. 19:44A-1 et seq.) to a member of the board of education during the preceding one year period."

Contributions During Term of Contract – Prohibited -- N.J.A.C. 6A:23A-6.3 (a) (2-3)
"Contributions reportable by the recipient under P.L. 1973, c83 (codified at N.J.S.A. 19:44A-1 et seq.) to any member of the school board from any business entity doing business with the school district are prohibited during the term of the contract."

"When a business entity referred in 4.1(e) is a natural person, contribution by that person's spouse or child that resides therewith, shall be deemed to be a contribution by the business entity. When a business entity is other than a natural person, a contribution by any person or other business entity having an interest therein shall be deemed to be a contribution by the business entity."

Chapter 271 Political Contribution Disclosure Form – Required -- N.J.A.C. 6A:23A-6.3 (a)(4)

All bidders shall submit with their bid package a completed and signed Chapter 271 Political Contribution Disclosure Form. The Chapter 271 form will be reviewed by the district to determine whether the vendor is in compliance with the aforementioned N.J.A.C. 6A:23A-6.3 (a)(2) Award of Contract.

38. POLITICAL CONTRIBUTION DISCLOSURE STATEMENT – PAY TO PLAY

A business entity as defined by law is advised of its responsibility to file an annual disclosure statement on political contributions with the New Jersey Election Law Enforcement Commission pursuant to N.J.S.A. 19:44A-20.13 (P.L. 2005 Chapter 271 section 3) if the business entity receives contracts in excess of $50,000 from public entities in a calendar year. It is the business entity's responsibility to determine if filing is necessary. Additional information on this requirement is available from the New Jersey Election Law Enforcement Commission at 1-888-313-3532 or at **www.elec.nj.us.**

39. PRE-BID MEETINGS

The pre-bid meeting is an important part of the bidding process. It allows all bidders to have an equal understanding of the procurement requirements and of the scope of work involved. Although pre-bid meetings are not mandatory, all potential bidders are strongly encouraged to attend. **Please review the General Specifications for a pre-bid meeting announcement**. Any or all changes to the bid specifications discussed because of the Pre-Bid Meeting will be formalized in the form of any written addenda to the specifications and distributed in accordance with N.J.S.A. 18A:18A-21(c) (2).

It is anticipated that the pre-bid meeting (if any) scheduled for this project will have an agenda format such as:

A. Registration Period
At this time all attendees will be asked to register to attend this meeting. Proper photo identification is required. Plans and specifications may be available for purchase from the Architect/Engineer of Record. Attendance will be recorded.

B. Review of Procurement/Contracting Requirements—School Business Administrator
The School Business Administrator will review the major components of the procurement and contracting requirements of the bid.

C. Scope of Work and Scheduled Completion Time—Architect/Engineer
The Architect/Engineer of Record, in conjunction with the Director of Facilities (Buildings and Grounds) and the School Business Administrator will review the scope of the work that is requested and completion time requirements (Number of Working Days). A review of the plans and any drawings may take place.

D. Walkthrough of Facility/Site
The Architect/Engineer, in conjunction with the Director of Facilities and/or the school Business Administrator may conduct a facility site walkthrough with all interested parties.

E. Questions; Clarifications—Official Addenda Process

Potential bidders are permitted to ask questions during the process. Questions of substantial measure or questions that require clarification of work to be completed may be answered at the meeting, however, the Architect/Engineer shall answer all such questions in writing in the form of an official addenda.

All answers to questions, interpretations or any supplemental instructions will be distributed in the form of a written official addenda to the specifications. The official addenda will be provided by the School Business Administrator's Office of the Board of Education in accordance with N.J.S.A. 18A:18A-21(c) (2) to the bidder by certified mail, certified fax or delivery service, no later than seven (7) days, not including Saturdays, Sundays, or holidays prior to the date for acceptance of the bids. All addenda so issued shall become part of the bid and contract document.

40. PRE-QUALIFICATION OF BIDDERS

A. Pursuant to N.J.S.A. 18A:18A-26, 27 et seq., all bidders on any contract for public work(s) which the entire cost of the contract exceeds $20,000.00, must be pre-qualified by the Department of Treasury, Division of Property Management and Construction, as to character and amount of public work on which they may submit bids. No person shall be qualified to bid on any public work contract with the Board if he has not submitted a statement to the Department of Treasury, Division of Property Management and Construction which fully develops the financial ability, adequacy of plant and equipment, organization and prior experience of the prospective bidder, and such other pertinent and material facts, within a period of one year preceding the date of opening of the bids for such contract.

B. Every pre-qualified bidder must submit with his bid, a notarized affidavit setting forth the type of work and the amount of work for which he has been qualified, that there has been no material adverse change in his qualification information, the total amount of completed work on contracts at the time and date of the classification. Any bid not including a copy of this affidavit shall be rejected as being non-responsive to bid requirements. (N.J.S.A. 18A:18A-32) **(Prequalification Affidavit)**

C. All bidders shall furnish satisfactory evidence that he and his subcontractors have sufficient means and experience in the type of work to complete the project in accordance with the bid specifications. Subcontractor listing and bidder's personnel and experience sheet shall be submitted to the Board as part of the bidding documents. Where the bidder intends to subcontract any portion of the project, the cost of which will exceed $20,000.00, the sub-contractor shall be pre-qualified to perform the work and the bidder shall submit the requisite documentation pertaining to the sub-contractor in accordance with Paragraphs A and B above. The Board may make such additional investigations as it deems necessary to determine the ability, competence and financial responsibility of the bidder to perform the work. The bidder shall furnish the Board with the information and data for this purpose upon request. The Board reserves the right to reject any bid if the information fails to establish to the Board's satisfaction that the bidder is properly qualified to carry out the obligations of the contract and to complete the work contemplated here.

D. **Notice of Classification** (For Contracts Exceeding $20,000) (N.J.S.A. 18A:18A-26 et seq.)
Each bidder shall submit with his/her bid a copy of a valid and active Notice of Classification letter issued by the Department of Treasury, Division of Property Management and Construction as appropriate to the nature of the bid. Any bid submitted to a school board under the terms of New Jersey Statutes not including a copy of a valid and active classification letter shall be rejected as being non-responsive to bid requirements.

"The Board of Education, through its authorized agent, shall upon completion of the contract report to the State agency listed on the pre-qualification/classification letter as to the contractor's performance and shall furnish such report from time to time during performance if the contractor is then in default".

E. **Uncompleted Contracts** (For Contracts Exceeding $20,000) (N.J.A.C. 17:19-2.13)
The Board also requires that each bidder submit with his bid a certified Total Amount of Uncompleted Contracts form as prescribed by law. (Form DPMC 701)

F. **Prequalification Affidavit** (For Contracts Exceeding $20,000)
Pursuant to N.J.S.A. 18A:18A-32, every bidder shall submit with his bid a prequalification affidavit.

41. PREVAILING WAGES: CONSTRUCTION, ALTERATIONS, REPAIRS

The State of New Jersey Prevailing Wage Act, Chapter 150 Laws of 1963 with applicable wage rates for Cumberland County as published by the Department of Labor and Workforce Development in conformance with

N.J.S.A. 34:11 56:25, is hereby made a part of these Contract Documents. Copies of these wage rates may be obtained from the State Department of Labor and Workforce Development, and/or viewed at **www.state.nj.us/labor**, the Prevailing Wages Determination Section.

Contractor agrees to submit to the Board of Education a certified payroll for each payroll period within ten (10) days of the payment of wages. Contractor further agrees that no payments will be made to the Contractor if certified payrolls are not received. It is the Contractor's responsibility to insure timely receipt by the district of certified payrolls.

Before final payment, the contractor shall furnish the Board of Education with an affidavit stating that all workers have been paid the prevailing rate of wages in accordance with State of New Jersey requirements. The contractor shall keep an accurate record showing the name, craft, or trade and actual hourly rate of wages paid to each workman employed by him in connection with this work. Upon request, the Contractor(s) and each Subcontractor shall file written statements certifying to the amounts then due and owing to any and all workmen for wages due on account of the work. The statements shall be verified by the oaths of the Contractor or Subcontractor, as the case may be.

Posting of Prevailing Wages
The contractor shall post the prevailing wage rates for each craft and classification involved in the work, including the effective date of any changes thereof, in prominent and easily accessible places at the Site of the work and in such place or places as used to pay workmen their wages. (Ref. 18A:7G-23 and N.J.S.A. 34:11-56.32.

The bidder shall submit a Prevailing Wages Certification with its bid package.

42. QUALIFICATION OF BIDDERS - Contractor Questionnaire Certification Form
The Board of Education may make such investigations as it seems necessary to determine the ability of the bidder to perform the terms of the contract. The bidder shall complete a Contractor Questionnaire Certification Form and return same with the bid and shall furnish all information to the Board as the Board may require to determine the contractor's ability to perform the duties and obligations as outlined in these specifications.

All bidders are reminded that bids may be rejected as not being responsive pursuant to N.J.S.A. 18A:18A-2(y) and therefore bidders are asked to complete the Questionnaire and to provide any supporting documentation with the bid package.

43. RESIDENT CITIZENS; PREFERRED IN EMPLOYMENT ON PUBLIC WORKS CONTRACTS
All bidders are to familiarize themselves with N.J.S.A. 34:9-2, which requires the contractor of any public work project to give preference in employment on the project, to citizens of the state of New Jersey. If the terms and conditions of N.J.S.A. 34:9-2 are not complied with, the contract shall be voidable. The Board is obligated to file with the Commissioner of Labor, the names and addresses of all contractors holding contracts with this project.

44. RENEWAL OF CONTRACT; AVAILABILITY AND APPROPRIATION OF FUNDS
The Board of Education may, at its discretion, request that a contract that is subject to renewal, be renewed in full accordance with N.J.S.A. 18A:18A-42. The School Business Administrator/Board Secretary, may negotiate terms for a renewal of contract bid and present such negotiated bid to the Board of Education. The Board of Education is the final authority in awarding renewals of contracts. All multi-year contracts and renewals are subject to the availability and appropriation annually of sufficient funds as may be needed to meet the extended obligation.

45. RIGHT TO KNOW LAW
All potentially hazardous materials or substances must be properly labeled in full accordance with the New Jersey Right to Know Law - N.J.S.A. 34:5A-1 et seq. All contractors or vendors who need additional information about the New Jersey Right to Know Law are to contact the:

New Jersey Department of Health
Right to Know Program
CN 368
Trenton, New Jersey 08625-0368
rtk@doh.state.nj.us

46. STATEMENT OF OWNERSHIP (N.J.S.A. 52:25-24.2)

Statement of Ownership

No business organization, regardless of form of ownership, shall be awarded any contract for the performance of any work or the furnishing of any goods and services, unless, prior to the receipt of the bid or accompanying the bid of said business organization, bidders shall submit a statement setting forth the names and addresses of all persons and entities that own ten percent or more of its stock or interest of any type at all levels of ownership.

The included Statement of Ownership shall be completed and attached to the bid proposal. This requirement applies to all forms of business organizations, including, but not limited to, corporations and partnerships, publicly-owned corporations, limited partnerships, limited liability corporations, limited liability partnerships, sole proprietorship, and Subchapter S corporations**. Failure to submit a disclosure document shall result in rejection of the bid as it cannot be remedied after bids have been opened.**

Not-for-profit entities should fill in their name, check the not-for-profit box, and certify the form. No other information is required.

47. STOCKHOLDERS' DISCLOSURE (N.J.S.A. 52:25-24.2)

All bidders are hereby notified that every corporation and partnership, according to the provision of Chapter 33, Laws of 1977 of the State of New Jersey, must submit a statement prior to the receipt of the bid or accompanying the bid, setting forth the names and addresses of all stockholders in the corporation or partnership who own 10% or more of its stock, of any class or of all partners in the partnership, who own 10% or greater interest herein, as the case may be. If one or more such stockholder or partner is itself a corporation or partnership, the stockholders holding 10% or more of that corporation's stock, or the individual partners 10% or greater interest in that partnership, as the case may be, shall also be listed. The disclosure shall be continued until names and addresses of every non-corporate stockholder, and individual partner, exceeding the 10% ownership criteria established in this act, has been listed.

48. SUBCONTRACTING: Subcontractor Disclosure Statement

Pursuant to N.J.S.A. 18A:18A-18(b) any bidder who bids for the overall contract and who will subcontract the following work:

- Plumbing and gas fitting work;
- Refrigeration, heating and ventilating systems and equipment; and
- Electrical work, tele-data, fire alarm or security systems
- Structural Steel and Ornamental Ironwork

shall identify the sucontractor that will be used on the form provided by the school district.

Qualified Subcontractors

If the cost of the work done by the subcontractors exceeds $20,000.00, then said contractor shall be qualified in accordance with Article 6 N.J.S.A. 18A:18A-26 et seq. For those subcontractors in the four branches listed above, the bidder shall supply proof that the subcontractor is qualified by submitting with the bid the subcontractor's:

- Notice of Classification Form
- Total Amount of Uncompleted Contractor's Form—Certified (Form DPMC 701)

For all other subcontractors who will perform work valued in excess of $20,000.00, the bidder shall submit the evidence of the subcontractor's qualifications listed above within ten (10) days of receipt of notice of the award of contract.

Documents to be Submitted: All Subcontractors

The prime contractor (bidders) who will be using a subcontractor on any part of this bid, shall identify the subcontractor(s) on the appropriate form and submit with the bid package the following subcontractor documents at the time indicated in the box below:

SUBCONTRACTOR DOCUMENT SUBMISSIONS		
Estimated Value of Contract – Subcontractor	For Subcontractors in any of the four major branches listed above: *Submit With Bid*	For all other Subcontractors: *Submit Within ten (10 Days of Receipt of Notice of Award*

$2,000 through $5,999	Contractor's Registration Certificate
$6,000 through $17,499	Contractor's Registration Certificate New Jersey Business Registration Certificate
$17,500 through $19,999	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form
$20,000 or more	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form Notice of Classification Total Amount of Uncompleted Contracts -- Certified

Failure to identify in the Subcontractor's Disclosure Statement the names and addresses of any or all subcontractors required to be named in the bid, or to submit with the bid the appropriate documents for each such subcontractor, may be cause for the bid to be rejected as being non-responsive.

Contractors are reminded that the subcontractors listed on the forms provided by the school district may not be changed later, except in the case of failure in performance or other contract breach where a change is needed to protect the school district.

49. SUBCONTRACTING: PROHIBITIONS: HOLD HARMLESS

Prime contractors, with whom the Board of Education have an executed contract, may not subcontract any part of any work done for the Board without first receiving written approval from the Board. Contractors seeking to use subcontractors must first complete the Request to Sub Contract Form as provided by the Building Services Department.

Subcontractors Prohibited to Sub Contract

It is the responsibility of the prime contractor to ensure that no subcontractor who has received written permission to do work for the Board, subcontracts any of its/their work without first receiving written approval from the prime contractor **and** the Director of Facilities or his designee.

The prime contractor assumes all responsibility for work performed by subcontractors. The prime contractor must also provide to the Board Business Office the following documents secured from all approved subcontractors:

- Insurance Certificate as outlined in the bid specifications;
- Affirmative Action Evidence as outlined in the bid specifications;
- Written certification that the subcontractor shall adhere to prevailing wages as provided through New Jersey State Law;
- Evidence of Performance Security;
- Documents listed in the Subcontractor Document Submissions list.

In cases of subcontracting, the Board of Education shall only pay the prime contractor. It is the sole responsibility of the prime contractor to ensure that all subcontractors are paid. The Board of Education shall not be responsible for payments to subcontractors and shall be held harmless against any or all claims generated against prime contractors for non-payment to subcontractors.

Penalties – Unauthorized Subcontractors

The Board of Education shall deduct the amount of $1,000.00 (one thousand dollars) per day as a penalty, for each day a prime contractor uses a subcontractor without first receiving **written** permission from the Building Services Department.

50. SWORN CONTRACTOR CERTIFICATION; QUALIFICTIONS AND CREDENTIALS

Pursuant to N.J.S.A. 18A:7G-37, a pre-qualified contractor seeking to bid school facilities projects, and any subcontractors, that are required to be named under N.J.S.A. 18A:7G-1 et seq. shall, as a condition of bidding, submit this Sworn Contractor Certification regarding qualifications and credentials. Failure to complete, sign and submit the certification may lead to the bid being rejected

51. TAXES; Contractor's Use of Board's Tax Exempt Status

As a New Jersey governmental entity, the Board of Education is exempt from the requirements under New Jersey state sales and use tax (N.J.S.A. 54:32B-1 et seq.),and does not pay any sales or use taxes. Bidders should note that they are expected to comply with the provisions of said statute and the rules and regulations promulgated thereto to qualify them for examinations and reference to any and all labor, services, materials and supplies furnished to the Board of Education. Contractors may not use the Board's tax identification number to purchase supplies, materials, service or equipment, for this project.

A contractor may qualify for a New Jersey Sales Tax Exemption on the purchase of materials, supplies and services when these purchases are used exclusively to fulfill the terms and conditions of the contract with the Board of Education. All contractors are referred to New Jersey Division of Taxation–Tax Bulletin S&U-3 for guidance. Again, contractors are not permitted to use the Board's tax identification number to purchase supplies, materials, services of equipment.

52. TERMINATION OF CONTRACT

If the Board determines that the contractor has failed to comply with the terms and conditions of the bid upon which the issuance of the contract is based or that the contractor has failed to perform said service, duties and or responsibilities in a timely, proper, professional and/or efficient manner, then the Board shall have the authority to terminate the contract upon written notice setting forth the reason for termination and effective date of termination.

Termination by the Board of the contract does not absolve the contractor from potential liability for damages caused the District by the contractor's breach of this agreement. The Board may withhold payment due the contractor and apply same towards damages once established. The Board will act diligently in accordance with governing statutes to mitigate damages. Damages may include the additional cost of procuring said services or goods from other sources.

The contractor further agrees to indemnify and hold the District harmless from any liability to subcontractors or suppliers concerning work performed or goods provided arising out of the lawful termination of this agreement.

53. WITHDRAWAL OF BIDS

The School Business Administrator/Board Secretary may consider a written request from a bidder to withdraw a bid if the written request is received by the School Business Administrator/Board Secretary before the advertised time of the bid opening. Any bidder who has been granted permission by the School Business Administrator/Board Secretary to have his/her bid withdrawn cannot re-submit a bid for the same advertised bid project. That bidder shall also be disqualified from future bidding on the same project if the project is re-bid.

SUPPLEMENTAL SPECIFICATIONS

54. AWARD OF CONTRACT

Award, if made, will be to the lowest responsible bidder for the contract to include Alternate Bids, if any, which the Owner chooses to accept, that result (s) in the lowest aggregate total sum.

55. EXPERIENCE

The Board of Education requires evidence from all bidders that they have completed work or projects of a similar nature as outlined in the bid package. Bidders are to provide evidence of satisfactory completion of work of similar nature as outlined in the bid from three (3) Boards of Education in New Jersey within the past seven (7) years.

56. NUMBER OF WORKING DAYS -- (N.J.S.A. 18A:18A-19)

The contractor agrees to substantially complete this public works project to the satisfaction of the Board of Education by **Friday, October 14, 2022** assuming a July 1, 2022 start of construction.

The number of working days set by the district may be extended by agreement between the contractor and the district. The agreement shall be in writing and will be considered an addendum to the contract.

57. SITE VISITS

A Pre-Bid Meeting will be held on **Thursday, June 9, 2022, at 10:00 AM** at **the South Wing Building** located at **5080 Atlantic Avenue, Mays Landing, NJ 08330.** Please meet at the entrance to the building. **Additionally, SCHEDULED** site visits can also be arranged but you should endeavor to attend at this time. We ask anyone who wants to arrange for a site visit to please email **Mr. Chris Wagner at cwagner@acitech.org or call (609)**

374-7463 to confirm an appointment. Scheduled times for bidders to visit the project site will be made to preclude large group gatherings.

58. TRADE CLASSIFICATION(S)

A. Bidder:

For this Public Works bid, each bidder shall be classified by the State of New Jersey—Division of Property Management and Construction in the following trade(s):

C006 - Construction Manager as Constructor
C008 - General Construction
C009 - General Construction/Alterations and Additions

Proof of classification shall be submitted with the bid package in the form of a current Notice of Classification as issued by the New Jersey Division of Property Management and Construction.

B. Subcontractor:

For the purpose of this Public Works bid, each bidder shall use a subcontractor that is properly classified by the State of New Jersey—Division of Property Management and Construction in the following trade(s):

C032 – Heating, Ventilation, Air Conditioning and Refrigeration (HVACR)
C047 - Electrical

Proof of classification, in the form of a current Notice of Classification form, for each sub-Contractor, shall be submitted by the bidder with the bid package for any estimated subcontractor work exceeding $20,000.00.

Atlantic County Vocational School District
5080 Atlantic Avenue
Mays Landing, NJ 08330

BID DOCUMENTS
AND
REQUIRED DOCUMENTATION

Atlantic County Institute of Technology
SOUTH WING ADMINISTRATIVE AREA ALTERATIONS
Project #22-03
5080 Atlantic Avenue
Mays Landing, NJ 08330

All documents in this section shall be completed, signed and submitted with the bid package – Failure to submit the bid documents and other documents so specified may be cause to reject the bid for being non-responsive (N.J.S.A. 18A:18A-2(y)).

Lauren Flynn
School Business Administrator/Board Secretary

Atlantic County Vocational School District
5080 Atlantic Avenue
Mays Landing, NJ 08330

CHECK OFF FORM

ACIT: SOUTH WING ADMINISTRATIVE AREA ALTERATIONS

Bid Date: Thursday, June 23, 2022 at 10:00 AM

1. _____ Acknowledgement of Addenda

2. _____ Bid Form

3. _____ Affirmative Action Questionnaire or Certificate of Employee Information Report

4. _____ Chapter 271 Political Disclosure Form

5. _____ Contractor Questionnaire/Certification

6. _____ Contractor's Registration Certification

7. _____ Equipment Certification

8. _____ Iran Disclosure of Investment Activities

9. _____ Non-Collusion Affidavit

10. _____ Prequalification Affidavit – No Material Change of Circumstances

11. _____ Prevailing Wages Certification

12. _____ Stockholders' /Partnership Disclosure Affidavit/Ownership Declaration

13. _____ Subcontractor's Disclosure Statement

14. _____ Certificate of Site Visit

15. _____ Notice of Classification

16. _____ DPMC Form 701 Total Uncompleted Projects

17. _____ Bid bond, certified check or letter of credit

18. _____ Consent of Surety

To be completed, signed below and returned with bid.

Atlantic County Vocational School District
5080 Atlantic Avenue
Mays Landing, NJ 08330

ACKNOWLEDGEMENT OF RECEIPT OF ADDENDA

ACIT: SOUTH WING ADMINISTRATIVE AREA ALTERATIONS

Bid Date: Thursday, June 23, 2022 at 10:00 AM

The Respondent acknowledges receipt of the hereinafter enumerated Addenda which have been issued during period of bid and agrees that said Addenda shall become a part of this contract. The Respondent shall list below the numbers and issuing dates of the Addenda.

ADDENDA NO.	ISSUING DATES
_____	_____
_____	_____
_____	_____
_____	_____

_____ **No Addenda Received**

Name of Company_____

Address _____ P.O. Box

City, State, Zip Code _____

Name of Authorized Representative _____

Signature _____ Date_____

To be completed, signed below and returned with bid.

Atlantic County Vocational School District
5080 Atlantic Avenue
Mays Landing, NJ 08330

OFFICIAL BID FORM

ACIT: SOUTH WING ADMINISTRATIVE AREA ALTERATIONS

Bid Date: Thursday, June 23, 2022 at 10:00 AM

CONTRACT NO. 1 - GENERAL CONSTRUCTION

I (We) propose to fully execute and complete all work under CONTRACT NO. 1 - GENERAL CONSTRUCTION to include all work required by these Documents for the total sum of:

_____($_____)

The respondent by signing this bid form, acknowledges that he/she has carefully examined the bid specifications and documents: and further acknowledges he/she understands and is able to render the scope of activity and services outlined in the bid.

Name:_____

Address:_____ P.O. Box_____

City, State, Zip Code _____

Federal Tax ID Number:_____

Phone Number:_____ Extension:_____

Authorized Agent: _____ Title: _____

Agent's Signature:_____ Date: _____

Bidder agrees to include in the base bid the stipulated sum specified as a contingency allowance as specified in Section 010050 -Administrative Provisions.

To be completed and signed below & returned with bid.

Atlantic County Vocational School District
5080 Atlantic Avenue
Mays Landing, NJ 08330

AFFIRMATIVE ACTION QUESTIONNAIRE

ACIT: SOUTH WING ADMINISTRATIVE AREA ALTERATIONS

This form is to be completed and returned with the bid. However, the Board will accept in lieu of this Questionnaire, Affirmative Action Evidence Employee Information Report stapled to this page.

1. Our company has a federal Affirmative Action Plan approval. _____ **Yes** _____ **No**
   If yes, please attach a copy of the plan to this questionnaire.

2. Our company has a N.J. State Certificate of Employee Information Report ____ **Yes** _____ **No**
   If yes, please attach a copy of the certificate to this questionnaire.

3. If you answered ***"NO"*** to both questions No. 1 and 2, you must apply for an Affirmative Action Employee Information Report – Form AA201.

Please visit the New Jersey Department of Treasury website for the Division of Public Contracts Equal Employment Opportunity Compliance: *www.state.nj.us/treasury/contract compliance/*

- Click on "Employee Information Report"
- Complete and submit the form with the appropriate payment to:

Department of Treasury
Division of Public Contracts/EEO Compliance
P.O. Box 209
Trenton, NJ 08625-0002

All fees for this application are to be paid directly to the State of New Jersey. A copy shall be submitted to the Board of Education within seven (7) days of the notice of the intent to award the contract or the signing of the contract.

I certify that the above information is correct to the best of my knowledge.

Name: _____

Signature _____

Title _____ Date _____

Name of Company_____

Address _____

City, State, Zip _____

To be completed and signed below & returned with bid.

Atlantic County Vocational School District
5080 Atlantic Avenue
Mays Landing, NJ 08330

Chapter 271
Political Contribution Disclosure Form
(Contracts that Exceed $17,500.00)
Ref. N.J.S.A. 19:44-20.26

The undersigned, being authorized and knowledgeable of the circumstances, does hereby certify that _____(Business Entity) has made the following **reportable** political contributions to any elected official, political candidate or any political committee as defined in N.J.S.A. 19:44-20.26 during the twelve (12) months preceding this award of contract:

Reportable Contributions

Date of Contribution	**Amount of Contribution**	**Name of Recipient Elected Official/ Committee/Candidate**	**Name of Contributor**

The Business Entity may attach additional pages if needed.

_____
_____ No Reportable Contributions (Please check if applicable.)

I certify that _____(Business Entity) made no reportable contributions to any elected official, political candidate or any political committee as defined in N.J.S.A. 19:44-20.26.

Certification:
I certify, that the information provided above is in full compliance with Public Law 2005—Chapter 271.
Name of Authorized Agent _____

Signature _____ Title _____

Business Entity_____

Atlantic County Vocational School District
5080 Atlantic Avenue
Mays Landing, NJ 08330

ACIT: SOUTH WING ADMINISTRATIVE AREA ALTERATIONS

C. 271 POLITICAL CONTRIBUTION DISCLOSURE FORM
Contractor Instructions

Business entities (contractors) receiving contracts from a public agency that are NOT awarded pursuant to a "fair and open" process (defined at N.J.S.A. 19:44A-20.7) are subject to the provisions of P.L. 2005, c. 271, s.2 (N.J.S.A. 19:44A-20.26). This law provides that 10 days prior to the award of such a contract, the contractor shall disclose contributions to:

- any State, county, or municipal committee of a political party
- any legislative leadership committee*
- any continuing political committee (a.k.a., political action committee)
- any candidate committee of a candidate for, or holder of, an elective office:
  - of the public entity awarding the contract
  - of that county in which that public entity is located
  - of another public entity within that county
  - or of a legislative district in which that public entity is located or, when the public entity is a county, of any legislative district which includes all or part of the county

The disclosure must list reportable contributions to any of the committees that exceed $300 per election cycle that were made during the 12 months prior to award of the contract. See N.J.S.A. 19:44A-8 and 19:44A-16 for more details on reportable contributions.
N.J.S.A. 19:44A-20.26 itemizes the parties from whom contributions must be disclosed when a business entity is not a natural person. This includes the following:]

- individuals with an "interest" ownership or control of more than 10% of the profits or assets of a business entity or 10% of the stock in the case of a business entity that is a corporation for profit
- all principals, partners, officers, or directors of the business entity or their spouses
- any subsidiaries directly or indirectly controlled by the business entity
- IRS Code Section 527 New Jersey based organizations, directly or indirectly controlled by the business entity and filing as continuing political committees, (PACs).

When the business entity is a natural person, "a contribution by that person's spouse or child, residing therewith, shall be deemed to be a contribution by the business entity." [N.J.S.A. 19:44A-20.26(b)]. The contributor must be listed on the disclosure. Any business entity that fails to comply with the disclosure provisions shall be subject to a fine imposed by ELEC in an amount to be determined by the Commission which may be based upon the amount that the business entity failed to report. The enclosed list of agencies is provided to assist the contractor in identifying those public agencies whose elected official and/or candidate campaign committees are affected by the disclosure requirement. It is the contractor's responsibility to identify the specific committees to which contributions may have been made and need to be disclosed. The disclosed information may exceed the minimum requirement. The enclosed form, a content-consistent facsimile, or an electronic data file containing the required details (along with a signed cover sheet) may be used as the contractor's submission and is disclosable to the public under the Open Public Records Act.

The contractor must also complete the attached Stockholder Disclosure Certification. This will assist the agency in meeting its obligations under the law. **NOTE: This section does not apply to Board of Education contracts.**

N.J.S.A. 19:44A-3(s): “The term "legislative leadership committee" means a committee established, authorized to be established, or designated by the President of the Senate, the Minority Leader of the Senate, the Speaker of the General Assembly or the Minority Leader of the General Assembly pursuant to section 16 of P.L.1993, c.65 (C.19:44A-10.1) for the purpose of receiving contributions and making expenditures.”

P.L. 2005, c.271

(Unofficial version, Assembly Committee Substitute to A-3013, First Reprint*)

AN ACT authorizing units of local government to impose limits on political contributions by contractors and supplementing Title 40A of the New Jersey Statutes and Title 19 of the Revised Statutes.

BE IT ENACTED by the Senate and General Assembly of the State of New Jersey:

40A:11-51 1. a. A county, municipality, independent authority, board of education, or fire district is hereby authorized to establish by ordinance, resolution or regulation, as may be appropriate, measures limiting the awarding of public contracts therefrom to business entities that have made a contribution pursuant to P.L.1973, c.83 (C.19:44A-l et seq.) and limiting the contributions that the holders of a contract can make during the term of a contract, notwithstanding the provisions and parameters of sections 1 through 12 of P.L.2004, c.19 (C. 19:44A-20.2 et al.) and section 22 of P.L.1973, c.83 (C.19:44A-22).

b. The provisions of P.L.2004, c.19 shall not be construed to supersede or preempt any ordinance, resolution or regulation of a unit of local government that limits political contributions by business entities performing or seeking to perform government contracts. Any ordinance, resolution or regulation in effect on the effective date of P.L.2004, c.19 shall remain in effect and those adopted after that effective date shall be valid and enforceable.

c. An ordinance, resolution or regulation adopted or promulgated as provided in this section shall be filed with the Secretary of State.

52:34-25 2. a. Not later than 10 days prior to entering into any contract having an anticipated value in excess of $17,500, except for a contract that is required by law to be publicly advertised for Bids, a State agency, county, municipality, independent authority, board of education, or fire district shall require any business entity bid thereon or negotiating therefor, to submit along with its Bid or price quote, a list of political contributions as set forth in this subsection that are reportable by the recipient pursuant to the provisions of P.L.1973, c.83 (C.19:44A-l et seq.) and that were made by the business entity during the preceding 12 month period, along with the date and amount of each contribution and the name of the recipient of each contribution. A business entity contracting with a State agency shall disclose contributions to any State, county, or municipal committee of a political party, legislative leadership committee, candidate committee of a candidate for, or holder of, a State elective office, or any continuing political committee. A business entity contracting with a county, municipality, independent authority, other than an independent authority that is a State agency, board of education, or fire district shall disclose contributions to: any State, county, or municipal committee of a political party; any legislative leadership committee; or any candidate committee of a candidate for, or holder of, an elective office of that public entity, of that county in which that public entity is located, of another public entity within that county, or of a legislative district in which that public entity is located or, when the public entity is a county, of any legislative district which includes all or part of the county, or any continuing political committee.

The provisions of this section shall not apply to a contract when a public emergency requires the immediate delivery of goods or services.

P.L. 2005,c271 (cont.)

b. When a business entity is a natural person, a contribution by that person's spouse or child, residing therewith, shall be deemed to be a contribution by the business entity. When a business entity is other than a natural person, a contribution by any person or other business entity having an interest therein shall be deemed to be a contribution by the business entity. When a business entity is other than a natural person, a contribution by: all principals, partners, officers, or directors of the business entity or their spouses; any subsidiaries directly or indirectly controlled by the business entity; or any political organization organized under section 527 of the Internal Revenue Code that is directly or indirectly controlled by the business entity, other than a candidate committee, election fund, or political party committee, shall be deemed to be a contribution by the business entity.

c. As used in this section:
"business entity" means a natural or legal person, business corporation, professional services corporation, limited liability company, partnership, limited partnership, business trust, association or any other legal commercial entity organized under the laws of this State or of any other state or foreign jurisdiction;

"interest" means the ownership or control of more than 10% of the profits or assets of a business entity or 10% of the stock in the case of a business entity that is a corporation for profit, as appropriate; and

"State agency" means any of the principal departments in the Executive Branch of the State Government, and any division, board, bureau, office, commission or other instrumentality within or created by such department, the Legislature of the State and any office, board, bureau or commission within or created by the Legislative Branch, and any independent State authority, commission, instrumentality or agency.

d. Any business entity that fails to comply with the provisions of this section shall be subject to a fine imposed by the New Jersey Election Law Enforcement Commission in an amount to be determined by the commission which may be based upon the amount that the business entity failed to report.

19:44A-20.13
3. a. Any business entity making a contribution of money or any other thing of value, including an in-kind contribution, or pledge to make a contribution of any kind to a candidate for or the holder of any public office having ultimate responsibility for the awarding of public contracts, or to a political party committee, legislative leadership committee, political committee or continuing political committee, which has received in any calendar year $50,000 or more in the aggregate through agreements or contracts with a public entity, shall file an annual disclosure statement with the New Jersey Election Law Enforcement Commission, established pursuant to section 5 of P.L.1973, c.83 (C.19:44A-5), setting forth all such contributions made by the business entity during the 12 months prior to the reporting deadline.

3. b. The commission shall prescribe forms and procedures for the reporting required in subsection a. of this section which shall include, but not be limited to:

(1) the name and mailing address of the business entity making the contribution, and the amount contributed during the 12 months prior to the reporting deadline;

(2) the name of the candidate for or the holder of any public office having ultimate responsibility for the awarding of public contracts, candidate committee, joint candidates committee, political party committee, legislative leadership committee, political committee or continuing political committee receiving the contribution; and

(3) the amount of money the business entity received from the public entity through contract or agreement, the dates, and information identifying each contract or agreement and describing the goods, services or equipment provided or property sold.

P.L. 2005,c271 (cont.)

3. c. The commission shall maintain a list of such reports for public inspection both at its office and through its Internet site.

3. d. When a business entity is a natural person, a contribution by that person's spouse or child, residing therewith, shall be deemed to be a contribution by the business entity. When a business entity is other than a natural person, a contribution by any person or other business entity having an interest therein shall be deemed to be a contribution by the business entity. When a business entity is other than a natural person, a contribution by: all principals, partners, officers, or directors of the business entity, or their spouses; any subsidiaries directly or indirectly controlled by the business entity; or any political organization organized under section 527 of the Internal Revenue Code that is directly or indirectly controlled by the business entity, other than a candidate committee, election fund, or political party committee, shall be deemed to be a contribution by the business entity.

As used in this section:

"business entity" means a natural or legal person, business corporation, professional services corporation, limited liability company, partnership, limited partnership, business trust, association or any other legal commercial entity organized under the laws of this State or of any other state or foreign jurisdiction; and

"interest" means the ownership or control of more than 10% of the profits or assets of a business entity or 10% of the stock in the case of a business entity that is a corporation for profit, as appropriate.

3. e. Any business entity that fails to comply with the provisions of this section shall be subject to a fine imposed by the New Jersey Election Law Enforcement Commission in an amount to be determined by the commission which may be based upon the amount that the business entity failed to report.

4. This act shall take effect immediately.

* Note: Bold italicized statutory references of new sections are anticipated and not final as of the time this document was prepared. Statutory compilations of N.J.S.A. 18A:18A-51 is anticipated to show a reference to N.J.S.A. 40A:11-51 and to N.J.S.A. 52:34-25.

List of Agencies with Elected Officials Required for Political Contribution Disclosure
N.J.S.A. 19:44A-20.26

County Name: Atlantic

State: Governor, and Legislative Leadership Committees

Legislative District #s: 1, 2, & 9

State Senator and two members of the General Assembly per district.

County:

Commissioners	County Clerk	Sheriff
County Executive	Surrogate	

Municipalities (Mayor and members of governing body, regardless of title):

Absecon City	Estell Manor City	Mullica Township
Atlantic City	Folsom Borough	Northfield City
Brigantine City	Galloway Township	Pleasantville City
Buena Borough	Hamilton Township	Port Republic City
Buena Vista Township	Hammonton Town	Somers Point City
Corbin City	Linwood City	Ventnor City
Egg Harbor City	Longport Borough	Weymouth Township
Egg Harbor Township	Margate City	

Boards of Education (Members of the Board):

Absecon City	Folsom Borough	Mainland Regional
Atlantic City	Galloway Township	Mullica Township
Buena Regional	Greater Egg Harbor Regional	Northfield City
Egg Harbor City	Hamilton Township	Pleasantville City
Egg Harbor Township	Hammonton Town	Somers Point City
Estell Manor City	Longport	Weymouth Township

Fire Districts (Board of Fire Commissioners):

Buena Borough Fire District No. 1
Buena Borough Fire District No. 2
Buena Vista Township Fire District No. 1
Buena Vista Township Fire District No. 2
Buena Vista Township Fire District No. 3
Buena Vista Township Fire District No. 4
Buena Vista Township Fire District No. 5

Atlantic County Vocational School District
5080 Atlantic Avenue
Mays Landing, NJ 08330

CONTRACTORS QUESTIONAIRE/CERTIFICATION

ACIT: SOUTH WING ADMINISTRATIVE AREA ALTERATIONS

Name of Company _____

Street Address _____ P.O. Box_____ _____

City, State, Zip _____

Business Phone Number ( )_____Extension _____

Emergency Phone Number ( )_____

FAX NO. ( )_____ E-Mail _____

FEIN No. _____

Questionnaire

1. How many years have you been engaged in the contracting business under your present firm or trading name?

   _____ Years

2. Have you ever failed to complete any work awarded to your company?

   _____ Yes _____ No

   If yes, explain _____

3. Have you ever defaulted on a contract?

   _____ Yes _____ No

   If yes, explain _____

4. Have you or other principals of your company been debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in any public works projects by any federal, state, or local agencies, including any **"prior negative experience** "disqualification pursuant to N.J.S.A. 18A:18A-4 (b) (c)?

   _____ Yes _____ No

   If yes, explain _____

(Form continued on next page)

Experience – Educational Facilities:

The Board of Education requires evidence from all bidders that they have completed work or projects of a similar nature as outlined in the bid package. Bidders are to provide evidence of satisfactory completion of work of similar nature as outlined in the bid from three (3) Boards of Education in New Jersey within the past seven (7) years. Bidders are to complete the section on experience and provide supporting documentation with the bid package.

A. Title of Work/Project: _____

Name of School District: _____

Name of School Official: _____ Title _____

Phone Number _____ E-Mail _____

Date(s) of Project: _____

B. Title of Work/Project: _____

Name of School District: _____

Name of School Official: _____ Title _____

Phone Number _____ E-Mail _____

Date(s) of Project: _____

C. Title of Work/Project: _____

Name of School District: _____

Name of School Official: _____ Title _____

Phone Number _____ E-Mail _____

Date(s) of Project: _____

References

Architects - List names of architects three architects with whom you have worked with on projects Within the last five (5) years.

Firm	Principal	Phone Number
1.		
2.		
3.		

Bank--List name of principal bank with which your company does business.

Bank	Officer	Phone Number

(Form continued on next page)

Trade--List names of companies within your trade with which your company does business:

Firm	Principal	Phone Number
1.		
2.		
3.		

Certifications

Debarment

I certify that the entity listed on the form or any person employed by this entity, are not presently on the following:

New Jersey Department of Treasury – Consolidated Debarment Report
New Jersey Department of Labor – Prevailing Wage Debarment List
Federal Debarred Vendor List—System for Award Management (SAM.gov)

Direct/Indirect Interests

I declare and certify that no member of the Board of Education of the Special Services School District and the Vocational School District of the County of Atlantic, , nor any officer or employee or person whose salary is payable in whole or in part by said Board of Education or their immediate family members are directly or indirectly interested in this bid or in the supplies, materials, equipment, work or services to which it relates, or in any portion of profits thereof. If a situation so exists where a Board member, employee, officer of the board has an interest in the bid, etc., then please attach a letter of explanation to this document, duly signed by the president of the firm or company.

I certify that I am not an official or employee of the Board of Education of the Special Services School District and the Vocational School District of the County of Atlantic.

Gifts; Gratuities; Compensation

I declare and certify that no person from my firm, business, corporation, association or partnership offered or paid any fee, commission or compensation, or offered any gift, gratuity or other thing of value to any school official, board member or employee of the **Atlantic County Vocational School District.**

Vendor Contributions

I declare and certify that I fully understand N.J.A.C. 6A:23A-6.3(a) (1-4) concerning vendor contributions to school board members.

False Material Representation

I further certify that I understand that it is a crime in the second degree in New Jersey to knowingly make a material representation that is false in connection with the negotiation, award or performance of a government contract.

_____
President or Authorized Agent

_____
Signature

To be completed, signed and returned with Bid

Atlantic County Vocational School District
5080 Atlantic Avenue
Mays Landing, NJ 08330

CONTRACTOR'S REGISTRATION CERTIFICATION

ACIT: SOUTH WING ADMINISTRATIVE AREA ALTERATIONS

It is the determination of the Board of Education that this is a public works project that in total will exceed $2,000.00 (two thousand dollars), therefore pursuant to the Public Works Contractor Registration Act -- N.J.S.A. 34:11-56.48 et seq., no contractor shall bid on any project for public works unless the contractor is registered pursuant to the act.

I certify that our company understands that the project of the Board of Education requires that all contractors and subcontractors listed in this bid possess a valid Contractor Registration Certificate at the time the bid is received by the Board and furthermore certify that I will provide copies of the valid certificate prior to the award of contract.

Name of Company:_____

Authorized Agent:_____

***Authorized Signature*:**_____

To be completed, signed and returned with Bid

Atlantic County Vocational School District
5080 Atlantic Avenue
Mays Landing, NJ 08330

EQUIPMENT CERTIFICATION

In accordance with N.J.S.A. 18A:18A-23, I hereby certify that

A) _____ *(Name of Company)* owns all the necessary equipment as required by the specifications and to complete the specified public work project.

or

B) _____ *(Name of Company)* leases or controls all the necessary equipment as required by the specifications and to complete the specified public work project.

PLEASE NOTE: If your company is not the actual owner of the equipment, **you shall submit with the bid**

1. A certificate stating the source from which the equipment will be obtained and
2. Obtain and submit with the bid a certificate from the owner and person in control of the equipment, definitely granting to the bidder the control of the equipment required during such time it may be necessary for the completion of that portion of the contract for which said equipment will be necessary.

*Name of Company*_____

*Address*_____

City, State, Zip _____

Authorized Agent _____ *Title* _____

_____

Signature

To be completed, signed and returned with Bid

STATE OF NEW JERSEY – DIVISION OF PURCHASE AND PROPERTY

DISCLOSURE OF INVESTMENT ACTIVITIES IN IRAN

Solicitation Number: _____ Respondent/Offeror_____

PART 1: CERTIFICATION

RESPONDENTS MUST COMPLETE PART 1 BY CHECKING EITHER ONE
FAILURE TO CHECK ONE OF THE BOXES WILL RENDER THE PROPOSAL NON-RESPONSIVE

Pursuant to public Law 2012, c. 25, any person or entity that submits a bid or proposal or otherwise proposes to enter into or renew a contract must complete the certification below to attest, under penalty of perjury, that neither the person or entity, nor any of its parents, subsidiaries, or affiliates, is identified on the Department of Treasury's Chapter 25 list as a person or entity engaging in investment activities in Iran. The Chapter 25 list is found on the Division's website at http://www.state.nj.us/treasury/purchase/pdf/Chapter25Listpdf. Respondents must review this list prior to completing the below certification. Failure to complete the certification will render a respondent's proposal non-responsive. If the Director finds a person or entity to be in violation of law, s/he shall take action as may be appropriate and provided by law, rule or contract, including but not limited to, imposing sanctions, seeking compliance, recovering damages, declaring the party in default and seeking debarment or suspension of the party.

PLEASE CHECK THE APPROPRIATE BOX:

_____**I certify, pursuant to Public Law 2012, c. 25, that neither the respondent listed above nor any of the respondent's parents,** prohibited activities in Iran pursuant to P.L. 2012, c. 25 ("Chapter 25 List"). I further certify that I am the person listed above, or I am an officer or representative of the entity listed above and authorized to make this certification on its behalf. I will skip Part 2 and sign and complete the Certification below.

OR

_____**I am unable to certify as above because the respondent and/or one or more of its parents, subsidiaries, or affiliates is listed on the Department's Chapter 25 list. I will provide a detailed, accurate and precise description of the activities in Part 2 below and sign and complete the Certification below.** Failure to provide such will result in the proposal being rendered as non-responsive and appropriate penalties, fines and/or sanctions will be assessed as provided by law.

PART 2: PLEASE PROVIDE FURTHER INFORMATION RELATED TO INVESTMENT ACTIVITIES IN IRAN –

You must provide a detailed, accurate and precise description of the activities of the bidding person/entity, or one of its parents, subsidiaries or affiliates, engaging in the investment activities in Iran outlined above by completing the box below.

PLEASE PROVIDE THOROUGH ANSWERS TO EACH QUESTION

Name: _____ Relationship to Respondent/Offeror _____

Description of Activities_____

Duration of Engagement _____ Anticipated Cessation Date _____

Respondent/Offeror Contact Name _____ Contact Phone Number _____

Certification: I, being duly sworn upon my oath, hereby represent and state that the foregoing information and any attachments thereto to the best of my knowledge are true and complete. I attest that I am authorized to execute this certification on behalf of the above-referenced person or entity. I acknowledge that the State of New Jersey is relying on the information contained herein and thereby acknowledge that I am under a continuing obligation from the date of this certification through the

completion of any contracts with the State to notify the State in writing of any changes to the answers of information contained herein. I acknowledge that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I recognize that I am subject to criminal prosecution under the law and that it will also constitute a material breach of my agreement(s) with the State of New Jersey and the State at its option may declare any contract(s) resulting from this certification void and unenforceable.

Full Name (Print):_____

Signature _____

Title: _____

Date: _____

Name of Company: _____

City/State/Zip: _____

DDP Standard Forms Packet (11/2013)

To be completed, signed and returned with Bid

NON-COLLUSION AFFIDAVIT

ACIT: SOUTH WING ADMINISTRATIVE AREA ALTERATIONS

STATE OF _____
:ss:
COUNTY OF _____

I, _____ of the City of _____

in the County of _____ and the State of _____

of full age, being duly sworn according to law on my oath depose and say that:

I am_____(Position in Company)

of the firm of _____ and the bidder making the bid for the above names contract, and that I executed the said bid with full authority so to do; that I have not, directly or indirectly, entered into any agreement, participated in any collusion, discussed any or all parts of this bid with any potential bidder, or otherwise taken any action in restraint of free, competitive bidding in connection with the above named bid, and that all statements contained in said bid and in this affidavit are true and correct, and made with full knowledge that the **Atlantic County Vocational School District** relies upon the truth of the statements contained in said bid and in the statements contained in this affidavit in awarding the contract for the said bid.

I further warrant that no person or selling agency has been employed or retained to solicit or secure such contract upon an agreement or understanding for a commission, percentage, brokerage or contingent fee, except bona fide employees of bona fide established commercial or selling agencies maintained by

_____
(Print Name of Contractor)

Subscribed and sworn to: _____
(**SIGNATURE OF CONTRACTOR**)

before me this _____ day of _____, _____.
Month Year

_____ _____
NOTARY PUBLIC SIGNATURE Print Name of Notary Public

My commission expires _____ _____, _____. - Seal -
Month Day Year

To be completed, signed and returned with Bid

NO MATERIAL CHANGE OF CIRCUMSTANCES

ACIT: SOUTH WING ADMINISTRATIVE AREA ALTERATIONS

TO: All Bidders

The below affidavit must be submitted with your bid for projects over $20,000.00 pursuant to N.J.S.A. 18A:18A-32:

STATE OF _____)
):SS:
COUNTY OF _____)

I, _____of the City of _____

in the County of _____and the State of _____

of full age, being duly sworn according to law on my oath depose and say that:

No Material Adverse change in Qualification—N.J.S.A. 18A:18A-32

I am_____(*Position in Company*), and the bidder for
the above named project and the answers to the following statements are true and correct and that there has been no material adverse change in the qualification information subsequent to the latest statement submitted as
required (N.J.S.A. 18A:18A-32 et seq.) as amended, except as set forth herewith:

_____*(Name of Company)* is classified by the State of New
Jersey under Chapter 105, Laws of 1962, as amended. This Classification became effective_____*(Date)*

Type of Contract/Trade Classified: _____

Approved Amount $ _____

A copy of my valid and active prequalification/classification certificate from the Department of Treasury, Division of Property Management and Construction is attached.

The total amount of uncompleted work on contracts is $ _____

_____

Signature of Authorized Representative CORPORATE SEAL:

_____

Name and Title

NOTARY SEAL:

Sworn and subscribed to before me this _____ day of _____ in the Year _____.

_____ _____ Notary Public of _____

Signature of Notary Print Name of Notary

My Commission Expires:_____ _____ _____

Month Day Year

This affidavit does not take the place of the "Notice of Classification" or the "Total Amount of Uncompleted Contracts" issued by the State of New Jersey, both of which must be submitted with each bidders bid.

To be completed, signed and returned with Bid

PREVAILING WAGES CERTIFICATION

It is the determination of the Board of Education that this is a public works project that in total will exceed $2,000.00 (two thousand dollars), therefore prevailing wages rules and regulations apply as promulgated by the New Jersey Prevailing Wage Act and in conformance with N.J.S.A. 34:11-56:25.

CERTIFICATION

1. I certify that our company understands that this project of the Board of Education requires prevailing wages to be paid in full accordance with the law.

2. I further certify that all subcontractors named in this bid understand that this project requires the subcontractor to pay prevailing wages in full accordance with the law.

NOTIFICATION OF VIOLATIONS – New Jersey Department of Labor

Has the bidder or any person having an "interest" with the bidder, been notified by the New Jersey Department of Labor by notice issued pursuant to N.J.S.A. 34:11-56:37 that he/she has been in violation for failure to pay prevailing wages as required by the New Jersey Prevailing Wage Act within the last five (5) years?

* Yes _____ No _____

*If yes, please attach a signed document explaining any/or all administrative proceedings with the NJDOL within the last five (5) years.

Please include any pending administrative proceedings with the NJ Department of Labor, if any.

Name of Company_____

Authorized Agent_____

Authorized Signature_____

To be completed, signed and returned with Bid

STOCKHOLDER/PARTNERSHIP DISCLOSURE AND STATEMENT OF OWNERSHIP

ACIT: SOUTH WING ADMINISTRATIVE AREA ALTERATIONS

Please check one type of Ownership, complete the form, and execute where provided

_____ Corporation	_____ Limited Partnership
_____ Partnership	_____ Limited Liability Corp.
_____ Sole Proprietorship	_____ Limited Liability Partnership
_____ Sub Chapter S Corp	_____ Other:_____

No corporation "or partnership" shall be awarded any contract nor shall any agreement be entered into for the performance of any work or the furnishing of any material or supplies, the cost of which is to be paid with or out of any public funds, by the State or any county, municipality or school district, or any subsidiary or agency of the State, or by an authority, board or commission which exercises governmental functions, unless prior to the receipt of the bid or accompanying the bid of said corporation or said partnership, there is submitted a statement setting forth the names and all individual partners in the partnership who own a 10% or greater interest therein, as the case may be." If one or more such stockholder "or partner" is itself a corporation "or partnership", the stockholder holding 10% or more of that corporation "or partnership" the individual partners owning 10% or greater interest in that partnership, as the case may be, shall also be listed. The disclosure shall be, continued until names and addresses of every non-corporate stockholder, and individual partner, exceeding the 10% ownership criteria established in this act, has been listed.

IT IS MANDATORY THAT THIS FORM BE COMPLETED AND SUBMITTED WITH BID. In the event that there are no persons who own ten percent or more of the stock or ownership of the bidder, then such fact should be certified below as part of this disclosure.

Name of Company _____
Address _____
City, State, Zip _____

List of Owners with Ten Percent (10%) or More Interest

Owner's Name	Home Address	Title/Office Held	Percent (%) of Partnership Shares Owned

NOTE: If you need more space than that provided above, please use an extra sheet for furnishing the above required information for any remaining persons or entities.

Signature _____ ***Date***_____

(Form continued on next page)

If your firm is not a corporation and/or partnership, please explain below how your firm is organized and include a list of the various principals.

Our firm, _____, is organized

Names of Principals	Title

Use additional paper if needed. Check here _____ if additional sheets are attached.

Name of Company: _____

Address: _____

City, State, Zip: _____

*Authorized Agent:*_____ *Title:*_____

_____

SIGNATURE OF AUTHORIZED AGENT

To be completed, signed and returned with Bid

SUBCONTRACTOR'S DISCLOSURE STATEMENT

ACIT: SOUTH WING ADMINISTRATIVE AREA ALTERATIONS

The _____ *(Name of Bidding Company)*

Please Check One _____ will sub-contract a portion of this project.
_____ will not sub-contract any portion of this project.

Authorized Agent _____ ***Title*** _____

Signature of Bidder _____ *Date*_____

If the bidder is not going to subcontract any portion of this project, the bidder need not complete any further part of this document.
If the bidder will subcontract any of the following:

- Plumbing/gas fitting work;
- Electrical work, tele-data, fire alarm or security systems.
- Refrigeration/heating/ventilating systems & equipment.
- Structural steel and ornamental ironwork.

the bidder must do the following:

- Identify the contract number and type of work he intends to subcontract;
- Provide the name, address and other pertinent information about the subcontractor;*
- If the cost of the work by the subcontractor shall exceed the amounts listed below, the bidder shall provide in the bid package submission the following documents:

SUBCONTRACTOR DOCUMENT SUBMISSIONS		
Estimated Value of Contract – Subcontractor	For Subcontractors in any of the four major branches listed above	For all other Subcontractors
	Submit With Bid	**Submit Within ten 10 Days of Receipt of Notice of Award**
$2,000 through $5,99	Contractor's Registration Certificate	
$6,000 through $17,499	Contractor's Registration Certificate New Jersey Business Registration Certificate	
$17,500 through $19,999	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form	
$20,000 or more	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form Notice of Classification Total Amount of Uncompleted Contracts -- Certified	

Please list subcontractor(s) on the following pages. Bidders may make extra copies of the following pages.
** Failure to identify the names and addresses of any subcontractors required to be named in the bid, or to submit the appropriate documents for each such subcontractor, may be cause for the bid to be rejected as being non-responsive.*

SUBCONTRACTOR'S DISCLOSURE STATEMENT

ACIT: SOUTH WING ADMINISTRATIVE AREA ALTERATIONS

2. Sub-Contractor for REFRIGERATION, HEATING & VENTILATING SYSTEMS AND EQUIPMENT

Name of Subcontracting Company _____

Address _____

City, State, Zip _____

Telephone _____ Fax _____

E-Mail _____ FEIN No:_____

Authorized Agent _____Title _____

Will the cost of sub-contract exceed $20,000.00?

_____ Yes Estimated Value of Contract $ _____

_____ No Estimated Value of Contract $ _____

If checked **yes**, the sub-contractor must be pre-qualified to perform the work. The bidder must provide in the bid package the following:

- The subcontractor's Notice of Classification;
- The subcontractor's Total Amount of Uncompleted Contracts; and
- Other documents that are required:

SUBCONTRACTOR DOCUMENT SUBMISSIONS		
Estimated Value of Contract – Subcontractor	For Subcontractors in any of the four major branches listed above	For all other Subcontractors
	Submit With Bid	**Submit Within ten 10 Days of Receipt of Notice of Award**
$2,000 through $5,999	Contractor's Registration Certificate	
$6,000 through $17,499	Contractor's Registration Certificate New Jersey Business Registration Certificate	
$17,500 through $19,999	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form	
$20,000 or more	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form Notice of Classification Total Amount of Uncompleted Contracts -- Certified	

Certification of Equipment

The _____hereby certifies the above named
Name of Bidding Company
subcontractor has the personnel, equipment, experience, financial and sufficient means to complete their portion of the contract in full accordance with the bid specifications.

_____ _____
Authorized Agent (Print) -- Bidder Signature of Authorized Agent—Bidder

SUBCONTRACTOR'S DISCLOSURE STATEMENT

ACIT: SOUTH WING ADMINISTRATIVE AREA ALTERATIONS

3. Sub-Contractor for ELECTRICAL WORK, TELE-DATA, FIRE ALARM and SECURITY SYSTEM

Name of Subcontracting Company _____

Address _____

City, State, Zip _____

Telephone _____ Fax _____

E-Mail _____ FEIN No:_____

Authorized Agent _____Title _____

Will the cost of sub-contract exceed $20,000.00?

_____ Yes Estimated Value of Contract $ _____

_____ No Estimated Value of Contract $ _____

If checked **yes**, the sub-contractor must be pre-qualified to perform the work. The bidder must provide in the bid package the following:

- The subcontractor's Notice of Classification;
- The subcontractor's Total Amount of Uncompleted Contracts; and
- Other documents that are required:

SUBCONTRACTOR DOCUMENT SUBMISSIONS		
Estimated Value of Contract – Subcontractor	For Subcontractors in any of the four major branches listed above	For all other Subcontractors
	Submit With Bid	**Submit Within ten 10 Days of Receipt of Notice of Award**
$2,000 through $5,999	Contractor's Registration Certificate	
$6,000 through $17,499	Contractor's Registration Certificate New Jersey Business Registration Certificate	
$17,500 through $19,999	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form	
$20,000 or more	Contractor's Registration Certificate New Jersey Business Registration Certificate Chapter 271 Political Contribution Disclosure Form Notice of Classification Total Amount of Uncompleted Contracts -- Certified	

Certification of Equipment

The _____hereby certifies the above named
Name of Bidding Company
subcontractor has the personnel, equipment, experience, financial and sufficient means to complete their portion of the contract in full accordance with the bid specifications.

_____ _____
Authorized Agent (Print) -- Bidder Signature of Authorized Agent—Bidder

CERTIFICATE OF SITE VISIT

ACIT: SOUTH WING ADMINISTRATIVE AREA ALTERATIONS

The undersigned hereby certifies that

(Person Inspecting Job Site)

inspected the job site for _____ on

(Company Name)

_____ and we are fully aware of any existing conditions and we are acquainted with the site.

(Date)

Bidder's Representative _____

Signature

District's Representative _____

Signature

Site visits can be arranged for all bidders. We ask anyone who wants to arrange for a site visit to please email **Mr. Chris Wagner at cwagner@acitech.org or call (609) 374-7463** to confirm an appointment.

APPENDIX A
AMERICANS WITH DISABILITIES ACT OF 1990
Equal Opportunity for Individuals with Disability

The contractor and the **Atlantic County Vocational School District** (hereafter "owner") do hereby agree that the provisions of Title 11 of the Americans With Disabilities Act of 1990 (the "Act") (42 U.S.C. S121 01 et seq.), which prohibits discrimination on the basis of disability by public entities in all services, programs, and activities provided or made available by public entities, and the rules and regulations promulgated pursuant there unto, are made a part of this contract. In providing any aid, benefit, or service on behalf of the owner pursuant to this Contract, the contractor agrees that the performance shall be in strict compliance with the Act. In the event that the Contractor, its agents, servants, employees, or subcontractors violate or are alleged to have violated the Act during the performance of this contract, the contractor shall defend the owner in any action or administrative proceeding commenced pursuant to this Act. The contractor shall indemnify, protect, and save harmless the owner, its agents, servants, and employees from and against any and all suits, claims, losses, demands, or damages, of whatever kind or nature arising out of or claimed to arise out of the alleged violation. The contractor shall, at its own Expense, appear, defend, and pay any and all charges for legal services and any and all costs and other expenses arising from such action or administrative proceeding or incurred in connection therewith. In any and all complaints brought pursuant to the owner's grievance procedure, the contractor agrees to abide by any decision of the owner which is rendered pursuant to said grievance procedure. If any action or administrative proceeding results in an award of damages against the owner, or if the owner incurs any expense to cure a violation of the ADA which has been brought pursuant to its grievance procedure, the contractor shall satisfy and discharge the same at its own expense.

The owner shall, as soon as practicable after a claim has been made against it, give written notice thereof to the contractor along with full and complete particulars of the claim, If any action or administrative proceeding is brought against the owner or any of its agents, servants, and employees, the *owner shall* expeditiously forward or have forwarded to the contractor every demand, complaint, notice, summons, pleading, or other process received by the owner or its representatives.

It is expressly agreed and understood that any approval by the owner of the services provided by the contractor pursuant to this contract will not relieve the contractor of the obligation to comply with the Act and to defend, indemnify, protect, and save harmless the owner pursuant to this paragraph.

It is further agreed and understood that the owner assumes no obligation to indemnify or save harmless the contractor, its agents, servants, employees and subcontractors for any claim which may arise out of their performance of this Agreement. Furthermore, the contractor expressly understands and agrees that the provisions of this indemnification clause shall in no way limit the contractor's obligations assumed in this Agreement, nor shall they be construed to relieve the contractor from any liability, nor preclude the owner from taking any other actions available to it under any other provisions of the Agreement or otherwise at law.

EXHIBIT B
MANDATORY EQUAL EMPLOYMENT OPPORTUNITY LANGUAGE
N.J.S.A. 10:5-31 et seq. (P.L. 1975, C. 127)
N.J.A.C. 17:27
CONSTRUCTION CONTRACTS

During the performance of this contract, the contractor agrees as follows:

The contractor or subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Except with respect to affectional or sexual orientation and gender identity or expression, the contractor will ensure that equal employment opportunity is afforded to such applicants in recruitment and employment, and that employees are treated during employment, without regard to their age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Such equal employment opportunity shall include, but not be limited to the following: employment, up−grading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Public Agency Compliance Officer setting forth provisions of this nondiscrimination clause.

The contractor or subcontractor, where applicable will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex.

The contractor or subcontractor will send to each labor union, with which it has a collective bargaining agreement, a notice, to be provided by the agency contracting officer, advising the labor union or workers' representative of the contractor's commitments under this act and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The contractor or subcontractor, where applicable, agrees to comply with any regulations promulgated by the Treasurer, pursuant to N.J.S.A. 10:5-31 et seq., as amended and supplemented from time to time and the Americans with Disabilities Act.

When hiring or scheduling workers in each construction trade, the contractor or subcontractor agrees to make good faith efforts to employ minority and women workers in each construction trade consistent with the targeted employment goal prescribed by N.J.A.C. 17:27−7.2; provided, however, that the Dept. of LWD, Construction EEO Monitoring Program may, in its discretion, exempt a contractor or subcontractor from compliance with the good faith procedures prescribed by the following provisions, A, B and C, as long as the Dept. of LWD, Construction EEO Monitoring Program is satisfied that the contractor or subcontractor is employing workers provided by a union which provides evidence, in accordance with standards prescribed by the Dept. of LWD, Construction EEO Monitoring Program, that its percentage of active "card carrying" members who are minority and women workers is equal to or greater than the targeted employment goal established in accordance with N.J.A.C. 17:27−7.2. The contractor or subcontractor agrees that a good faith effort shall include compliance with the following procedures:

(A) If the contractor or subcontractor has a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor shall, within three business days of the contract award, seek assurances from the union that it will cooperate with the contractor or subcontractor as it fulfills its affirmative action obligations under this contract and in accordance with the rules promulgated by the Treasurer pursuant to N.J.S.A. 10:5- 31 et. seq., as supplemented and amended from time to time and the Americans with Disabilities Act. If the contractor or subcontractor is unable to obtain said assurances from the construction trade union at least five business days prior to the commencement of construction work, the contractor or subcontractor agrees to afford equal employment opportunities minority and women workers directly, consistent with this chapter. If the contractor's or subcontractor's prior experience with a construction trade union, regardless of whether the union has provided said assurances, indicates a

significant possibility that the trade union will not refer sufficient minority and women workers consistent with affording equal employment opportunities as specified in this chapter, the contractor or subcontractor agrees to be prepared to provide such opportunities to minority and women workers directly, consistent with this chapter, by complying with the hiring or scheduling procedures prescribed under (B) below; and the contractor or subcontractor further agrees to take said action immediately if it determines that the union is not referring minority and women workers consistent with the equal employment opportunity goals set forth in this chapter.

(B) If good faith efforts to meet targeted employment goals have not or cannot be met for each construction trade by adhering to the procedures of (A) above, or if the contractor does not have a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor agrees to take the following actions:

(1) To notify the public agency compliance officer, the Dept. of LWD, Construction EEO Monitoring Program, and minority and women referral organizations listed by the Division pursuant to N.J.A.C. 17:27-5.3, of its workforce needs, and request referral of minority and women workers;

(2) To notify any minority and women workers who have been listed with it as awaiting available vacancies;

(3) Prior to commencement of work, to request that the local construction trade union refer minority and women workers to fill job openings, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade;

(4) To leave standing requests for additional referral to minority and women workers with the local construction trade union, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade, the State Training and Employment Service and other approved referral sources in the area;

(5) If it is necessary to lay off some of the workers in a given trade on the construction site, layoffs shall be conducted in compliance with the equal employment opportunity and non-discrimination standards set forth in this regulation, as well as with applicable Federal and State court decisions;

(6) To adhere to the following procedure when minority and women workers apply or are referred to the contractor or subcontractor:

(i) The contactor or subcontractor shall interview the referred minority or women worker.

(ii) If said individuals have never previously received any document or certification signifying a level of qualification lower than that required in order to perform the work of the construction trade, the contractor or subcontractor shall in good faith determine the qualifications of such individuals. The contractor or subcontractor shall hire or schedule those individuals who satisfy appropriate qualification standards in conformity with the equal employment opportunity and non-discrimination principles set forth in this chapter. However, a contractor or subcontractor shall determine that the individual at least possesses the requisite skills, and experience recognized by a union, apprentice program or a referral agency, provided the referral agency is acceptable to the Dept. of LWD, Construction EEO Monitoring Program. If necessary, the contractor or subcontractor shall hire or schedule minority and women workers who qualify as trainees pursuant to these rules. All of the requirements, however, are limited by the provisions of (C) below.

(iii) The name of any interested women or minority individual shall be maintained on a waiting list, and shall be considered for employment as described in (i) above, whenever vacancies occur. At the request of the Dept. of LWD, Construction EEO Monitoring Program, the contractor or subcontractor shall provide evidence of its good faith efforts to employ women and minorities from the list to fill vacancies.

(iv) If, for any reason, said contractor or subcontractor determines that a minority individual or a woman is not qualified or if the individual qualifies as an advanced trainee or apprentice, the contractor or subcontractor shall inform the individual in writing of the reasons for the determination, maintain a copy of the determination in its files, and send a copy to the public agency compliance officer and to the Dept. of LWD, Construction EEO Monitoring Program.

(7) To keep a complete and accurate record of all requests made for the referral of workers in any trade covered by the contract, on forms made available by the Dept. of LWD, Construction EEO Monitoring Program and submitted promptly to the Dept. of LWD, Construction EEO Monitoring Program upon request.

(C) The contractor or subcontractor agrees that nothing contained in (B) above shall preclude the contractor or subcontractor from complying with the union hiring hall or apprenticeship policies in any applicable collective bargaining agreement or union hiring hall arrangement, and, where required by custom or agreement, it shall send journeymen and trainees to the union for referral, or to the apprenticeship program for admission, pursuant to such agreement or arrangement. However, where the practices of a union or apprenticeship program will result in the exclusion of minorities and women or the failure to refer minorities and women consistent with the targeted county employment goal, the contractor or subcontractor shall consider for employment persons referred pursuant to (B) above without regard to such agreement or arrangement; provided further, however, that the contractor or subcontractor shall not be required to employ women and minority advanced trainees and trainees in numbers which result in the employment of advanced trainees and trainees as a percentage of the total workforce for the construction trade, which percentage significantly exceeds the apprentice to journey worker ratio specified in the applicable collective bargaining agreement, or in the absence of a collective bargaining agreement, exceeds the ratio established by practice in the area for said construction trade. Also, the contractor or subcontractor agrees that, in implementing the procedures of (B) above, it shall, where applicable, employ minority and women workers residing within the geographical jurisdiction of the union.

After notification of award, but prior to signing a construction contract, the contractor shall submit to the public agency compliance officer and the Dept. of LWD, Construction EEO Monitoring Program an initial project workforce report (Form AA 201) electronically provided to the public agency by the Dept. of LWD, Construction EEO Monitoring Program, through its website, for distribution to and completion by the contractor, in accordance with N.J.A.C. 17:27-7.

The contractor also agrees to submit a copy of the Monthly Project Workforce Report once a month thereafter for the duration of this contract to the Division and to the public agency compliance officer. The contractor agrees to cooperate with the public agency in the payment of budgeted funds, as is necessary, for on−the−job and/or off−the−job programs for outreach and training of minorities and women.

(D) The contractor and its subcontractors shall furnish such reports or other documents to the Dept. of LWD, Construction EEO Monitoring Program as may be requested by the Dept. of LWD, Construction EEO Monitoring Program from time to time in order to carry out the purposes of these regulations, and public agencies shall furnish such information as may be requested by the Dept. of LWD, Construction EEO Monitoring Program for conducting a compliance investigation pursuant to **Subchapter 10 of the Administrative Code (NJAC 17:27).**

(REVISED 4/10)

SECTION 010020 - FORMS

PART 1 GENERAL

1.1 BID FORMS

A. Refer to Bid Documents and Required Documentation section of these specifications.

1.2 FORMS TO BE SUBMITTED BY THE SUCCESSFUL BIDDER:

A. Refer to Bid Documents and Required Documentation section of these specifications.
B. Standard Form of Agreement Between Owner and Contractor (AIA Document A101).
C. Application & Certificate for Payment (AIA Document G702 and G703).

1.3 PROJECT CLOSE OUT FORMS:

A. Certificate of Substantial Completion (AIA Document G704).
B. Contractor's Affidavit of Payment of Debts and Claims (AIA Document G706).
C. Contractor's Affidavit of Release of Liens (AIA Document G706A).
D. Consent of Surety Company to Final Payment (AIA Document G707).

1.4 GENERAL CONDITIONS

A. The General Conditions of the Contract for Construction (A.I.A. Document A.201, Fourteenth Edition, dated 2017) as published by the American Institute of Architects are a part of the Contract Documents and shall apply to all Contractors, separate Contractors and/or Subcontractors.

END OF SECTION

SECTION 010030 - GENERAL CONDITIONS

PART 1 GENERAL

1.1 FORM OF CONTRACT

A. Contracts will be let on American Institute of Architect's Document A101, Standard Form of Agreement Between the Owner and the Contractor where the Basis of payment is a Stipulated sum, 2017 Edition. The Contractor shall also receive a purchase order from the district.

1.2 EXAMINATION OF SITE, DRAWINGS, ETC.:

A. Bidders shall also thoroughly examine and be familiar with the Drawings and Specifications. The failure or omission of any bidder to receive or examine any form, instrument or document, or to visit the site and acquaint himself with conditions there existing shall in no way relieve any bidder from obligation with respect to his bid. By submitting a bid, the bidder agrees and warrants that he has examined the site, the Drawings and Specifications and, where the Specifications require in any part of the work a given result to be produced, that the Specifications and Drawings are adequate and the required result can be produced under the Drawings and Specifications.

The bidder shall promptly report to the Owner and Architect any errors, omissions or inconsistencies in the specifications or drawings that the bidder considers to potentially affect performance of the work or the achievement of the project design results under the plans and specifications. No claim for any extra will be allowed because of alleged impossibilities in the production of the results specified or because of unintentional errors or conflicts in the Drawings and Specifications.

1.3 DRAWINGS AND SPECIFICATIONS:

A. The project shall be performed in accordance with the requirements of the Drawings and Specifications subject to modification as provided in General Conditions. The Drawings and Specifications are intended to complement and supplement each other.

B. Any work required by either of them and not by the other shall be performed even though omitted on others. Should any work be required which is not also denoted in the Specifications or on the Drawings because of an obvious omission, but which is, nevertheless, necessary for the proper completion of or performance of the project, such work shall be performed as fully as if it were described and delineated.

C. In the event of a conflict between the drawings, notes on the drawings and/or the specifications, please refer to the previous sections and to the General Conditions and Supplementary General Conditions.

1.4 SUBSTITUTIONS:

A. In the event a Contractor should propose a substitution for the specified equipment or materials, it shall be his responsibility to submit proof of equality, and to provide and pay for any tests which may be required by the Architect/Engineer in order to evaluate such proposed substitution.

B. Where any particular brand or manufactured article is specified, it shall be regarded as a standard. Similar products of other manufacturers, capable of equal performance and quality, in the opinion of the Architect/Engineer, will be accepted upon review and approval pursuant to NJSA 18A: 18A-15d.

C. The application for approval of a substitution by the Contractor shall include the following information:
   a. Identifying information shall be fully and completely furnished;
   b. Note whether the item is included in Specifications; in which case, identify the Specification paragraph and section;
   c. Attach data indicating in detail whether and how the substitution differs, if at all, from the article specified.
   d. If a credit is to be offered for the substitution, a detailed itemization of the amount of credit must be shown.
   e. If the proposed substitution involves a change in the scope of the Work of this or any other contractor or trade under the Contract Documents, then and in that event, the Contractor requesting approval undertakes and agrees to be responsible for any and all added costs and thereby involved by reason of the change in the work, the Work of other Contractors and trades, including redesign, if any;
   f. When requesting approval of an out-of-state Subcontractor or material manufacturer or supplier, a statement indicating that reasonable effort was first made to find and employ United States firms and/or materials, at comparable costs, term and performance capabilities pursuant to NJSA 18A: 18A-20.
   g. An agreement by the Contractor to submit proof of equality and to have such tests performed at the Contractor's own expense as may be required by the Contracting Officer or the Architect/Engineer;
   h. No Contractor shall base his bid on substitutions which may have been approved on previous projects or on substitutions anticipated but not approved. Bids shall be based solely on Plans and Specifications of the subject project.

D. Since substitutions are primarily for the financial benefit of the Contractor, a credit change order shall accompany each request for substitution

1.5 CONSTRUCTION PERMITS:

A. Bidders shall exclude from their proposal the cost of all permits, fees and licenses for the proper execution and completion of the work. These costs to be paid by Owner, if required.

B. Contractor shall be required to apply for and obtain all permits required for the construction and to perform all work in accordance with the State Uniform Construction Code as enhanced by rules and regulations of the NJ Department of Education, N.J.A.C. 6:22-5.1, et. seq. All construction shall be inspected as provided by law.

1.6 OCCUPANCY:

A. The Owner throughout the course of the project shall occupy the site. The Contractor shall at all times during the course of performance of the work take all precautions as to the safety and welfare of the occupants, staff, and visitors as well as coordinate all execution with the everyday working operations of the facility.

1.7 SITE ACCESS:

A. Access to the site for delivery of construction materials or equipment shall be made only from locations designated by Owner.

1.8 OBSERVANCE OF LAWS:

A. The Contractor shall observe and comply with all Federal, State and local laws that affect those engaged or employed in this project, the materials and/or the conduct of the work.

B. All such laws and/or ordinances affecting this Contract in any way shall be part of the Contract as if included herein.

C. The specifications, instructions to bidders, and all accompanying documents, including the bid and the contract as awarded, shall be construed to be in accordance with the laws of the State of New Jersey.

1.9 SPECIFICATIONS/JURISDICTIONAL ISSUES

A. The titles to the Divisions of these Specifications are introduced merely for convenience and are not necessarily a correct segregation of labor or materials. Such separations shall not operate to make the Architect an arbiter to establish limits between the General Contractor and Subcontractors.

B. The Contractor shall classify and allocate the furnishing of materials and the performance of work to the various trades in accordance with local customs, jurisdictional awards, regulations and decisions insofar as they are applicable.

C. The Contractor for General Construction and all subcontractors shall conduct all their operations on this project in such a manner that no jurisdictional disputes arise regarding unloading, handling, installations, and connections of the various items in the several trades involved.

1.10 INTERPRETATIONS

A. Should the Specification and/or Drawings disagree in themselves or with each other, the greater quality or quantity of work shall be provided.

B. Large scale details shall govern small scale Drawings.

C. Where the work is indicated in detail on only a portion of a drawing, this work shall apply to other like portions of the area of work. In like manner, finishes and building elements shown in a continuous manner on one or more elevations of a space shall be assumed to continue on other walls of that same room in the same fashion unless noted otherwise.

D. Information represented in a plan view as being similar to another area, also shown in plan view but accompanied by additional information: details, sections, elevations, etc., shall be deemed to be similarly represented by virtue of being depicted the same or similar, and such additional information shall be interpreted as being typical of any such spaces for the work of this Contract, whether specifically call out as “Similar”, “Opp. Hand” or no reference is given.

E. Should any work be necessary for the proper execution of the Specifications or Drawings, the Contractor shall perform all such work as if fully specified or indicated.

F. The Architects shall be advised in writing of all discrepancies, errors, conflicts and omissions in the specifications and Drawings. The Architect will promptly resolve the matter. Any work undertaken after the discrepancy has been discovered and prior to clarification by the Architects will be done at the Contractor’s risk.

G. The Architects shall decide as to the meaning or intention of any portion of the Specifications and Drawings. His decision shall be final.

H. Throughout the Specifications and Drawings, references are made to nominal, not actual, sizes of commercial materials. In all such cases, Contractor shall supply materials in their commercial sizes in accordance with recognized and accepted standards as intended. Only

if accurately dimensioned, or if particularly specified, will sizes other than usual commercial sizes be required.

I. Definitions:
1. "Typical" shall represent all such spaces, whether specifically cross-referenced or not.
2. "Opposite Hand" (opp. hand) shall mean similar but a mirror image.
3. "Similar to" (sim. to) shall mean that the detail is similar in most respects but may have minor variations in substrate, dimensions, offsets, etc. to account for slight variations from an established standard detail.

1.11 LONG LEAD ITEMS

A. Contractor shall submit a list of all materials, equipment or components which are anticipated to require more than one week delivery, together with scheduled ordering and delivery time table. This will be discussed and reviewed regularly at the job sit meetings. Upon request by the Architect, the Contractors shall be prepared to produce evidence of having placed orders for specific materials, equipment and components.

1.12 VOLATILE ORGANIC COMPOUNDS (VOC)

A. All material used on this Project shall comply with all applicable governmental and local VOC requirements.

1.13 TIME OF COMPLETION

A. Work, including the procurement of permits and processing of required submittals, shall be started within five (5) days of the date of the Notice to Proceed which is the date of the Owner-Contractor Agreement for this work unless otherwise agreed to by the Owner and Contractor or modified elsewhere in these specifications.

B. The date of substantial completion is defined as the date when construction is sufficiently completed, in accordance with the Contract Documents, as modified by any Change Order agreed to by the parties so that the Owner can occupy the project for the intended use and a Temporary Certificate of Occupancy is issued. Partial occupation of the project shall not be deemed to be substantially complete.

C. Time shall be of the essence of the performance of the Contract. The Contractor and the Owner agree, that the date of beginning and the time for completion as specified in the Contract of work to be done hereunder are essential conditions of this Contract and it is further mutually understood and agreed that the work embraced in this Contract shall be commenced on the date to be specified above or in a Notice to Proceed issued by Owner or Architect.

D. The Contractor agrees that said work shall be prosecuted regularly, diligently, and uninterruptedly at such rate of progress as will insure full completion thereof, by and between the Contractor and the Owner, that the time for the completion of the same, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

E. Contractor shall be required to request an extension of time for any delay under Article 8.3 - Delays and Extensions of Time in the manner set forth in the General Conditions.

1.14 GUARANTEE

A. The Contractor shall guarantee all materials and workmanship installed and/or performed under this Contract to be free of defects which may impair the strength, durability or appearance of said work and/or may make it unsuitable for the intended purpose, for a period of two (2) years from the date of final completion, unless otherwise noted in the other sections of this Specification.

B. The Contractor shall repair and/or replace any such work to the satisfaction of the Owner at no additional cost to the Owner.

C. This guarantee is in addition to and shall in no way limit any other warranty, guarantee or maintenance bond required by the provisions of the Contract Documents or any warranty of a manufacturer of supplier.

D. Contractor or manufacturers agree to provide in the closeout documents a manufacturer's warranty or warranties in the form attached to or provided for in this manual or better.

1.15 REGULATIONS

A. The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work as drawn and specified. If the Contractor observes that the Drawings and Specifications are at variance therewith, he shall promptly notify the Architect in writing and any necessary changes shall be adjusted as provided for in the Contract Documents. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Architect, he shall bear all costs arising therefrom.

1.16 SUSPENSION OF WORK / NO DAMAGES FOR DELAY:

A. Should the Owner be prevented or enjoined from proceeding with work or from authorizing its prosecution either before or after its prosecution, for any reason, the Contractor shall not be entitled to make or assert a claim for damage by reason of said delay, but time for completion of the work will be extended to such reasonable time as the Owner may determine will compensate for time lost by such delay with such determination to be set forth in writing.

1.17 ANTI-KICKBACK ACT

A. The parties to this contract will comply with the requirements of the Copeland "Anti-Kickback Act" (18 USC 374) and N.J.S.A. 2C:21-33, 27-4, 27-6, 22-9, N.J.S.A. 40A:9-22.1, N.J.S.A. 52: 13D-21, 34-48 and N.J.S.A. 56:9-11.

1.18 SAFETY PRECAUTIONS AND PROGRAMS

A. Neither the Owner nor the Architect will be responsible for providing a safe working place for the Contractors, their Subcontractors or their employees, or any individual responsible for the work.

B. Neither the professional activities of the Architect, nor the presence of the Architect or the Architect's employees and sub-consultants at a construction site, shall relieve the Contractor and any other entity of their obligations, duties, and responsibilities including, but not limited to, construction means, methods, sequences, techniques or procedures necessary for performing, superintending or coordinating all portions of the work of construction in accordance with the contract documents and any health or safety precautions required by

any regulatory agencies. The Architect and Architect's personnel have no authority to exercise any control over any connection with their work or any health or safety precautions. The Owner agrees that the Contractor is solely responsible for job site safety and warrants that this intent shall be made evident in the Owner's agreement with the Contractor. The Owner also agrees that the Owner, the Architect and the Architect's consultants shall be indemnified and shall be made additional insured under the Contractor's general liability insurance policy as otherwise provided herein.

1.19 SAFETY OF PERSONS AND PROPERTY

A. The Contractor shall conform to requirements of the Federal Occupational Safety and Health Act, and the Construction Safety Code. The requirements of the State, Local and Association Codes shall apply where they are equal to or more restrictive that the requirements of the Federal Act.

B. The Contractor will be responsible for providing general safeguarding, compliance with the requirements of laws, regulations and codes relating to safety and coordinating with all Contractors, subcontractors and material suppliers on the Project. Contractors and subcontractors shall comply with the Construction Safety Act, N.J.S.A. 34:5-166 et seq.

C. The Contractor shall protect all materials and equipment for which he is responsible, which is stored at the Project Site for incorporation in the work, or which has been incorporated into the work. He shall replace all such materials and equipment which may be lost, stolen or damaged at his expense, whether or not such materials or equipment have been entirely or partially paid for by the Owner.

D. Each Contractor shall submit Material Safety Data Sheets (MSDS) to the General Contractor for all material to be used on site and prior to material being sought on site. The General Contractor shall maintain Material Safety Data Sheets and make them available for inspection to everyone as required by law.

1.20 ASBESTOS

A. Any Contractor performing any type of renovation or construction in or around existing buildings must contact the Business Administrator of the School Board to be informed of the district's asbestos procedures.

B. Any Contractor disturbing or damaging any asbestos identified will be totally responsible for its legal repair and/or removal at no additional cost to the Owner and in conformance with OSHA 29 CFR 1926.5.

END OF SECTION

SECTION 010050 - ADMINISTRATIVE PROVISIONS

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

A. Regulatory Requirements.

B. Access to Site and Use of Premises.

C. Security Procedures.

D. Coordination.

E. Reference Standards.

F. Allowances

1.2 REGULATORY REQUIREMENTS

A. The following regulations are applicable to this project:
   1. International Building Code (Latest New Jersey Edition).
   2. Rehabilitation Subcode.

B. Other regulations may also be applicable.

1.3 ACCESS TO THE SITE AND USE OF THE PREMISES

A. The space available to the contractor for the performance of the work, either exclusively or in conjunction with others performing other construction as part of the project, is shown on the drawings.
   1. Other areas are off limits to all construction personnel.

B. The Owner will continue to occupy the existing building during the construction period.
   1. The Owner will endeavor to cooperate with the contractor's operations when the contractor has notified the owner in advance of need for changes in operations in order to accommodate construction operations.
   2. Conduct the work so as to cause the least interference with the Owner's operations.

C. Storage areas will be available on site.

D. All deliveries by the Contractors to be coordinated with the Owner, prior to the delivery date.

E. No material or equipment is to be sent directly to the school and such items will not be received by the Owner. All deliveries are to be to the construction site when appropriate contractor's representatives are available to accept delivery.

F. Limit use of premises to areas of construction. Do not disturb portions of the building beyond the areas indicated.

1.4 SECURITY PROCEDURES

A. Limit access to the site to persons involved in the work.

B. Provide secure storage for materials for which the owner has made payment and which are stored on site.

C. Secure completed work as required to prevent loss.

1.5 COORDINATION WITH OCCUPANTS

A. Occupied areas include all areas in which the Owner’s regular operations will be going on or to which the Owner requires access during the construction period, whether conducted by the Owner or the public.

B. Limit access through occupied areas to those days and time which the Owner approves.

C. Provide separated access from the exterior to the construction area, without passing through occupied area, unless coordinated with the owner in advance.

1.6 REFERENCE STANDARDS

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

B. The date of the standard is that in effect as of the Bid date, or date of Owner-Contractor Agreement when there are no bids, except when a specific date is specified.

1.7 ALLOWANCES

A. Include in the contract for construction, a stipulated sum of **Twenty thousand ($20,000.00) dollars** for use upon the Owner's instruction as a contingency allowance for incidental work not covered under the contract.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Coordination and project conditions.

B. Preconstruction meeting.

C. Progress meetings.

D. Pre-installation meetings.

1.2 RELATED SECTIONS

A. Division 1 - Project Coordination: Coordination with Owner/Architect.

1.3 COORDINATION AND PROJECT CONDITIONS

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.

B. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion.

1.4 PRECONSTRUCTION MEETING

A. Owner/Architect will schedule a meeting after Notice of Award.

B. Attendance Required: Owner, Architect and Prime Contractor.

C. Agenda:
1. Review Scope of Work.
2. Designation of personnel representing the parties in Contract and the Architect.
3. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
4. Scheduling.

1.5 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum bi-weekly intervals. Coordinate with Pre-Installation meeting referenced in this Section.

B. General Contractor will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

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

D. Agenda:
1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems which impede planned progress.

5. Review of submittals schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to Work.

E. General Contractor will record minutes and distribute copies within 2 days after meeting to participants, with 1 copy to Architect, Owner, participants, and those affected by decisions made.

1.6 PRE-INSTALLATION MEETING

A. When required in individual specification sections, convene a pre-installation meeting at the site prior to commencing work of the section. Mock-up/samples are to be finished prior to meeting.

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

C. Notify Architect one (1) day in advance of meeting date.

D. Prepare agenda and preside at meeting:
1. Review conditions of installation, preparation and installation procedures.
2. Review coordination with related work.
3. Review mock-up/samples.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 013000 - SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Procedures.

B. Schedule of Values.

C. Product Data.

D. Manufacturer's Instructions.

E. Shop Drawings.

F. Coordination of Submittals.

1.2 PROCEDURES

A. Deliver submittals to Architect at address listed on cover of Project Manual.

B. After Architect/Owner review of submittal, revise and resubmit as required, identifying changes made since previous submittal.

1.3 SCHEDULE OF VALUES

A. Submit typed schedule on AIA Form G703.

1.4 PRODUCT DATA

A. Mark each copy to identify applicable products, models, options, and other data; supplement manufacturer's standard data to provide information unique to the Work.

B. Submit the number of copies which Contractor requires, plus two copies which will be retained by Architect.

C. Submit Material Safety Data Sheets on all chemicals to be used on the project in triplicate to the Owner prior to using any chemicals on this project.

1.5 MANUFACTURER'S INSTRUCTIONS

A. When required in individual Specification Section, submit manufacturer's printed instructions for delivery, storage, assembly, installation, adjusting, and finishing, in quantities specified for product data.

1.6 SHOP DRAWINGS

A. Submit the number of opaque reproductions which Contractor requires, plus two copies which will be retained by Architect.

1.7 COORDINATION OF SUBMITTALS

A. Schedule of Submittals:
   1. Prepare and submit for approval a schedule showing the required dates of all required submittals.
   2. Organize the schedule by the applicable specification section number.

3. Submit Schedule of Submittals within ten (10) days after “Notice to Proceed”.
4. Revise and resubmit the schedule for approval when requested.

B. Contractor Review: Contractor to sign each copy of each submittal certifying compliance with the requirements of the contract document.

C. Notify the architect, in writing and at time of submittal, of all points upon which the submittal does not conform to the requirements of the contract documents, if any.

D. Submittals will be accepted from the contractor ONLY. Submittals received from other entities will be returned without review or action.

END OF SECTION

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

A. General Quality Control.

B. Workmanship.

C. Manufacturer's Instructions.

D. Manufacturer’s Certification.

E. Samples.

1.2 QUALITY CONTROL - GENERAL

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

1.3 WORKMANSHIP

A. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.

B. Perform work by persons qualified to produce workmanship of specified quality.

C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

1.4 MANUFACTURER'S INSTRUCTIONS

A. Comply with instructions in full detail, including each step in sequence. Should instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
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1.5 MANUFACTURERS' CERTIFICATES

A. When required by individual Specifications Section, submit manufacturer's certificate, in duplicate, that products meet or exceed specified requirements.

1.6 SAMPLES

A. Submit samples as specified. Samples are to be of same materials and finish as final product.

END OF SECTION

SECTION 015000 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

A. Temporary Utilities: Electricity, water and sanitary facilities.

B. Temporary Controls: Barriers and protection of the work.

C. Construction Facilities: Progress cleaning.

D. Security.

E. Employee Facilities.

1.2 RELATED SECTIONS

A. Section 017000 - Contract Closeout: Final Cleaning.

1.3 ENUMERATION OF TEMPORARY FACILITIES AND SERVICES

A. General Construction Work Contractor shall provide and pay for the following:
   1. Dust control services.
   2. Existing property protection.
   3. Public protective facilities required by law.
   4. Waste disposal service.

1.4 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas to allow for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations.

B. Contractor to provide secure storage for all materials and equipment when on site.

1.5 PROTECTION OF INSTALLED WORK

A. Protect installed work and project special protection where specified in individual specification Sections.

1.6 PROGRESS CLEANING

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

B. Remove waste materials, debris and rubbish from site periodically. Use of Owner's dumpsters and containers will not be permitted.

PART 2 PRODUCTS

2.1 TEMPORARY ELECTRICITY

A. Utilities:
   1. Electric:
      a. Obtain electric from existing building.
      b. Provide required cords, equipment, etc.

2. Water:
   a. Obtain from existing building.

2.3 EMPLOYEE FACILITIES

A. Toilet Facilities:
   1. School Toilet Facilities are not to be used unless it is approved by Owner.

B. Parking Facilities: Parking areas for all construction employees.
   1. Use designated areas identified by Owner.

END OF SECTION

SECTION 016000 - MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

A. Products.

B. Transportation and Handling.

C. Storage and Protection.

D. Product Options.

E. Product List.

F. Substitutions.

1.2 PRODUCTS

A. Products include material, equipment, and systems.

B. Comply with Specifications and referenced standards as minimum requirements.

C. Components required to be supplied in quantity within a Specification section shall be the same, and shall be interchangeable.

1.3 TRANSPORTATION AND HANDLING

A. Transport products by methods to avoid product damage; deliver in undamaged condition in manufacturer's unopened containers or packaging, dry.

B. Provide equipment and personnel to handle products by methods to prevent soiling or damage.

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

1.4 STORAGE AND PROTECTION

A. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions.

B. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged and are maintained under required conditions.

1.5 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards.

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

C. Products Specified by Naming Several Manufacturers: Products of named manufacturers meeting specifications: No options, no substitutions allowed.

D. Products Specified by Naming Only One Manufacturer: No options, no substitutions allowed.

1.6 PRODUCTS LIST

A. Within 7 days after date of Owner-Contractor Agreement, submit a complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

1.7 SUBSTITUTIONS

A. Only within 7 days after date of Owner-Contractor Agreement will Architect consider requests from Contractor for substitutions. Subsequently, substitutions will be considered only when a product becomes unavailable due to no fault of Contractor.

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

C. Request constitutes a representation that Contractor:
1. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.
2. Will provide the same warranty for substitution as for specified product.
3. Will coordinate installation and make other changes which may be required for Work to be complete in all respects.
4. Waives claims for additional costs which may subsequently become apparent.

D. 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 substantial revision of Contract Documents.

E. Architect/Engineer will determine acceptability of proposed substitution and will notify Contractor of acceptance or rejection in writing within a reasonable time.

F. Only one request for substitution will be considered for each product. When substitution is not accepted, provide specified product.

END OF SECTION

SECTION 017000 - CONTRACT CLOSEOUT

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

A. Closeout Procedures.

B. Final Cleaning.

C. Maintenance Materials.

D. Project Record Documents.

1.2 CLOSEOUT PROCEDURES

A. Comply with procedures stated in General Conditions of the Contract for issuance of Certificate of Substantial Completion.

B. Submit a final statement of accounting giving total adjusted Contract Sum, previous payments, and sum remaining due.

1.3 FINAL CLEANING

A. Execute prior to final inspection.

B. Clean surfaces exposed to view; remove stains and foreign substances.

C. Remove waste and surplus materials, rubbish, and construction facilities from the Project and from the site.

D. Clean site, sweep paved areas, rake clean all other surfaces affected by work.

1.4 MAINTENANCE MATERIALS

A. Provide products and maintenance materials in quantities specified in each Section, in addition to that used for construction of Work.

1.5 PROJECT RECORD DOCUMENTS

A. Maintain on site, one set of the following record documents; record actual revisions to the Work:
   1. Contract Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other Modifications to the Contract.
   5. Reviewed shop drawings, product data and samples.

B. Store Record Documents separate from those used for construction.

C. Record information concurrent with construction progress.

D. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and Modifications.

E. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   3. Field changes of dimension and detail.
   4. Details not on original Contract Drawings.

F. Delete Architect title block from all documents.

G. Submit documents to Architect with claim for final Application for Payment.

H. Submit as-built drawings for all trades; Two (2) copies.

I. Keep documents current; do not permanently conceal any work until required information has been recorded.

J. At Contract closeout, submit documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents, and signature of Contractor.

END OF SECTION

SECTION 024200 – MINOR DEMOLITION FOR REMODELING

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes:
1. Removal of designated building equipment and fixtures.
2. Removal of designated construction.
3. Removal of light fixtures, etc. and identification of utilities.
4. Coordinate items designated for relocation with Owner.
5. Removal of landscaping and decking.

B. Related Sections include the following:
1. Section 010050 - Administrative Provisions: Owner Occupancy.
2. Section 015000 - Temporary Controls: Temporary enclosures, security at Owner occupied areas and cleanup during construction.
3. Division 09 – Walls, Flooring and Finishes work.
4. Division 22, 23 and 26 - HVAC, Plumbing and Electrical work.

1.2 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 017000 - Contract Closeout.

B. Accurately record actual locations of capped utilities and surface obstructions.

1.3 REGULATORY REQUIREMENTS

A. Conform to applicable codes for demolition work, safety of structure, dust control, and disposal.

B. Obtain required permits from authorities.

C. Notify affected utility companies before starting work and comply with their requirements.

D. Do not disable or disrupt building fire or life safety systems without 3-day prior written notice to the Owner.

E. Conform to procedures applicable when discovering hazardous or contaminated materials.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PREPARATION

A. Provide, erect, and maintain temporary barriers at required locations.

B. Erect and maintain weatherproof closures for exterior openings.

C. Erect and maintain temporary partitions to prevent spread of dust, odors and noise to permit continued Owner occupancy, as specified in Section 015000 - Construction Facilities and Temporary Controls.

D. Protect existing materials and structures which are not to be demolished.

E. Prevent movement of structure; provide required bracing and shoring.

3.2 DEMOLITION REQUIREMENTS

A. Conduct demolition to minimize interference with adjacent and occupied building areas.

B. Cease operations immediately if structure appears to be in danger. Notify Architect. Do not resume operations until directed.

C. Cease operation immediately if the presence of asbestos is suspected. Notify Architect. Do no resume operation until directed.

D. Maintain protected egress and access to the Work.

3.3 DEMOLITION

A. Disconnect or remove and cap and identify designated utilities within demolition areas.

B. Demolish in an orderly and careful manner. Protect existing supporting structural members and materials which are to remain.

C. Except where noted otherwise, remove demolished materials from site. Do not burn or bury materials on site.

D. Remove demolished materials from site as work progresses. Upon completion of work, leave areas in clean condition.

E. Remove temporary work.

END OF SECTION

SECTION 032000 - CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Reinforcing steel bars, wire fabric and accessories for cast-in-place concrete.

1.2 RELATED SECTIONS

A. Section 033000 - Cast-in-Place Concrete.

1.3 REFERENCES

A. ACI 301 - Structural Concrete for Buildings.

B. ACI 318 - Building Code Requirements For Reinforced Concrete.

C. ACI SP-66 - American Concrete Institute - Detailing Manual.

D. ANSI/ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.

E. ANSI/AWS D1.4 - Structural Welding Code for Reinforcing Steel.

F. AWS D12.1 - Welding Reinforcement Steel, Metal Inserts and Connections in Reinforced Concrete Construction.

G. CRSI - Concrete Reinforcing Steel Institute - Manual of Practice.

H. CRSI 63 - Placing Reinforcing Bars.

1.4 SUBMITTALS

A. Submit under provisions of Division 1 - General Requirements.

B. Shop Drawings: Indicate bar sizes, spacings, locations, and quantities of reinforcing steel and wire fabric, bending and cutting schedules, and supporting and spacing devices.

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

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with CRSI - Manual of Standard Practice, ACI 301 and ACI 318.

1.6 COORDINATION

A. Coordinate work under provisions of Division 1 - General Requirements.

B. Coordinate with placement of formwork, formed openings and other Work.

PART 2 PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel: ASTM A615, 60 ksi; deformed billet steel bars, unfinished.

B. Welded Steel Wire Fabric: ASTM A185, in flat sheets or coiled rolls, unfinished.

C. Stirrup Steel: ANSI/ASTM A82, unfinished.

2.2 ACCESSORY MATERIALS

A. Tie Wire: Minimum 16 gage annealed type.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor barrier puncture.

2.3 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI Manual of Practice.

B. Locate reinforcing splices not indicated on drawings, at point of minimum stress. Review location of splices with Architect.

PART 3 EXECUTION

3.1 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Do not displace or damage vapor barrier.

C. Accommodate placement of formed openings.

D. Maintain minimum recommended concrete cover around reinforcing as required.

3.2 FIELD QUALITY CONTROL

A. Field inspection will be performed under provisions of Division 1 - General Requirements.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Infill of slabs-on-grade in areas of new construction.

B. Vapor barrier.

1.2 RELATED SECTIONS

A. Section 032000 - Concrete Reinforcement.

A. Section 079000 - Joint Sealers.

1.3 REFERENCES

A. ACI 301 - Structural Concrete for Buildings.

B. ACI 302 - Guide for Concrete Floor and Slab Construction.

C. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.

D. ACI 308 - Standard Practice for Curing Concrete.

E. ACI 318 - Building Code Requirements for Reinforced Concrete.

F. ASTM C33 - Concrete Aggregates.

G. ASTM C94 - Ready-Mixed Concrete.

H. ASTM C150 - Portland Cement.

I. ANSI/ASTM D994 - Preformed Expansion Joint Filler for Concrete (Bituminous Type).

1.4 SUBMITTALS

A. Product Data: Provide data on joint devices, attachment accessories and admixtures.

B. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent Work.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301, ACI 347 and ACI 318.

B. Acquire cement and aggregate from same source for all work.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

A. Cement: ASTM C150, Type I - Normal; Portland Type.

B. Fine and Coarse Aggregates: ASTM C33.

C. Lightweight Aggregate: ASTM C330.

D. Water: Clean and not detrimental to concrete.

2.2 ADMIXTURES

A. Air Entraining Admixtures: ASTM C260; certified by manufacturer to be compatible with other required admixtures.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. "Sika Aer", Sika Corporation.
      b. "MB-VR or MB-AE", Master Builders.
      c. "Darex AEA" or "Daravair", W.R. Grace.
      d. "Edoco 2001 or 2002", Edoco Technical Products.

B. Water Reducing Admixture: ASTM C494, Type A, and containing no chloride ions.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. "Eucon WR-75", Euclid Chemical Co.
      b. "Pozzolith Normal", Master Builders.
      c. "Plastocrete 160", Sika Chemical Corporation.
      d. "Chemtard", Chem-Masters Corporation.

C. High Range Water Reducing Admixture (Super Plasticizer): ASTM C494 Type F or Type G and containing no chloride ions.
   1. Products: Subject to compliance with the requirements, provide one of the following:
      a. "Eucon WR-75", Euclid Chemical Co.
      b. "Pozzolith Normal", Master Builder.
      c. "Plastocrete 160", Sika Chemical Corporation.
      d. "Chemtard", Chem-Masters Corporation.

D. Water-Reducing, Non-Chloride Accelerator Admixture: ASTM C494, Type E, and containing no chloride ions.
   1. Products: Subject to compliance with the requirements, provide one of the following:
      a. "Accelguard 80", Euclid Chemical Corporation.
      b. "Pozzolith High Early", Master Builders.

E. Water-Reducing, Retarding Admixture: ASTM C494, Type D, and containing no chloride ions.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. "Edoco 20006", Edoco Technical Products.
      b. "Pozzolith Retarder", Master Builders.
      c. "Eucon Retarder 75", Euclid Chemical Co.
      d. "Daratard", W.R. Grace.
      e. "Plastiment", Sika Chemical Corporation.

F. Prohibited Admixtures: Calcium chloride thyocyanates or admixtures containing chloride ions are not permitted.

2.3 ACCESSORIES

A. Bonding Compound: Polyvinyl Acetate or acrylic base.
1. Products: Subject to compliance with requirements, provide one of the following:
a. Polyvinyl Acetate (Interior Only):
"Euco Weld", Euclid Chemical Co.
"Weldcrete", Larsen Products Corporation.
b. Acrylic or Styrene Butadiene:
"J-40 Bonding Agent", Dayton Superior Corporation.
"Everbond", L & M Construction Chemicals.
"Hornweld", A.C. Horn, Inc.
"Sonocrete", Sonneborn-Rexnord.
"Acrylic Bondcrete", The Burke Co.
"SBR Latex", Euclid Chemical Co.
"Daraweld C", W.R. Grace.

B. Vapor Retarder: Provide vapor retarder to cover over prepared base material where indicated below slabs on grade. Use only materials which are resistant to decay when tested in accordance with ASTM E154, as follows:
1. Polyethylene sheet not less than 10 mils thick.

C. Non-Shrink Grout: CRD-621, factory premixed grout.
1. Products: Subject to compliance with the requirements, provide one of the following:
a. Non-metallic
"Masterflow 713", Master Builders.
"Sonogrout", Sonneborn-Contech.
"Euco-NS", Euclid Chemical Co.
"Crystex", L & M Construction Chemical Co.
"Sure Grip Grout", Dayton Superior Corporation.
"Horngrout", A.C. Horn

D. Cast in Concrete Anchors: ASTM A36; structural size and configuration suitable for application.

2.4 JOINT DEVICES AND FILLER MATERIALS

A. Joint Filler Type A: ASTM D1751; Asphalt impregnated fiberboard or felt, 1/4 inch thick; tongue and groove profile.

2.5 CONCRETE MIX

A. Prepare design mixes for each type and strength of concrete in accordance with ACI 301.
1. Compressive Strength:
28 days: 3,000 psi (foundations and slab-on-grade)

B. Submit written reports to the Architect of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by the Architect.

C. Design mixes shall provide strength and durability as required and as indicated on drawings and schedule. Use air entrained concrete for areas exposed to weather.

D. Mix design adjustments may be requested by the Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant at not additional cost to the Owner and as accepted by the Architect. Laboratory test data for

revised mix design and strength results must be submitted to and accepted by the Architect before using in work.

E. Provide maximum water-cement (WC) ratios for standard concrete as follows:
   1. Subjected to freezing and thawing WC 0.50.
   2. Subjected to deicers WC 0.45.
   3. Subjected to brackish water WC 0.40.

F. Proportion and design mixes for standard concrete to result in concrete slump at point of placement as follows:
   1. Ramps, slabs, and sloping surfaces: Not more than 3" prior to addition of superplasticizers.
   2. Other concrete: No less than 3" and not more than 6".

G. Mix and deliver concrete in accordance with ASTM C94, Alternative No. 1.

H. Vary mixing time to allow for effect of ambient temperature.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify site conditions.

B. Verify requirements for concrete cover over reinforcement.

C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

D. Verify lines, levels and centers before proceeding with form work. Ensure dimensions agree with drawings.

3.2 REINFORCEMENT

A. Place, support and secure reinforcement against displacement.

3.3 PLACING CONCRETE

A. Place concrete in accordance with ACI 304.

B. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.

C. Separate slabs on grade from vertical surfaces with 1/4 inch thick joint filler.

D. Place joint filler in floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

E. Extend joint filler from bottom of slab to within 1/4 inch of finished slab surface. Conform to Section 079000 for finish joint sealer requirements.

F. Apply sealants in joint devices in accordance with Section 079000.

G. Do not interrupt successive placement; do not permit cold joints to occur.

H. Screed floors and slabs on grade level, maintaining surface flatness of maximum 1/4 inch in 10 ft.

I. Install vapor retarder under interior slabs-on-grade. Lap joints minimum 6 inches and seal watertight by sealant applies between overlapping edges and ends.

J. Install joint devices in accordance with manufacturer's instructions.

3.4 CONCRETE FINISHING

A Finish concrete floor surfaces in accordance with ACI 301.

B. Steel trowel surfaces which are scheduled to be exposed.

3.5 CURING AND PROTECTION

A. Cure floor surfaces in accordance with ACI 308.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.6 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by the Architect/Engineer.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect/Engineer for each individual area.

END OF SECTION

SECTION 061000 – CARPENTRY WORK

PART 1 GENERAL

1.1 WORK INCLUDED

A. Rough and finish carpentry. Refer to Schedule located at the end of this Section.

B. Wood furring and grounds.

C. Concealed wood blocking for support of miscellaneous items.

D. Roof and Wall Sheathing.

E. T1-11 wood siding.

F. Building wrap.

G. Aluminum soffits.

1.2 RELATED WORK

A. Section 076200 – Sheet Metal Flashing and Trim: Aluminum wrapped wood fascias.

B. Section 092600 - Gypsum Board Systems: Installation of wood blocking for support of miscellaneous items.

1.3 REFERENCES

A. ALSC - American Lumber Standards Committee: Softwood Lumber Standards.

B. APA: American Plywood Association.

C. AWPA (American Wood Preservers Association) C1 - All Timber Products Preservative Treatment by Pressure Process.

D. NFPA: National Forest Products Association.

E. SPIB: Southern Pine Inspection Bureau.

F. WWPA: Western Wood Products Association.

1.4 QUALITY ASSURANCE

A. Rough Carpentry Lumber: Visible grade stamp, of agency certified by National Forest Products Association (NFPA).

B. Perform work in accordance with the following agencies:
   1. Lumber Grading Agency: Certified by ALSC.
   2. Plywood Grading Agency: Certified by APA.

PART 2 PRODUCTS

2.1 ROUGH CARPENTRY MATERIALS

A. Lumber: PS 20; graded in accordance with established Grading rules; maximum moisture content of 15% - 19%; of the following species and grades.
   1. Non-Structural Light Framing and Blocking: Stress Group C; standard grade.

2.2 ROOF SHEATHING

A. Plywood Roof Sheathing: Exterior, Structural 1 Sheathing.
   1. Span Rating: Not less than 40/20.
   2. Nominal Thickness: Not less than 5/8"; APA rated sheathing; exterior exposure durability – 1.

2.3 WALL SHEATHING

A. Plywood Wall Sheathing: exterior, Structural 1 Sheathing.
   1. Span Rating: Not less than 32/16.
   2. Nominal Thickness: Not less than 1/2"; APA rated sheathing; exterior exposure durability – 1.

2.4 ACCESSORIES

A. Fasteners and Anchors:
   1. Fasteners: Hot-dipped galvanized steel and stainless steel or better for high humidity and treated wood locations. The use of staples is not permitted.
   2. Anchors: Toggle bolt type for anchorage to hollow masonry and bolt or ballistic fastener for anchorages to steel.
   3. Nails and Brads: ASTM F1667.

2.5 FINISH CARPENTRY MATERIALS

A. T1-11 plywood panel siding.
   1. 5/8" thick; natural/rough sawn.
   2. 4' x 8' sheet size.
   3. Rated for exterior use.

2.6 BUILDING WRAP

A. Moisture Barrier: Tyvek CommercialWrap spunbonded olefin, non-woven, non-perforated as manufactured by DuPont.

B. Substitutes: Under provision of Division 1 – General Requirements.

2.7 ALUMINUM SOFFITS

A. Atas Wind-Lok soffit panel, vented Model No. MPR120.

B. 12" wide, .032" aluminum; smooth finish.

C. Substitutions: Under provisions of Division 1 – General Requirements.

PART 3 EXECUTION

3.1 FRAMING

A. Set structural and non-structural members level and plumb, in correct position.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.

B. Fastening Methods: Fasten panels as indicated below:
   1. Wall and Roof Sheathing:
      a. Nail to wood framing. Apply a continuous bead of glue to framing members at edges of wall sheathing panels.
      b. Screw to cold-formed metal framing.
      c. Space panels 1/8 inch apart at edges and ends.

C. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

D. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

E. Secure roof sheathing perpendicular to framing members with ends staggered and sheet ends over firm bearing.

F. Secure wall sheathing with long dimension perpendicular to wall framing, with ends over firm bearing and staggered.

G. Install moisture barrier in accordance with manufacturer's instructions. Seal joints and penetrations prior to installation of finish material.

H. Install soffit panels in accordance with manufacturer's instructions.

3.3 SCHEDULES

A. Rough Carpentry:
   1. Non-Structural Framing as applicable.
   2. Miscellaneous blocking for support of miscellaneous items.
   3. Plywood Roof Sheathing.
   4. Plywood Wall Sheathing.

B. Finish Carpentry:
   1. T1-11 plywood panel siding; natural/rough sawn; 5/8” thick; painted.
   2. Vented Aluminum Soffit; pre-finished; Kynar 500; color as selected by Architect.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Shop fabricated wood trusses for roof framing.

B. Bridging, bracing and anchorage.

C. Truss Identification Sign (See Drawings).

1.2 RELATED SECTIONS

A. Section 061000 - Carpentry Work: Framing and Sheathing.

B. Section 073113 - Fiberglass Asphalt Shingles.

1.3 REFERENCES

A. ALSC - American Lumber Standards Committee: Softwood Lumber Standards.

B. ASTM A446 - Steel Sheet, Zinc Coated Galvanized by the Hot-Dip Process, Structural Physical Quality.

C. NFPA: National Forest Products Association.

D. SPIB: Southern Pine Inspection Bureau.

E. TPI (Truss Plate Institute) BWT-76 - Bracing Wood Trusses.

F. TPI (Truss Plate Institute) HET-80 - Handling and Erecting Wood Trusses.

G. TPI (Truss Plate Institute) TPI-85 - Metal Plate Connected Wood Trusses.

H. TPI (Truss Plate Institute) QST-88 - Metal Plate Connected Wood Trusses.

I. WWPA: Western Wood Products Association.

1.4 SUBMITTALS

A. Shop Drawings: Indicate sizes and spacing of trusses, loads and truss cambers, framed openings submit design calculations. Provide 1/4" - 1'-0" scale drawing with truss layout.

B. Product Data: Provide truss configurations, bearing and anchor details, bridging, bracing and connectors.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with the following agencies:
   1. Lumber Grading Agency: Certified by ALSC.
   2. Plywood Grading Agency: Certified by APA.

B. Truss Design, Fabrication, and Installation: In accordance with Truss Plate Institute.

1.6 QUALIFICATIONS

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

B. Design trusses under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed at the place where the Project is located in the State of New Jersey.

1.7 REGULATORY REQUIREMENTS

A. Conform to applicable code for loads, seismic zoning and other governing load criteria.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to site under provisions of Section 01600.

B. Protect trusses from moisture, warpage and other distortion during transit and when stored.

C. Store trusses in vertical position resting on bearing ends.

1.9 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

PART 2 PRODUCTS

1.6 MANUFACTURERS - TRUSSES

A. Concord Truss Company.

2.2 MATERIALS

A. Lumber Grading Rules: NFPA and WWPA.

B. Steel Connectors: ASTM A446 steel, Grade A, hot dip galvanized; die stamped with integral teeth; .036 inch thick.

C. Truss Bridging: Type, size and spacing recommended by truss manufacturer.

D. Hurricane Ties: Galvanized, size and type recommended by truss manufacturer.

2.4 FABRICATION

A. Standard Trusses: Fabricate standard trusses to achieve structural requirements as follows:

1.	Top Chord Dead Load:	7 psf
2.	Bottom Chord Dead Load:	10 psf
3.	Top Chord Live Load:	30 psf
4.	Total Load:	47 psf

B. Brace wood trusses in accordance with TPI BWT-76.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that supports and openings are ready to receive trusses.

3.2 PREPARATION

A. Coordinate placement of bearing and support items.

3.3 ERECTION

A. Install trusses in accordance with manufacturer's instructions at a spacing of 24 inches o.c. unless otherwise noted.

B. Set members level and plumb, in correct position.

C. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure plumb, and in true alignment until completion of erection and installation of permanent bracing.

D. Install hurricane ties in accordance with manufacturer's instructions and as directed by truss manufacturer. Provide a minimum of one tie at each bearing point of each truss.

E. Do not field cut or alter structural members without approval of Architect.

F. Place headers and supports to frame openings required.

G. Frame openings between trusses with lumber in accordance with Section 061000.

H. Coordinate placement of decking with work of this section.

3.4 TOLERANCES

A. Framing Members: ½ inch maximum, from true position.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Thermal batt insulation in exterior wall and roof/ceiling construction.

B. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

C. Sound attenuating batt insulation in interior walls.

1.2 RELATED SECTIONS

A. Section 09260 - Gypsum Board Systems: Acoustic insulation.

1.3 REFERENCES

A. ASTM C665 - Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

B. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.

C. NFPA 255 - Test of Surface Burning Characteristics of Building Materials.

D. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.4 SYSTEM DESCRIPTION

A. Materials of This Section: Provide continuity of thermal barrier at building enclosure elements in conjunction with thermal insulating materials in Section 07212.

PART 2 PRODUCTS

2.1 MANUFACTURERS - INSULATION MATERIALS

A. Certain Teed Product: Kraft faced, thermal batt insulation.

B. Certain Teed Product: Unfaced sound attenuating batt insulation.

C. Certain Teed Product: FSK thermal batt insulation.

D. Certain Teed Product: Unfaced thermal batt insulation.

E. Substitutions: Under Provisions of Division 1.

2.2 MATERIALS

A. Thermal Batt Insulation: ASTM C665; preformed glass fiber batt roll type with kraft faced membrane one side; For use in concealed locations only in substantial contact with building finish.

B. Thermal Batt Insulation: ASTM C655; preformed glass fiber batt roll type with FSK-25 faced membrane one side; flame spread 25; smoke developed 50. For use when exposed to view in attic and walls when facing is not in contact with the unexposed surface of the ceiling, floor or wall finish.

C. Sound Attenuating Batt Insulation (Interior walls only): ASTM C665; preformed glass fiber batt roll type unfaced.

D. Nails or Staples: Steel wire; electroplated; type and size to suit application.

E. Tape: Mesh reinforced, 2 inch wide.

F. Wire Mesh: Galvanized steel, hexagonal wire mesh.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation are dry and ready to receive insulation.

B. Verify mechanical and electrical services within walls have been installed and tested.

3.2 INSTALLATION

A. Install insulation in accordance with insulation manufacturer's instructions.

B. Install in exterior walls and roof spaces without gaps or voids. Do not compress insulation.

C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation.

E. Install with factory applied vapor retarder membrane facing warm side of building spaces unless noted otherwise. Lap ends and side flanges of membrane over framing members.

F. Tape, seal butt ends, lapped flanges, and tears or cuts in membrane.

3.3 SCHEDULES

A. Exterior Walls: R-19, 6 inches thick; Kraft faced and FSK faced, 16" wide.

B. Roof/Trusses: R-38, 12 inches thick; FSK faced, 24” wide.

C. Interior Walls (Acoustical): 3½ inches thick; unfaced, 16" wide.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Class A fire rated and UL wind rated fiberglass asphalt shingles.

B. Ice dam protection, moisture shedding underlayment, eave, valley and ridge protection.

C. Ridge vents.

D. Associated metal flashings and accessories.

1.2 RELATED SECTIONS

A. Section 061000 - Carpentry: Plywood roof sheathing.

B. Section 076200 - Sheet Metal Flashing and Trim: Flashings.

C. Division 23 - Mechanical: Mechanical work projecting through roof.

1.3 REFERENCES

A. ASTM B209/B209M - Aluminum and Aluminum-Alloy Sheet and Plate.

B. ASTM D3018 - Class A Asphalt Shingles Surfaced with Mineral Granules.

C. ASTM D3462 - Asphalt Shingles Made From Glass Felt and Surfaced With Mineral Granules.

D. UL 580 - Tests for Wind Uplift Resistance of Roof Assemblies.

E. UL 790 - Tests for Fire Resistance of Roof Covering Materials.

1.4 SUBMITTALS FOR REVIEW

A. Samples: Submit two samples of each shingle color indicating color range and finish texture/pattern; for color selection.

1.5 SUBMITTALS FOR INFORMATION

A. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

B. Manufacturer’s Instructions: Indicate installation criteria and procedures for all products used.

PART 2 PRODUCTS

2.1 ASPHALT SHINGLES

A. Manufacturer:
   1. Tamko Heritage.
   2. Substitutions: Under provisions of Division 1 - General Requirements.

B. Fiberglass Asphalt Shingles: ASTM D3018, Class A with Type I - Self Sealing ASTM D3462; UL Rating of A and Wind Resistance Label, glass fiber mat base, asphalt, ceramic mineral granule surface type; self sealing type; limited lifetime warranty, color as selected by Architect.

2.2 ACCESSORIES

A. Nails: Standard round wire shingle type hot dipped zinc coated steel type, of sufficient length to penetrate through roof sheathing. 3/4 inch into roof sheathing.

B. Ridge Vents: Plastic, extruded with vent openings that do not permit direct water or weather entry. Size and profile to be GAF“Cobra” ridge vent or approved equal.

2.3 FLASHING MATERIALS

A. Sheet Flashings: ASTM B209/B209M; 0.03 inch thick aluminum; mill finish.

B. Nails: Standard round wire roofing type, hot dipped zinc coated steel; of sufficient length to penetrate through roof sheathing.

C. Ice and Water Barrier Membrane: Tamko Moisture Guard self-adhering waterproofing underlayment.

D. 15# Underlayment: Tamko No. 15 organic felt saturated with asphalt.

2.4 FLASHING FABRICATION

A. Form flashings to protect roofing materials from physical damage and shed water.

B. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.

C. Hem exposed edges of flashings.

D. Apply bituminous paint on concealed surfaces of flashings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that roof penetrations are in place and flashed to deck surface.

B. Verify roof openings are correctly framed.

C. Verify deck surfaces are dry, free of ridges, warps, or voids.

3.2 PREPARATION

A. Broom clean deck surfaces under eave protection and underlayment.

3.3 INSTALLATION - PROTECTIVE UNDERLAYMENT

A. Install #15 underlayment and ice and water barrier membrane in full accordance with manufacturer’s instructions.

3.4 INSTALLATION - VALLEY PROTECTION

A. Place ice and water barrier membrane in valley and where indicated on Drawings in full conformance with manufacturer’s instructions.

3.5 NSTALLATION - METAL FLASHING AND ACCESSORIES

A. Weather lap joints minimum 2 inches and seal weather tight with plastic cement.

B. Secure in place with nails as required. Conceal fastenings.

C. Flash and seal work weather tight, projecting through or mounted on roofing with plastic cement.

3.6 INSTALLATION - ASPHALT SHINGLES

A. Install shingles in accordance with manufacturer's instructions.

B. Place shingles in straight coursing pattern with 5 inch weather exposure to provide double thickness over entire roof.

C. Project first course of shingles 3/4 inch beyond fascia boards.

D. Extend shingles 1/2 inch beyond face of gable edge fascia boards.

E. Extend shingles on both slopes across valley in a weave pattern and fasten. Extend shingles a minimum of 12 inches beyond valley centerline to achieve woven valley, concealing the valley protection.

F. Cap hips and ridges with individual shingles, maintaining 5 inch weather exposure. Place to avoid exposed nails.

G. Coordinate installation of roof mounted components or work projecting through roof with weather tight placement of counter flashings.

H. Complete installation to provide weather tight service.

3.7 INSTALLATION - RIDGE VENT

A. Install continuous ridge vent, strip vent, end caps and cap shingles in accordance with manufacturer’s instructions.

3.8 PROTECTION OF FINISHED WORK

A. Protect unfinished work.

B, Do not permit traffic over finished roof surface.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Non-tapered insulation.

B. Membrane roofing, base flashings, roofing membrane and counter flashings.

1.2 RELATED SECTIONS

A. Section 061000 – Carpentry Work.

B. Section 061930 – Plate Connected Wood Trusses.

C. Section 076200 - Sheet Metal Flashing and Trim: Counter flashings and copings.

1.3 REFERENCES

A. ASTM C177 - Test Method for Steady-State Thermal Transmission Properties by Means of the Guarded Hot Plate.

B. ASTM C578 - Preformed, Cellular Polystyrene Thermal Insulation.

C. ASTM D412 - Rubber Properties in Tension.

D. ASTM D471 - Standard Test Method for Rubber Property - Effect of Liquids.

E. ASTM D624 - Rubber Property - Tear Resistance.

F. ASTM D746 - Brittleness Temperature of Plastics and Elastomeric by Impact.

G. ASTM D1004 - Initial Tear Resistance of Plastic Film and Sheeting.

H. ASTM E96 - Water Vapor Transmission of Materials.

I. FM 4470 (Factory Mutual Engineering Corporation) - Roof Assembly Classifications.

J. NRCA (National Roofing Contractors Association) - Roofing and Waterproofing Manual.

K. UL 790 - Fire Hazard Classifications.

1.4 SYSTEM DESCRIPTION

A. Elastomeric Sheet Membrane Conventional Roofing System: One ply membrane system with insulation, and adhesive applied membrane finish.

1.5 SUBMITTALS

A. Submit under provisions of Division 1 - General Requirements.

B. Product Data: Provide characteristics on membrane materials, flashing materials and insulation.

C. Shop Drawings: Indicate outline on roof and size, location and type of all penetrations, joint or termination detail conditions and conditions of interface with other materials.

D. Manufacturer's Installation Instructions: Indicate special precautions required for seaming the membrane.

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

F. Manufacturer's Field Reports: Submit under provisions of General Requirements.

G. Reports: Indicate procedures followed; ambient temperatures, humidity, wind velocity during application.

H. Final Shop Drawings shall be approved and assigned a number by Carlisle.

1.6 QUALITY ASSURANCE

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

B. Applicator: Company specializing in performing the work of this section with three years documented experience and approved by system manufacturer.

C. Perform Work in accordance with NRCA Roofing and Waterproofing Manual.

1.7 REGULATORY REQUIREMENTS

A. Conform to applicable code for roof assembly fire hazard requirements.

B. UL 790: Class A Fire Hazard Classification.

1.8 DELIVERY, STORAGE, AND PROTECTION

A. Division 1 - Material and Equipment: Transport, handle, store, and protect products.

B. Store products in weather protected environment, clear of ground and moisture.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Do not apply roofing membrane during inclement weather or at temperatures unacceptable to roofing manufacturer.

B. Do not apply roofing membrane to damp or frozen deck surface.

C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

1.10 COORDINATION

A. Coordinate work under provisions of Division 1 - General Requirements.

B. Coordinate the work with the installation of associated metal flashings, as the work of this section proceeds.

1.11 WARRANTY

A. Provide a fifteen (15) year total systems warranty under provisions of Division 1 - General Requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS - MEMBRANE MATERIAL

A. Firestone Building Products Company. Model - Adhered Rubbergard Roofing System.

B. Carlisle SynTec Systems. Model - Sure-Seal Adhered Roofing System.

C. Substitutions: Under provisions of Division 1.

2.2 MEMBRANE AND ASSOCIATED MATERIALS

A. Membrane: EPDM; reinforced, .060 inch thick, 240 inch wide roll; black color; conforming to the following criteria:

	Properties	Test	Results
1.	Tolerance on Nominal Thickness	ASTM D-751	±10%
2.	Breaking Strength	ASTM D-751A	90 lbf
3.	Elongation	ASTM D-412	250% minimum
4.	Tear Strength	ASTM D-751B	10 lbs. minimum
5.	Ozone Resistance	ASTM D-1149	No cracks
6.	Heat Aging	ASTM D-573	
7.	Brittleness Point	ASTM D-2137	-49° F
8.	Water Vapor Permeability	ASTM E-96	2.0 perm mils maximum

B. Seaming Materials: Splice tape as recommended by membrane manufacturer.

C. Washer Disc: Membrane material with adhesive backing.

2.3 ADHESIVE MATERIALS

A. Surface Conditioner: As recommended by membrane manufacturer, compatible with membrane.

B. Membrane Adhesives: As recommended by membrane manufacturer.

C. Insulation Adhesive: As recommended by insulation manufacturer, compatible with sheet membrane.

D. Thinner and Cleaner: As recommended by adhesive manufacturer, compatible with sheet membrane.

2.4 MANUFACTURERS

A. Manufacturers:

1. Firestone Building Products Company. Model - Firestone ISO 95+ GL (tapered and non-tapered).

2. Carlisle SynTec Systems. Model - Sure-Seal EPS.
3. Substitutions: Compatible with and acceptable by roofing manufacturer as required to maintain 15 year total systems warranty.

B. Insulation: Firestone ISO 95 +GL (Polyisocyanurate)

1.	Board Size	48 x 48 inch
2.	Board Thickness	1½ inch with ½" thick coverboard; 2" total minimum thickness
3.	Board Edges	square

C. Coverboard: Firestone ISOGARD HD Cover Board: ½" thick (may be laminated to standard ISO 95 +GL Polyisocyanurate insulation; Firestone ISOGARD HD composite board; 2" total thickness with non-tapered insulation installed underneath.

2.5 FLASHINGS

A. Flexible Flashings: Same material as membrane; black color; manufactured by roofing manufacturer.

B. Metal Flashings: Use the longest pieces of material practical. All flashings and terminations shall be done in accordance with applicable manufacturer's details.

C. Counterflashings: Metal, as specified in Section 076200.

2.6 FLASHING - OTHER PENETRATIONS

A. General: Flash all penetrations passing through the membrane with flashing according to the applicable manufacturer's details.

2.7 ACCESSORIES

A. Insulation Fasteners: Appropriate for purpose intended and approved by Factory Mutual and system manufacturer; length required for thickness of material with metal washers;manufactured by Carlisle SynTec Systems.

B. Sealants: As recommended by membrane manufacturer.

C. Provide preservative treated wood blocking as recommended by membrane manufacturer.

D. Termination Bar: Extruded aluminum as required to suit application.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify deck is supported and secure.

C. Verify deck is clean and smooth, free of depressions, waves, or projections, properly sloped to valleys or eaves.

D. Verify deck surfaces are dry and free of snow or ice.

E. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, and wood nailing strips are in place.

3.2 INSULATION APPLICATION

A. Mechanically fasten insulation to plywood roof sheathing in accordance with insulation manufacturer's instructions.

B. Place fasteners as recommended by manufacturer.

C. Minimum Total Insulation Thickness: 1½" with ½" thick coverboard; 2" total minimum thickness.

D. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.

E. Apply no more insulation than can be covered with membrane in same day.

3.3 MEMBRANE APPLICATION

A. Apply membrane and primer in accordance with manufacturer's instructions.

B. Apply adhesive at a rate recommended by manufacturer to mechanically attach discs.

C. Roll out membrane, free from air pockets, wrinkles, or tears. Firmly press sheet into place without stretching.

D. Bond sheet to substrate except those areas directly over or within 3 inches of a control or expansion joint.

E. Overlap edges and ends and seal by contact adhesive, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.

F. Shingle joints on sloped substrate in direction of drainage.

3.4 FLASHINGS AND ACCESSORIES

A. Apply flexible flashings to seal membrane to vertical elements.

B. Secure to nailing strips at 4 inches oc.

3.5 FIELD QUALITY CONTROL

A. Division 1 - General Requirements - Quality Assurance: Field inspection and testing.

B. Correct identified defects or irregularities.

3.6 CLEANING

A. Division 1 - General Requirements - Contract Closeout: Cleaning installed work.

B. In areas where finished surfaces are soiled by Work of this section, consult manufacturer of surfaces for cleaning advice and conform to their instructions.

C. Repair or replace defaced or disfigured finishes caused by Work of this section.

3.7 PROTECTION OF FINISHED WORK

A. Division 1 - General Requirements - Contract Closeout: Protecting installed work.

B. Protect building surfaces against damage from roofing work.

C. Where traffic must continue over finished roof membrane, protect surfaces.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Miscellaneous metal flashings.

B. Counterflashings over EPDM base flashings.

C. Counterflashings at roof mounted equipment and vent stacks.

D. Miscellaneous aluminum trim / aluminum wrapped wood fascias.

1.2 RELATED SECTIONS

A. Section 061000 – Carpentry Work.

B. Section 073113 – Asphalt Shingles.

C. Section 076310 - Gutters and Downspouts.

D. Section 079000 - Joint Sealers.

E. Division 15 - Mechanical: Roof curbs for mechanical equipment.

F. Division 15 - Mechanical: Flashing sleeves and collars for mechanical items through roofing membrane.

G. Division 16 - Electrical: Flashing sleeves and collars for electrical items through roofing membrane.

1.3 REFERENCES

A. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

B. NRCA (National Roofing Contractors Association) - Roofing Manual.

C. SMACNA (Architectural Sheet Metal Manual) - Fourth Edition, 1987.

1.4 SUBMITTALS

A. Submit under provisions of Division 1 - General Requirements.

Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA standard details and requirements.

B. Maintain one copy of each document on site.

1.6 QUALIFICATIONS

A. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 5 years documented experience.

1.7 DELIVERY, STORAGE, AND PROTECTION

A. Deliver, store, protect and handle products to site under provisions of Division 1 - General Requirements.

B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

C. Prevent contact with materials which may cause discoloration or staining.

1.8 COORDINATION

A. Coordinate work under provisions of Division 1 - General Requirements.

B. Coordinate with the work of Section 043000 for installing flashing reglets.

PART 2 PRODUCTS

2.1 SHEET MATERIALS

A. Aluminum Sheet for Concealed Applications: ASTM B209; 6063-T2 alloy, minimum .032 inch thick; mill finish.

B. Aluminum Sheet for Exposed Applications (Trim, Fascias, Drips, Copings, etc.): ASTM B209; 6063-T2 alloy, minimum .050 inch thick; fluoropolymer Kynar 500 finish; color as selected by Architect.

2.2 ACCESSORIES

A. Fasteners: Same material and finish as flashing metal with soft neoprene washers.

B. Underlayment: ASTM D226, No. 15 asphalt saturated roofing felt.

C. Slip Sheet: Rosin sized building paper.

D. Protective Backing Paint: Bituminous.

E. Sealant: Specified in Section 079000.

2.3 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Fabricate cleats of aluminum type sheet metal, same material as sheet, interlocking with sheet.

C. Form pieces in longest possible lengths.

D. Hem exposed edges on underside 1/2; miter and seam corners.

E. Form material with flat lock seams.

F. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.

G. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

2.4 BACK PAINT

A. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.2 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Install surface mounted reglets true to lines and levels. Seal top of reglets with sealant.

3.3 INSTALLATION

A. Conform to drawing details included in the SMACNA manual.

B. Insert flashings into reglets to form tight fit. Secure in place with lead wedges. Pack remaining spaces with lead wool. Seal flashings into reglets with sealant.

C. Apply plastic cement compound between metal flashings and felt flashings.

D. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

E. Seal metal joints watertight.

F. Apply bituminous protective backing on surfaces in contact with dissimilar materials.

3.4 FIELD QUALITY CONTROL

A. Field inspection will be performed under provisions of Division 1 - General Requirements.

B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Gutters.

B. Downspouts.

C. Concrete splashblocks.

D. Accessories.

1.2 RELATED SECTIONS

A. Section 075310 - Single Ply Roofing.

B. Section 079000 - Joint Sealants.

1.3 REFERENCES

A. SMACNA - Architectural Sheet Metal Manual.

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1.4 SUBMITTALS

A. Submit two (2) samples 4 x 6 inch in size illustrating metal finish color.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA standard details and requirements.

1.6 QUALIFICATIONS

A. Fabricator and Installer: Company specializing in sheet metal flashing work with 3 years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site.

B. Stack preformed and prefinished material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

C. Prevent contact with materials which may cause discoloration or staining.

1.8 COORDINATION

A. Coordinate the work with downspout discharge into downspout boot and PVC site drainage piping.

PART 2 PRODUCTS

2.1 ACCEPTABLE DOWNSPOUT MANUFACTURERS

A. Englert, Inc., Perth Amboy, NJ (908) 826-8614.

2.2 MATERIALS

A. Aluminum Sheet (Gutters & Downspouts): ASTM B209, aluminum alloy, smooth, Kynar 500; color as selected by Architect. (See schedule for thickness).

B. Splashblocks: Precast concrete type, minimum 3,000 psi at 21 days with minimum 5% air entrapment; 3" x 16" x 32".

2.3 ACCESSORIES

A. Fasteners: Manufacturer's standard type to suit application, stainless steel; any exposed fastener caps to be same color as adjacent material.

B. Protective Backing Paint: Bituminous.

C. Sealant: Manufacturer's standard type suitable for use with installation of system; non-staining; non-skinning.

D. Downspout Anchorage Devices: Type recommended by fabricator.

E. Downspout Supports: Brackets and Straps.

2.4 COMPONENTS

A. Gutters: See Schedule.

B. Downspouts: See Schedule; fabricate rectangular downspouts. Furnish with metal hangers, from same material as downpouts and anchors.

C. Accessories: Profiled to suit gutters and downspouts.

2.5 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Fabricate cleats of stainless steel sheet metal, interlockable with sheet.

C. Form pieces in longest possible lengths.

D. Hem exposed edges on underside 1/2 inch; miter and seam corners.

E. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.

F. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

G. Form flashings to protect roofing materials from physical damage and shed water.

H. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.

2.6 FINISH

A. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

2PART EXECUTION

2.1 INSTALLATION

A. Conform to drawing details included in the SMACNA manual.

B. Seal metal joints watertight.

C. Secure gutters and downspouts in place using concealed fasteners.

D. Weather lap joints minimum 2 inches and seal weathertight with plastic cement.

E. Terminate downspouts at concrete splashblocks or pipe underground into site drainage system.

2.2 SCHEDULE

	Location	Metal Type	Style	Thickness	Size	Finish
A.	Gutters	Pre-coated Aluminum	F	.050	6” wide x 4-3/4” deep	Kynar 500
B.	Downspouts	Pre-coated Aluminum	Plain Rectangular	.040	3-3/4” x 4-3/4”	Kynar 500

END OF SECTION

SECTION 078443 – JOINT FIRESTOPPING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Fireproof firestopping and firesafing materials and accessories.
2. Firesafing of penetrations in new and existing wall assemblies.

B. Related Sections:
1. Section 092600 – Gypsum Board Systems
2. Division 22 – Plumbing.
3. Division 23 – HVAC.
3. Division 26 – Electrical.

1.2 REFERENCES

A. American Society for Testing and Materials:
1. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
2. ASTM E119 - Method for Fire Tests of Building Construction and Materials.
3. ASTM E814 - Test Method of Fire Tests of Through Penetration Firestops.
4. ASTM E1966 - Test Method for Use in Joint Systems.

B. Factory Mutual: FM - Fire Hazard Classifications.

C. Underwriters Laboratories:
1. UL - Fire Hazard Classifications.
2. UL 263 - Fire Tests of Building Construction and Materials.
3. UL 723 - Test for Surface Burning Characteristics of Building Materials.
4. UL 1479 - Fire Tests of Through-Penetration Firestops.

D. Warnock Hersey: WH - Certification Listings.

1.3 DEFINITION

A. Firestopping (Firesafing): A sealing or stuffing material or assembly placed in spaces between building materials to arrest the movement of smoke, heat, gases, or fire through wall or floor openings.

1.4 SYSTEM DESCRIPTION

A. Firestopping Materials: ASTM E119 and ASTM E814 to achieve a fire rating as noted on Drawings.

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

1.5 SUBMITTALS

A. Submit under provisions of Division 1 - General Requirements: Submittals.

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

C. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.

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

1.6 QUALIFICATIONS

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

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

1.7 REGULATORY REQUIREMENTS

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

1.8 ENVIRONMENTAL REQUIREMENTS

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

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

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

PART 2 PRODUCTS

2.1 FIRE-SAFING SYSTEM

A. Manufacturers:
1. Grace Construction Products
2. United States Gypsum Co.
3. Or approved equal.

B. Products:
1. Fire-safing Insulation:
   a. High-melt mineral-fiber fire-safing insulation.
   b. ASTM C665, Type I.
   c. Nominal density: 4.0 pounds/cubic foot.
   d. Thermafiber, as manufactured by United States Gypsum Co., or approved equal.
2. Fire-safing Compound:
   a. Vinyl-type compound.
   b. Firecode Compound, as manufactured by United States Gypsum Co., or approved equal.
   c. Density: 74.8 pounds/cubic foot.
   d. Shrinkage: 5% maximum.
   e. Surface burning characteristics:
      1. Flame spread: 0.
      2. Smoke developed: 0.

2.2 ACCESSORIES

A. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces.

B. Installation Accessories: Galvanized steel safing impaling clips and other devices required to position and retain materials in place.

C. Water: Clean and potable.

2.3 FINISHES

A. Thermafiber Safing: Regular color, unfaced.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify openings are ready to receive the work of this section.

3.2 PREPARATION

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

B. Remove incompatible materials which may affect bond.

3.3 APPLICATION - SAFING INSULATION

A. Safing insulation to be nominal 4" thick; install safing insulation recessed a minimum of 1" from the surface of the assembly. Provide minimum 1" thick layer of fill material (Firecode Compound).

B. Cut safing ½" wider than opening to ensure compression fit. Friction fit in the safe-off area to be protected.

C. For poke-through penetrations, install safing insulation in opening. Compress or install on wire hangers in all floor slab openings, to seal completely around telephone cables, ducts, piping or other utilities.

3.4 APPLICATION - FIRECODE COMPOUND

A. Mix compound in accordance with manufacturer’s instructions.

B. Apply compound to a minimum of 1-inch thickness on top of safing insulation. Ensure that compound is in contact with all surfaces and that entire opening is filled with safing and compound.

C. For poke-through penetrations, trowel compound and work into penetrating opening.

3.5 CLEANING

A. Clean Work under provisions of Division 1 - General Requirements: Final Cleaning.

3.6 PROTECTION OF FINISHED WORK

A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Preparing substrate surfaces.

B. Sealant and joint backing.

1.2 RELATED SECTIONS

A. Section 092600 – Gypsum Board Systems.

1.3 REFERENCES

A. ASTM C790 - Use of Latex Sealing Compounds.

B. ASTM C919 - Use of Sealants in Acoustical Applications.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.6 COORDINATION

A. Coordinate work under provisions of Division 1 - General Requirements.

B. Coordinate the work with all sections referencing this section.

PART 2 PRODUCTS

2.1 SEALANTS

	Location	Type	Color
A.	Misc. Sealant	Silicone, Single Component	Clear
B.	Joints in GWB Partitions	OSI SC-175, Latex Sealant	White (Paintable)

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces and joint openings are ready to receive work.

3.2 PREPARATION

A. Remove loose materials and foreign matter which might impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions.

D. Protect elements surrounding the work of this section from damage or disfiguration.

3.3 INSTALLATION

A. Install sealant in accordance with manufacturer's instructions.

3.4 CLEANING

A. Clean work under provisions of Division 1 - General Requirements.

B. Clean adjacent soiled surfaces.

END OF SECTION

SECTION 081120 - STANDARD STEEL FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Non-rated steel door frames.

1.2 RELATED SECTIONS

A. Section 082110 - Wood Doors.

B. Section 087100 - Door Hardware.

C. Section 092600 – Gypsum Board Systems.

D. Section 099000 - Painting: Field painting of frames.

1.3 REFERENCES

A. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.

B. ANSI/SDI-100 - Standard Steel Doors and Frames.

C. DHI - Door Hardware Institute: The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.

1.4 SUBMITTALS

A. Submit under provisions of Division 1 - General Requirements.

B. Shop Drawings: Indicate frame elevations, reinforcement, and finish.

C. Product Data: Indicate frame configuration, anchor types and spacings, location of cut-outs for hardware, reinforcement.

D. Manufacturer's Installation Instructions: Indicate special installation instructions.

E. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. Conform to requirements of ANSI/SDI-100 and ANSI A117.1.

1.6 QUALIFICATIONS

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

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to site under provisions of Division 1 - General Conditions.

B. Accept frames on site in manufacturer's packaging. Inspect for damage.

1.8 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

1.9 COORDINATION

A. Coordinate work under provisions of Division 1 - General Requirements.

B. Coordinate the work with frame opening construction, door and hardware installation.

PART 2 PRODUCTS

2.1 FRAME MANUFACTURERS

A. Pioneer Product: Series F

B. Substitutions: Under provisions of Division 1 – General Requirements.

2.2 FRAMES

A. Interior Frames: 16 gage thick material, base metal thickness.

2.3 ACCESSORIES

A. Silencers: Resilient rubber, fitted into drilled hole.

2.4 FABRICATION

A. Fabricate frames as knock down unit

B. Fabricate frames with hardware reinforcement plates welded in place.

C. Prepare frame for silencers. Provide three single silencers for single doors on strike side.

D. Fabricate frames to suit gypsum wall board with 2-inch head member or as indicated on drawings.

E. Jamb depth as indicated on drawings and to suit application.

2.5 FINISH

A. Steel Sheet: Galvanized to ASTM A525 A60.

B. Primer: Air dried.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify substrate conditions under provisions of Division 1 - General Requirements.

B. Verify that opening sizes and tolerances are acceptable.

3.2 INSTALLATION

A. Install frames in accordance with ANSI/SDI-100 and DHI.

B. Coordinate with wallboard wall construction for anchor placement.

C. Coordinate installation of frames with installation of hardware specified in Section 087100 and doors in Section 082110.

3.3 ERECTION TOLERANCES

A. Maximum Diagonal Distortion: 1/16 inch measured with straight edges, crossed corner to corner.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Flush wood doors; non-rated.

1.2 RELATED SECTIONS

A. Section 081120 - Standard Steel Frames.

B. Section 087100 - Door Hardware.

C. Section 088000 – Glazing.

1.3 REFERENCES

A. ANSI/HPMA HP - Hardwood and Decorative Plywood.

B. ASTM E413 - Classification for Determination of Sound Transmission Class.

C. AWI - Quality Standards of the Architectural Woodwork Institute.

1.4 SUBMITTALS

A. Submit under provisions of Division 1 - General Requirements.

B. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, identify cutouts for hardware, glazing, etc.

C. Product Data: Indicate door core materials and construction; veneer species, type and characteristics; and factory machining criteria.

D. Samples: Submit two samples of door veneer, 4 x 4 inch in size illustrating wood grain, stain color, and sheen.

E. Manufacturer's Installation Instructions: Indicate special installation instructions.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with AWI Quality Standard Section 1300, Premium Grade.

B. Finish doors in accordance with AWI Quality Standard Section 1500.

1.6 QUALIFICATIONS

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

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to site under provisions of Division 1 - General Requirements.

B. Package, deliver and store doors in accordance with AWI Section 1300.

C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges if stored more than one week. Break seal on-site to permit ventilation.

1.8 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

1.9 COORDINATION

A. Coordinate work under provisions of Division 1 - General Requirements.

B. Coordinate the work with door opening construction, door frame and door hardware installation.

1.10 WARRANTY

A. Provide warranty under provisions of Division 1 - General Requirements.

B. Include life-time warranty coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers:
1. VT Industries: Heritage Collection Flush Wood Veneer Doors.
2. Or approved equal.

2.2 DOOR TYPES

A. Flush Interior Doors: 1-3/4" thick; solid core / filled construction; non-rated.

B. Flush Interior Woods with Glazing/Louver: 1-3/4” thick; solid core construction with factory cut openings as per Drawings. Provide VT1 (100) flush wood lite moulding/wood stop.

2.3 DOOR CONSTRUCTION

A. Solid non-rated and rated: AWI Section 1300.
1. Non-Rated: SRC-Stile and rail, particle core bonded to stiles and rails.
2. 5-Ply construction.

2.4 DOOR FACING

A. Veneer Facing: AWI Custom quality premium White Birch, rotary sliced; pre-finished from manufacturer’s standard selection of finishes.

B. Wood species and grain provided for bidding purposes, Door finish to match existing. Submit selection match from field verification and color samples for selection by Architect. Species and Color Finish to match existing doors.

2.5 ADHESIVE

A. Facing Adhesive: Type II - water resistant.

2.6 FABRICATION

A. Fabricate non-rated doors in accordance with AWI Quality Standards requirements.

B. Provide lock blocks at lock edge and top of door for closer and hardware reinforcement.

C. Vertical Exposed Edge of Stiles: Of same species as veneer facing. Hardwood for transparent finish facing.

D. Fit door edge trim to edge of stiles after applying veneer facing.

E. Bond edge banding to cores.

F. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.2 INSTALLATION

A. Install doors in accordance with AWI Quality Standards.

B. Trim door width by cutting equally on both jamb edges.

C. Trim door height by cutting bottom edges to a maximum of 3/4 inch.

D. Pilot drill screw and bolt holes.

E. Machine cut for hardware. Pocket for mortise. Core for handsets and cylinders.

F. Coordinate installation of doors with installation of frames.

3.3 INSTALLATION TOLERANCES

A. Conform to AWI requirements for fit and clearance tolerances.

B. Conform to AWI Section 1300 requirements for maximum diagonal distortion.

3.4 ADJUSTING

A. Adjust work under provisions of Division 1 - General Requirements.

B. Adjust door for smooth and balanced door movement.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Cylinders specified for doors in other sections.

C. Related Sections:

1. Division 08 Section “Hollow Metal Doors and Frames”.
2. Division 08 Section “Flush Wood Doors”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1. ANSI/BHMA Certified Product Standards - A156 Series.
2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
3. ANSI/UL 294 - Access Control System Units.
4. UL 305 - Panic Hardware.
5. ANSI/UL 437- Key Locks.

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:

a. Type, style, function, size, label, hand, and finish of each door hardware item.
b. Manufacturer of each item.
c. Fastenings and other pertinent information.
d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
e. Explanation of abbreviations, symbols, and codes contained in schedule.
f. Mounting locations for door hardware.
g. Door and frame sizes and materials.
h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

D. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.4 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.

F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.
3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.

2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures

I. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

D. Special Warranty Periods:
   1. Twenty five years for manual overhead door closer bodies.

1.8 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

   1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

   1. Quantity: Provide the following hinge quantity:

      a. Two Hinges: For doors with heights up to 60 inches.
      b. Three Hinges: For doors with heights 61 to 90 inches.
      c. Four Hinges: For doors with heights 91 to 120 inches.
      d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

   2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

a. Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.
b. Sizes from 3’1” to 4’0”: 5” standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following:

a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5. Manufacturers:

a. Hager Companies (HA).
b. McKinney (MK).
c. Stanley Hardware (ST).

2.3 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.

1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
2. Furnish dust proof strikes for bottom bolts.
3. Surface bolts to be minimum 8” in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.

5. Manufacturers:

a. Door Controls International (DC).
b. Rockwood (RO).
c. Trimco (TC).

2.4 CYLINDERS AND KEYING

A. Supplied by Owner.

2.5 MORTISE LOCKSETS

A. Supplied by Owner.

2.6 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.

2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.

4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.

5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.

6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Commercial Duty): ANSI/BHMA 156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, institutional grade door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck, closing sweep, and latch speed control valves. Provide non-handed units standard.

1. Manufacturers:

a. Corbin Russwin Hardware (RU) - DC6000 Series.
b. Norton Rixson (NO) - 8500 Series.
c. Sargent Manufacturing (SA) - 1431 Series.
d. Yale Commercial(YA) - 3500 Series.

2.7 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.

2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

3. Where plates are applied to fire rated doors with the top of the plate more than 16” above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer’s catalog and template book for specific requirements for size and applications.

4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:

   a. Stainless Steel: 300 grade, 050-inch thick.

5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.

6. Manufacturers:

   a. Hiawatha, Inc. (HI).
   b. Rockwood (RO).
   c. Trimco (TC).

2.8 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Manufacturers:

   a. Hiawatha, Inc. (HI).
   b. Rockwood (RO).
   c. Trimco (TC).

2.9 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Manufacturers:

1. National Guard Products (NG).
2. Pemko (PE).
3. Reese Enterprises, Inc. (RE).

2.10 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.11 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Sections “Closeout Procedures”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.

2. The supplier is responsible for handing and sizing all products.

3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

Hardware Sets

Set 1.0 – Door #3

6	Hinge, Full Mortise	TA2714	US26D	MK
1	Flush Bolt (manual)	555 (metal) / 557 (wood)	US26D	RO
2	Dust Proof Strike	570	US26D	RO
1	Mortise Lock & cylinder	Supplied by owner		OT
2	Surface Closer	CLP8501T	689	NO
2	Kick Plate	K1050 10" high BEV CSK	US32D	RO
2	Silencer	608		RO

Set 2.0 – Doors 1, 2 and 4

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Mortise Lock & cylinder	Supplied by owner		OT
1	Surface Closer	CLP8501T	689	NO
1	Kick Plate	K1050 10" high BEV CSK	US32D	RO
3	Silencer	608		RO

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Glass and glazing for doors and Guardrail (Full height).

1.2 RELATED SECTIONS

A. Section 061000 – Carpentry Work.

B. Section 079000 - Joint Sealers.

C. Section 082110 - Wood Doors.

1.3 REFERENCES

A. ANSI/ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

B. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Used in Buildings.

C. ASTM C1036 - Flat Glass.

D. ASTM C1048 - Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.

E. FGMA - Glazing Manual.

F. FGMA - Sealant Manual.

G. FS TT-S-001657 - Sealing Compound, Single Component, Butyl Rubber Based, Solvent Release Type.

H. FS TT-S-00230 - Sealing Compounds, Synthetic-Rubber Base, Single Component, Chemically Curing.

I. FS TT-S-01543 - Sealing Compound, Silicone Rubber Base.

J. Laminators Safety Glass Association - Standards Manual.

1.4 PERFORMANCE REQUIREMENTS

A. Glass and glazing materials of this Section shall provide continuity of building enclosure vapor and air barrier:

B. In conjunction with materials described in Section 079000.

C. Maintain continuous air and vapor barrier throughout glazed assembly from glass pane to heel bead of glazing sealant.

D. Size glass to withstand dead loads and positive and negative live loads acting normal to plane of glass as calculated in accordance with applicable code in accordance with ANSI/ASTM E330.

E. Limit glass deflection to 1/200 or flexure limit of glass with full recovery of glazing materials, whichever is less.

1.5 SUBMITTALS

A. Submit under provisions of Division 1 - General Requirements.

B. Product Data on Glass Types Specified: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.

D. Manufacturer's Installation Instructions: Indicate special precautions required.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with FGMA Glazing Manual FGMA Sealant Manual for glazing installation methods.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Do not install glazing when ambient temperature is less than 50 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.8 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop Drawings.

1.9 COORDINATION

A. Coordinate Work under provisions of Division 1 - General Requirements.

B. Coordinate the Work with glazing frames, wall openings, and perimeter air and vapor seal to adjacent Work.

1.10 WARRANTY

A. Provide five-year manufacturer's warranty under provisions of Division 1 - General Requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS - FLAT GLASS MATERIALS

A. Pittsburgh Plate Glass.

B. Substitutions: Under provisions of Division 1 - General Requirements.

2.2 FLAT GLASS MATERIALS

A. Safety Glass: Clear, fully tempered with horizontal tempering conforming to ANSI Z97.1; 1/4 inch thick; Type G-1.

2.3 GLAZING COMPOUNDS

A. Acrylic Sealant: FS TT-S-00230, Type II, Class A; single component; cured Shore A hardness of 15- 25 non-bleeding color as selected.

2.4 GLAZING ACCESSORIES

A. Setting Blocks: Neoprene 80 - 90 Shore A durometer hardness, length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene 50 - 60 Shore A durometer hardness, minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.

C. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify prepared openings under provisions of Division 1 - General Requirements.

B. Verify that openings for glazing are correctly sized and within tolerance.

C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

3.2 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant.

3.3 INTERIOR - DRY METHOD (TAPE AND TAPE)

A. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.

B. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

C. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.

D. Place glazing tape on free perimeter of glazing in same manner described above.

E. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

F. Knife trim protruding tape.

3.4 EXTERIOR - WET/DRY METHOD

A. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with sealant.

B. Apply heel bead of sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.

C. Place setting blocks at 1/4 points with edge block no more than 6 inches from corner.

D. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.

E. Install removable stops, with spacer strips inserted between glazing and applied stops, 1/4 inch below sight line.

F. Fill gap between glazing stop with sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.

G. Apply cap bead of sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.5 CLEANING

A. Clean work under provisions of Division 1 - General Requirements.

B. Remove glazing materials from finish surfaces.

C. Remove labels after work is complete.

3.6 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Division 1 - General Requirements.

B. After installation, mark pane with an 'X' by using removable plastic tape or paste.

END OF SECTION

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 Section Includes:

A. Non-load-bearing steel framing systems for interior gypsum board assemblies.

PART 2 - PRODUCTS

2.1 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.

2. Protective Coating: ASTM A 653/A 653M, G40, hot-dip galvanized, unless otherwise indicated.

B. Studs and Runners: ASTM C 645

1. Steel Studs and Runners:

a. Minimum Base-Metal Thickness: As indicated on Drawings.
b. Depth: As indicated on Drawings.

C. Slip-Type Head Joints: Where indicated, provide one of the following:

1. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

D. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base-Metal Thickness: As indicated on Drawings.

2. Depth: As indicated on Drawings.

E. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch wide flanges.

1. Depth: As indicated on Drawings.

2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 0.033 inch .

3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-(1.59-mm) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

2.2 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.3 INSTALLING FRAMED ASSEMBLIES

A. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

B. Install studs so flanges within framing system point in same direction.

1. Space studs as follows:

a. Single-Layer Application: 16 inches o.c. unless otherwise indicated.

C. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.

D. Direct Furring:

1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or power-driven fasteners spaced 24 inches o.c.

E. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Gypsum board.

B. Taped and sanded joint treatment.

C. Accessories.

1.2 RELATED SECTIONS

A. Section 061000 – Carpentry Work: Wood blocking.

B. Section 092216 – Non-structural Metal Framing.

1.3 REFERENCES

A. ASTM C36 - Gypsum Wallboard.

B. ANSI A118.9 Test Methods and Specification for Cementitious Backer Units

C. ASTM C475 - Joint Treatment Materials for Gypsum Wallboard Construction.

D. ASTM C840 - Application and Finishing of Gypsum Board.

E. ASTM C1002 - Steel Drill Screws for the Application of Gypsum Board.

F. ASTM C1325 Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units

G. GA-201 - Gypsum Board for Walls.

H. GA-216 - Recommended Specifications for the Application and Finishing of Gypsum Board.

1.4 SUBMITTALS

A. Submit under provisions of Division 1 - General Requirements.

B. Product Data: Provide data on metal framing, gypsum board, joint and tape.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ASTM C840 and GA-600.

1.6 QUALIFICATIONS

A. Applicator: Company specializing in performing the work of this section with minimum 3 years documented experience.

PART 2 PRODUCTS

2.1 MANUFACTURERS - GYPSUM BOARD SYSTEM

A. Georgia - Pacific Gypsum Products.

B. National Gypsum

C. USG

D. Substitutions: Under provisions of Division 1 - General Requirements.

2.2 GYPSUM BOARD MATERIALS

A. Interior Standard Gypsum Board (Interior Mold and Moisture Resistant Gypsum Wallboard): Coated inorganic glass mat-faced, water resistant treated gypsum core wallboard, enhanced mold & mildew resistant gypsum core, 5/8" thick. Conforming to the physical properties of ASTM 6306 and ASTM C1177. Rating of 10 “No Mold Growth” as tested for 4 weeks according to ASTM D3273. DensArmor Plus Fiberglass Mat Gypsum Panels manufactured by Georgia-Pacific Corporation.

2.3 ACCESSORIES

A. Corner Beads: Metal.

B. Joint Materials: ASTM C475; reinforcing tape, joint compound, adhesive, and water.

C. Fasteners: ASTM C1002.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify site conditions under provisions of Division 1 - General Requirements.

B. Verify that site conditions are ready to receive work and opening dimensions are as indicated on shop drawings.

3.2 GYPSUM BOARD INSTALLATION

A. Install gypsum board in accordance with GA-201, GA-216 and GA-600.

B. Erect single layer standard gypsum board in most economical direction, with ends and edges occurring over firm bearing.

C. Use screws when fastening gypsum board to metal furring or framing.
D. Place control joints consistent with lines of building spaces.

E. Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.

3.3 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

3.4 FINISH

A. Gypsum Wallboard:
   1. **Level 1:** Above finished ceilings concealed from view.
   2. **Level 3:** Walls of all storage areas, etc.
   3. **Level 4:** All walls, ceilings and soffits, except as noted.

END OF SECTION

SECTION 095110 - SUSPENDED ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Suspended metal grid ceiling system and perimeter trim.

B. Acoustical tile.

1.2 REFERENCES

A. ASTM C635 - Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.

B. ASTM C636 - Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.

C. ASTM E1264 - Classification of Acoustical Ceiling Products.

D. Ceilings and Interior Systems Contractors Association (CISCA) - Acoustical Ceilings: Use and Practice.

1.3 SYSTEM DESCRIPTION

A. Suspension system to rigidly secure acoustical ceiling system including integral mechanical and electrical components with maximum deflection of 1/360.

1.4 SUBMITTALS

A. Submit under provisions of Division 1 - General Requirements.

B. Product Data: Provide data on metal grid system components and acoustical units.

C. Samples: Submit two samples full size illustrating material and finish of acoustical units.

D. Samples: Submit two samples each, of suspension system main runner, cross runner, and edge trim.

E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.5 QUALIFICATIONS

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

B. Acoustical Unit Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.6 REGULATORY REQUIREMENTS

A. Conform to applicable codes for combustibility requirements for materials.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Maintain uniform temperature of minimum 60 degrees F and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

1.8 EXTRA MATERIALS

A. Furnish under provisions of Division 1 - General Requirements.

B. Provide two unopened boxes of tile to Owner.

PART 2 PRODUCTS

2.1 MANUFACTURERS - SUSPENSION SYSTEM

A. Armstrong Contract Interiors.

B. Substitutions: Under provisions of Division 1 - General Requirements.

2.2 SUSPENSION SYSTEM MATERIALS

A. Non-fire Rated Grid: ASTM C635, intermediate duty; exposed T; components die cut and interlocking; hot dipped galvanized. Product: Prelude 15/16" T-bar grid suspension system.

B. Grid Finish: Prelude 15/16" Grid - White.

C. Accessories: Stabilizer bars, hold-down clips, splices, edge and moldings required for suspended grid system.

D. Support Channels and Hangers: Hot dipped galvanized; size and type to suit application and ceiling system flatness requirement specified.

2.3 MANUFACTURERS - ACOUSTICAL UNITS

A. Certainteed.

B. Substitutions: Under provisions of Division 1 - General Requirements.

2.4 ACOUSTICAL UNIT MATERIALS

A. Acoustical Tile - (Type 1) Certainteed Fine Fissured Protectone; PFF-197, ASTM E1264 classification, conforming to the following:
   1. Size: 24" x 48".
   2. Thickness: 5/8 inch.
   3. Class: A.
   4. NRC: .55
   5. CAC Range: 40 min.
   6. Edge Detail: Trim
   7. Surface Burning Characteristics: Flame spread 25 or under.
   8. Smoke Development: 15.
   9. Grid: 15/16 inch.
   10. Color: White.
   11. Non-Sag Warranty.
   12. Recycled Content: 44%.

2.5 ACCESSORIES

A. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify site conditions under provisions of Division 1 - General Requirements.

B. Verify that layout of hangers will not interfere with other work.

3.2 INSTALLATION - LAY-IN GRID SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C636 and manufacturer's instructions and as supplemented in this section.

B. Install system capable of supporting imposed loads to a deflection of 1/360 maximum.

C. Locate system on room axis according to reflected ceiling plan.

D. Install after major above ceiling work is complete. Coordinate the location of hangers with other work.

E. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

H. Do not eccentrically load system or produce rotation of runners.

I. Install edge molding at intersection of ceiling and vertical surfaces, using longest practical lengths. Miter corners. Provide edge moldings at junctions with other interruptions.

3.3 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Lay directional patterned units one way with pattern parallel to room axis. Fit border trim neatly against abutting surfaces.

D. Install units after above ceiling work is complete.

E. Install acoustical units level in uniform plane and free from twist, warp and dents.

F. Cut tile to fit irregular grid and perimeter edge trim. Field rabbet tile edge. Double cut and field paint exposed edges of tegular units.

3.4 ERECTION TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees

3.5 SCHEDULE

A. See drawings for locations, grid module and orientation of new grid and tile.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Resilient tile flooring – VCT.

B. Resilient base.

C. Accessories

1.2 RELATED SECTIONS

A. Section 033000 – Cast-in-Place Concrete.

B. Section 096880 - Carpet.

1.3 REFERENCES

A. ASTM E648 - Critical Radiant Flux - Class 1.

B. ASTM E 662 - Smoke - 450 or less.

C. ASTM F1066 - Vinyl Composition Floor Tile.

D. FS-SS-W-40 - Wall Base: Rubber and vinyl plastic.

1.4 SUBMITTALS

A. Submit under provisions of Division 1 - General Requirements.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns and colors available.

C. Samples: Submit two samples, 2 x 2 inch in size illustrating color and pattern for each floor material for each color specified.

D. Submit two inch long samples of base material for each color specified.

E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Division 1 - General Requirements.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Store materials for three days prior to installation in area of installation to achieve temperature stability.

B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and 24 hours after installation of materials.

1.7 MAINTENANCE DATA

A. Submit under provisions of Division 1 - General Requirements.

B. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.8 EXTRA MATERIALS

A. Furnish under provisions of Division 1 - General Requirements.

B. Provide 20 sq ft of flooring and 20 lineal feet of base of each material specified.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. VCT: Armstrong.

B. Vinyl Base: Johnsonite/Tarkett.

C. Substitutions: Under provisions of Division 1 - General Requirements.

2.2 MATERIALS – VINYL COMPOSITE TILE

A. Vinyl Composition Tile: ASTM F1066
   1. Size: 12 x 12 inches.
   2. Thickness: 1/8 inch.
   3. Design: Non-directional.
   4. Manufacturer: Armstrong Standard Excelon.
   5. Color: As selected by Architect.
   6. Pattern: Solid/basketweave.

2.3 MATERIALS - BASE

A. Base: Standard vinyl wall base, coved:
   1. Height: 4 inch
   2. Thickness: 1/8 inch thick
   3. Length: Roll (120 feet)
   4. Manufacturer: Johnsonite/Tarkett.
   5. Color: as selected by Architect (Assume color to Match ACIT Standard).

2.4 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.

B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.

C. Sealer and Wax: Types recommended by flooring manufacturer.

D. Transition Strips: VCT/Carpet adapter or approved equal. Colors as selected by Architect.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify concrete floors are dry to a maximum moisture content of 7 percent, and exhibit negative alkalinity, carbonization, or dusting.

B. Verify floor and lower wall surfaces are free of substances that may impair adhesion of new adhesive and finish materials.

3.2 PREPARATION

A. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.

B. Prohibit traffic until filler is cured.

C. Vacuum clean substrate.

C. Apply primer to required surfaces.

3.3 INSTALLATION - TILE FLOORING

A. Install in accordance with manufacturer's instructions.

B. Spread only enough adhesive to permit installation of materials before initial set.

C. Set flooring in place, press with heavy roller to attain full adhesion.

D. Install VCT to basket weave pattern. Allow minimum ½ full tile width at room or area perimeter.

E. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile.

F. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.

G. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.4 INSTALLATION - BASE

A. Fit joints tight and vertical. Maintain maximum measurement between joints.

B. Miter internal corners. At external corners, 'V' cut back of base strip to 2/3 of its thickness and fold. At exposed ends, use pre-molded units.

C. Install base on solid backing. Bond tight to wall and floor surfaces.

D. Scribe and fit to door frames and other interruptions.

3.5 CLEANING

A. Clean work under provisions of Division 1 - General Requirements.

B. Remove access adhesive from floor, base, and wall surfaces without damage.

C. Clean, seal, and wax floor and base surfaces in accordance with manufacturer's instructions.

3.7 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Division 1 - General Requirements.

B. Prohibit traffic on floor finish for 48 hours after installation.

END OF SECTION

SECTION 096880 - CARPET

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Carpet tile placed with glue-down method.

B. Accessories.

1.2 RELATED SECTIONS

A. Section 033000 - Cast-in-Place Concrete.

B. Section 096500 - Resilient Flooring: resilient base and accessories.

1.3 REFERENCES

A. ASTM D2859 - Test Method for Flammability of Finished Textile Floor Covering Materials.

B. ASTM E84 - Surface Burning Characteristics of Building Materials.

C. ASTM E648 - Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

D. NFPA 253 - Test for Critical Radiant Flux of Floor Covering Systems.

1.4 SUBMITTALS

A. Submit under provisions of Division 1 - General Requirements

B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.

C. Samples: Submit two samples 6 x 6 inch in size illustrating color and pattern for each carpet material specified.

D. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing specified carpet with minimum three years documented experience.

B. Installer: Company specializing in installing carpet with minimum three years documented experience and approved by manufacturer.

1.6 REGULATORY REQUIREMENTS

A. Conform to applicable codes for flame/smoke rating requirements in accordance with ASTM E84.

B. Conform to ASTM D2859 for surface flammability ignition test.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Store materials for 3 days prior to installation in area of installation to achieve

temperature stability.

B. Maintain minimum 70 degrees F ambient temperature 3 days prior to, during and 24 hours after installation.

1.8 MAINTENANCE DATA

A. Submit under provisions of Division 1 - General Requirements.

B. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

1.9 EXTRA MATERIAL

A. Furnish under provisions of Division 1 - General Requirements.

B. Provide a total of 90 sq ft of carpeting of main type, color, and pattern specified.

PART 2 PRODUCTS

2.1 MATERIALS - CARPET TILE

A. Carpet Tile: Mohawk – Swipe Right GT418; Color No. 969 – Brookwood.

B. Installation Method – Quarter Turn.

*****Note: Materials listed for Bidding purposes. Final selections by Architect.**

2.3 ACCESSORIES

A. Sub-Floor Filler: White premix latex; type recommended by adhesive material manufacturer.

B. Adhesive: Recommended by carpett manufacturer.

C. Transition Strip: Carpet to Tile reducer; color as selected by Architect.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are smooth and flat with maximum variation of 1/4 inch in 10 ft and are ready to receive work.

3.2 PREPARATION

A. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.

B. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.

C. Vacuum clean substrate.

3.3 INSTALLATION

A. Install carpet tile and adhesive in accordance with manufacturers' instructions.

B. Verify carpet tile match before cutting to ensure minimal variation between dye lots.

C. Double cut carpet tile, to allow intended seam and pattern match.
Make cuts straight, true, and unfrayed. Edge seam carpet at public areas.

D. Lay carpet tile tight and flat on subfloor, well fastened at edges, with a uniform appearance. Provide monolithic color, pattern, and texture match within any one area.

E. Do not change run of pile in any room where carpet tile is continuous through a wall opening into another room. Locate change of color or pattern between rooms under door centerline.

F. Cut and fit carpet tile around interruptions.

G. Fit carpet tile tight to intersection with vertical surfaces without gaps.

H. Install carpet tile in patterns specified/indicated.

I. Provide carpet tile in areas indicated on Finish Schedule.

3.4 CLEANING

A. Clean work under provisions of Division 1 - General Requirements.

B. Remove excess adhesive without damage, from floor, base, and wall surfaces.

C. Clean and vacuum carpet surfaces.

END OF SECTION

SECTION 099000 - PAINTS AND COATINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Surface preparation and field application of paints and coatings:
a. On new and existing GWB Walls.
b. On new and existing door frames.

B. Related Sections:
1. Section 092600 – Gypsum Board Systems.
2. Division 8 - Doors and Frames: Shop primed items.

1.2 REFERENCES

A. American Society for Testing and Materials: ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

1.3 DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this Section.

1.4 SUBMITTALS

A. Submit under provisions of Division 1 - General Requirements: Submittals.

B. Product Data: Provide data on all finishing products and high-performance coatings.

C. Samples: Submit samples illustrating range of colors and textures available for each surface finishing product scheduled.

D. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.

E. Manufacturer’s Safety Data Sheet (MSDS) for each product used.

1.5 QUALITY ASSURANCE

A. Single Source
1. Provide primers and other undercoat paints produced by same manufacturer as finish coats for each application
2. Use only thinners approved by paint manufacturer and use only with recommended limits.

B. Coordination of Work
1. Review other sections of these Specifications in which prime paints are to be provided, to ensure compatibility of total coatings system.
2. Upon request from other trades, furnish information or characteristics of proposed finish materials, to ensure that compatible prime coats are used.

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

D. Applicator: Company specializing in performing the work of this section with minimum 3 years documented experience and where applicable, approved by manufacturer.

1.6 REGULATORY REQUIREMENTS

A. Conform to applicable codes, standards and specifications referenced in this section.

B. Conform to applicable code for flame and smoke rating requirements for finishes.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Division 1 - General Requirements: Storage and Protection.

B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

C. Container label to include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

D. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

E. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

C. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.

D. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

1.9 EXTRA MATERIALS

A. Furnish under provisions of Division 1 – General Requirements.

B. Provide 1 unopened gallon of each color, type, and surface texture to Owner.

C. Label each container with color, type, texture, and room locations, in addition to the manufacturer's label.

PART 2 PRODUCTS

2.1 MANUFACTURERS

1. Paints and Coatings:
    1. Benjamin Moore (Basis of Design).
    2. MAB /Sherwin Williams.
    3. Or approved equal.

2.2 MATERIALS

A. Coatings:
1. All coatings must be VOC compliant for use in New Jersey.
2. Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating; good flow and brushing properties; capable of drying or curing free of streaks or sags.

B. Products - Paints and Coatings:
1. Primers:
a. Alkyd primer: Exterior grade rust-inhibiting primer specifically intended for use on unprimed ferrous metal, compatible with intermediate/finish coat.
b. Acrylic latex primer: Exterior grade primer specifically intended for use on galvanized ferrous metal, compatible with intermediate/finish coat.
c. Latex primer sealer: Undercoater specifically intended for use on new (cured) drywall and plaster, compatible with intermediate / finish coat.
d. Primer/void-filler: Alkali resistant, water reducible, vinyl acetate/acrylic latex void filler specifically intended for use on (cured - 28 days minimum) concrete masonry substrates, compatible with intermediate/ finish coat. for masonry substrates.
e. Epoxy Primer: Epoxy primer specifically intended for use on interior unfinished concrete.
2. Intermediate/finish coats:
a. Alkyd enamel: Exterior Grade, Premium grade, low odor latex enamel specifically intended for use on metal substrates.
b. Latex enamel: Interior grade, washable, non-yellowing latex enamel.
c. Acrylic epoxy finish: Interior grade, high performance, non-yellowing, water reducible low odor, two-part self-priming acrylic epoxy finish specifically intended for use on masonry, abrasion-resistant semi-gloss finish.
3. Transparent coatings:
a. Polyurethane finish: Clear alkyd polyurethane, resistant to discoloration, abrasion and water spotting, satin finish.

C. Accessory Materials:
1. Sanding sealer: Clear, fast drying vinyl toluene alkyd sanding sealer, compatible with primers and transparent coatings.
2. Other materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.

2.3 FINISHES

A. Refer to schedule at end of section for surface finish schedule.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces and substrate conditions are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Test shop applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
1. Gypsum Wallboard: 12 percent.
2. Interior Wood: 15 percent, measured in accordance with ASTM D2016.

3.2 PREPARATION

A. Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.

B. Correct defects and clean surfaces which affect work of this section.

C. Seal with shellac and seal marks which may bleed through surface finishes.

D. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

E Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.

F. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by power tool wire brushing or sandblasting. Clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.

G. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces with a long oil, rust inhibitive primer.

3.3 APPLICATION

A. Apply products in accordance with manufacturer's instructions.

B. Do not apply finishes to surfaces that are not dry.

C. Apply each coat to uniform finish.

D. Sand wood and metal lightly between coats to achieve required finish.

E. Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.

F. Allow applied coat to dry before next coat is applied.

G. Prime concealed surfaces of interior woodwork with primer paint.

3.4 CLEANING

A. Clean work under provisions of Division 1 - General Requirements: Final Cleaning.

B. Collect waste material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

3.5 SCHEDULE - INTERIOR SURFACES

A. Ferrous Metal: Latex Gloss (hollow metal frames)
Primer: 1 coat- PPG 90-912 PittTech Plus Int./Ext. DTM Acrylic Metal Primer.
Finish: 2 coats- PPG 90-1210 PittTech Plus Int./Ext. DTM Acrylic Semi-Gloss
Total DFT: 6 mils (Assume 2 colors)

B. Gypsum Board: Epoxy Eggshell (Moderate Abuse)
Primer: 1 coat- 6-4900XI Speedhide 0-VOC Int. Acrylic Primer-Sealer.
Finish: 2 coats- 16-310 Pitt-Glaze WB1 Int. Waterborne Acrylic Precat. Epoxy EggShell.
Total DFT: 6 mils (Assume 2 colors)

END OF SECTION

SECTION 230500 - COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. All work and material on this project shall be in compliance with all local, state and federal regulations including but not limited to the following:
   1. Established Federal Standards of the Occupational Safety and Health Administration under the Department of Labor.
   2. New Jersey UCC as based on International Building Code 2018.
   3. International Mechanical Code 2018.
   4. International Energy Conservation 2018.

B. The above regulations are considered a part of the specifications and shall prevail should they differ with the plans and specifications. Prior to construction the Contractor shall notify the Architect of the difference. Should the Contractor not so notify the Architect, the Contractor shall fully comply without claim for extra costs

1.2 SUMMARY

A. This section includes General Provisions for HVAC/Mechanical work.

B. This Section includes the following:
   1. Equipment installation requirements common to equipment sections.
   2. Painting and finishing.
   3. Concrete bases.
   4. Supports.

1.3 DEFINITIONS

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

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

C. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and chases.

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

1.4 SUBMITTALS

A. SHOP DRAWINGS AND OTHER RELATED SUBMITTALS
   1. The type submittal information required for each item of equipment shall be as indicated in the individual sections of the specification.
   2. When a substitute item of equipment has been submitted for approval, submit layout drawings indicating the changes necessary to adapt the substituted item of equipment to the system design.
   3. Submittal data shall include Specification data, such as metal gauges, finishes, optional accessories, etc., even though such equipment and materials may be detailed on the drawings or specified. In addition, the submittal data shall include performance (certification) data, wiring diagrams where applicable, accurate dimensional data and a recommended spare parts list. Outline or dimensional

drawings alone are not acceptable. No roughing-in, connections, etc., shall be done until Architect reviewed equipment submittals are in the hands of the Contractors. It shall be the Contractor's responsibility to obtain drawings and to make all connections, etc., in the neatest and most workmanlike manner possible.

4. In general, normal catalog information (with the particular items underlined or otherwise denoted as being the submitted item) will be acceptable as submittal data. Installation, operating and maintenance instructions must be that information, specifically applicable to the items furnished, ordinarily supplied with the equipment to the Owner with any modifications indicated. Wiring diagrams must be correct for the application. Generalized wiring diagrams, showing alternate methods of connection, will not be acceptable unless all unrelated sections are marked. out. Submittal data sheets, which indicate several different model numbers, figure numbers, optional accessories, installation arrangements, etc., shall be clearly marked to indicate the specific items of equipment to be furnished. Samples and certificates shall be furnished as requested. Submittal data must be complete for each piece of equipment; piecemeal data will not be processed.
5. It shall be noted that the reviewing of shop drawings by the Architect applies only to general design, arrangement, type, capacity, and quality. Such review does not apply to quantities, dimensions, connection locations and the like. In all cases, the Contractor alone shall be responsible for furnishing the proper quantity of equipment and/or materials required, that all equipment fits the available space in a satisfactory manner, all equipment characteristics are appropriate and that all connections are suitably located.
6. Before the project is accepted, all submittal data (shop drawings, etc.) must be complete and reviewed.
7. After equipment requiring temperature control connection has been reviewed by the Architect, furnish complete manufacturer's data and wiring diagrams to the Automatic Temperature Control Supplier.

B. SUBSTITUTION OF MATERIALS AND EQUIPMENT

1. When the Contractor requests approval of substitute materials and/or equipment, except when under formal alternate proposal, it shall be understood and agreed that such substitution, if approved, will be made without cost to the Owner, regardless of changes in connections, spacing, electrical service, etc. In all cases where substitutions affect other trades the Contractor offering such substitutions shall reimburse all affected Contractors for all necessary changes in their work (without cost to Owner).

1.5 QUALITY ASSURANCE

A. Disclaimers and Limitations: Manufacturer’s disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer’s disclaimers and limitations on product warranties do not relieve suppliers, manufacturers and subcontractors required to countersign special warranties with the Contractor.

1.6 DELIVERY, STORAGE, AND HANDLING

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

1.7 COORDINATION

A. Coordination Between Trades:
   1. Carefully examine all architectural, structural, electrical and any other drawings and specifications pertaining to the construction before fabricating and installing the work described and indicated under these drawings and specifications. Cooperate with all other Contractors in locating piping, ductwork, sleeves, equipment, etc., in order to avoid conflict with all other Contractor's work. No extra compensation will be allowed to cover the cost of relocating piping, ducts, etc., or equipment found encroaching on space required by others.
   2. Lay out work from construction lines and levels established by the General Contractor. This Contractor shall be responsible for the proper location and placement of his work.
   3. Any discrepancies occurring on the accompanying drawings and between the drawings and the specifications shall be reported to the Architect prior to any fabrication and installation so that a workable solution can be presented. Extra payment will not be allowed for the relocation of, or revision to, piping, ductwork, equipment, etc., not installed in accordance with the above instructions, and which interferes with work and equipment of other trades.

B. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for HVAC installations.

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

PART 3 - EXECUTION

3.1 STRUCTURAL RESPONSIBILITY

A. Properly shore, brace, support, etc., any construction to guard against cracking, settling, collapsing, displacing or weakening. No structural member shall be cut without the written consent of the Architect.

B. Any damage occurring to the structure, due to failure to exercise proper precautions or due to action of the elements, shall be promptly and properly made good to the satisfaction of the Owner or Architect, without cost.

3.2 PROTECTION OF THE BUILDING AND STORED EQUIPMENT

A. Do not store materials or equipment on any floor or roof of building in such quantity that these parts of the building will be overloaded in any way. Do not move heavy equipment across any floor or roof without first submitting the details of the work to the Architect and having obtained his approval. In cases where frequent movement of men or materials

over the roof is encountered, provide walking boards or other suitable protection for the roofing.

B. Provide suitable storage for, and completely protect all materials and equipment prior to installation. Storage shall be dry, clean and safe. Any materials or equipment lost through theft or mishandling shall be replaced, all without additional cost to the Owner

3.3 DRAWINGS

A. The drawings accompanying these specifications are diagrammatic and indicate the general design and arrangement of the proposed work. Do not scale drawings for the exact location of equipment and work. The exact routing and/or location of piping, ductwork, sleeves, equipment, etc., unless specifically dimensioned on the drawings, shall be determined to suit field conditions encountered, and to avoid interferences with other Contractors' work.

3.4 EQUIPMENT CONNECTIONS

A. Make all water and drainage connections, etc., to equipment furnished by others under this Contract whenever such equipment is shown on any of the drawings or mentioned in any section of the specifications, unless otherwise specifically specified hereinafter.

3.5 PERMITS AND APPROVALS

A. All permits and certificates of approval for the complete system shall be obtained by the respective Contractors from the authorities governing such work. The cost of all permits, tap-in-fees and approvals shall be borne by the Contractor furnishing the work, except as noted in the General Requirements. All work shall be approved by the Architect before final payment will be made.

3.6 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C. Install HVAC equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

3.7 PAINTING

A. Painting of HVAC systems, equipment, and components is specified in Division 09 Sections "Interior Painting" and "Exterior Painting."

B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.8 CONCRETE BASES

A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
   1. Construct concrete bases of dimensions indicated, but not less than 4 inches (100 mm) larger in both directions than supported unit.
   2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of the base.
   3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
   4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   5. Install anchor bolts to elevations required for proper attachment to supported equipment.
   6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
   7. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete and reinforcement as specified in Division 03."

3.9 INSTALLATION

A. All equipment shall be installed at locations indicated.

B. Assembly and installation of equipment shall be in strict accordance with manufacturer's installation instructions.

C. Equipment shall be securely anchored in place. Care shall be exercised to correctly orient equipment before securing in place.

3.10 EQUIPMENT PADS

A. Floor-mounted equipment, such as air handling units, boilers, water heaters, etc., shall be provided with a suitable concrete pad. Each pad shall have suitable hold-down bolts in pipe sleeves, of sufficient number to properly secure the apparatus. Hold-down bolts shall be accurately located by template prepared from actual measurement of the equipment or from certified drawings furnished by the equipment manufacturer. Hold-down bolts shall be set in wrought iron pipe sleeves ¾” larger than the bolts to facilitate alignment of equipment.

B. All pads shall be complete with all pipe sleeves, anchor bolts, reinforcing steel, concrete, etc., as required. Pads larger than 18” in width shall be reinforced with ½” bars on 9” centers, both ways. Bars shall be approximately 3” below top of pad. All parts of pads and foundations shall be properly spaced. If exposed parts of the pads and foundations are rough after removing forms, all rough surfaces shall be rubbed to a smooth surface.

C. Pads, unless indicated otherwise, shall extend 4” above the finished floor and shall be securely anchored to the floor so vibration or stresses cannot cause lateral movement.

D. In general, pads for equipment such as air handling units, pumps, etc., shall extend 6” beyond base dimensions.

3.11 EQUIPMENT MOUNTING

A. All equipment with moving parts, such as fans, air handling units, etc., shall be mounted on vibration supports and in addition, said equipment shall be isolated from external connections, such as piping, ducts, raceways, etc., by means of flexible connectors.

B. Unitary equipment, such as small exhaust fans, etc., shall be rigidly braced and mounted to wall, floor, or ceiling, as required, and tightly gasketed and sealed to mounting surface to prevent air leakage and to obtain quiet operation

C. Where drivers are connected with couplings, the alignment shall be checked and the driver reconnected. Couplings shall have tolerances as indicated by the manufacturer.

D. Where drivers are connected with belt or chain drives, the driver and driver shafts shall be aligned parallel. The motor adjustment shall be loosened sufficiently to put on the belts or chain and then tightened to the proper centerline distance or tension. No belt compound shall be used.

3.12 FRAMING

A. All rectangular or special shaped openings in walls, partitions, roofs, ceilings, etc., including plaster, stucco, or similar materials shall be framed by means of plaster frames, casing beads, wood or metal angle members, as required. The intent of this paragraph is to prohibit cutting and patching in new construction and to provide smooth, even termination of wall, floor, and ceiling finishes, as well as to provide a fastening means for grilles, diffusers, etc. Lintels shall be provided over all openings in walls, etc., when not specifically indicated elsewhere. Lintels shall be of size and shape to prevent excessive deflection and shall be approved by Architect prior to installation.

3.13 CUTTING, FITTING AND PATCHING

A. Each respective Contractor shall do all cutting and drilling of masonry, steel, wood, or iron work, and all fitting necessary for the proper installation of all apparatus and materials.

B. No cutting or drilling of the structure, of any kind, shall be done without first obtaining permission from Architect. All cutting and drilling shall be done under the supervision of the General Contractor in strict accordance with instructions furnished by Architect.

C. All patching and finishing shall be the responsibility of the Contractor whose cutting or drilling makes such patching and finishing necessary. Patching and finishing shall be done by workmen skilled in the trade affected (masonry, plastering, painting, etc.).

3.14 CLEANING, TESTING AND PREPARATION FOR START-UP

A. All equipment shall be cleaned of all foreign material.

B. All equipment shall be lubricated and placed in proper working order. Drives on rotating equipment shall be checked for proper rotation and alignment. V-belt drives shall be checked and adjusted for proper tension. All fans shall be operated for at least 24 hours so that the initial stretch of the V-belt drives will take place before testing. When the belts have stretched, the fan drives shall be realigned and adjusted for tightness to make sure that the excess slippage is eliminated. All drives shall be set for the recommended speeds. All sheaves and bearing blocks shall be checked for any loose screws or nuts.

C. All controls and safety devices shall be checked to determine that they are in place and properly installed.

D. Where equipment is intended to contain fluids, it shall be filled and tested for leaks as recommended by the equipment manufacturer.

E. Equipment shall be operated for a reasonable time to determine any undue vibration, heating of parts, or other improper operation.

END OF SECTION

SECTION 230593 - TESTING, ADJUSTING AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes TAB to produce design objectives for the following:
   1. Air Systems:
      a. Constant-volume air systems.
   2. HVAC equipment quantitative-performance settings.
   3. Verifying that automatic control devices are functioning properly.
   4. Reporting results of activities and procedures specified in this Section.

1.2 SUBMITTALS

A. Certified TAB Reports: Submit two copies of reports prepared, as specified in this Section, on approved forms certified by TAB firm.

B. Warranties specified in this Section.

1.3 QUALITY ASSURANCE

A. TAB Firm Qualifications: Engage a TAB firm certified by AABC, NEBB or TABB.

B. Certification of TAB Reports: Certify TAB field data reports. This certification includes the following:
   1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
   2. Certify that TAB team complied with approved TAB plan and the procedures specified and referenced in this Specification.

C. TAB Report Forms: Use standard forms from AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems." NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems." or SMACNA's TABB "HVAC Systems - Testing, Adjusting, and Balancing." TAB firm's forms approved by Architect. TABB "Contractors Certification Manual."

D. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2016, Section 7.2.2 - "Air Balancing."

E. ASHRAE/IESNA 90.1-2016 Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2016, Section 6.7.2.3 - "System Balancing."

1.4 PROJECT CONDITIONS

A. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

1.5 COORDINATION

A. Coordinate the efforts of factory-authorized service representatives for systems and equipment, HVAC controls installers, and other mechanics to operate HVAC systems and equipment to support and assist TAB activities.

B. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

1.6 WARRANTY

A. National Project Performance Guarantee: Provide a guarantee on AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems" forms stating that AABC will assist in completing requirements of the Contract Documents if TAB firm fails to comply with the Contract Documents. Guarantee includes the following provisions:
   1. The certified TAB firm has tested and balanced systems according to the Contract Documents.
   2. Systems are balanced to optimum performance capabilities within design and installation limits.

B. Special Guarantee: Provide a guarantee on NEBB forms stating that NEBB will assist in completing requirements of the Contract Documents if TAB firm fails to comply with the Contract Documents. Guarantee shall include the following provisions:
   1. The certified TAB firm has tested and balanced systems according to the Contract Documents.
   2. Systems are balanced to optimum performance capabilities within design and installation limits.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.
   1. Verify that balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are required by the Contract Documents. Verify that quantities and locations of these balancing devices are accessible and appropriate for effective balancing and for efficient system and equipment operation.

B. Examine approved submittal data of HVAC systems and equipment.

C. Examine design data, including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.

D. Examine equipment performance data including fan and pump curves. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system. Calculate system effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from those presented when the equipment was performance tested at the factory. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," Sections 7 through 10; or in SMACNA's "HVAC Systems--Duct Design," Sections 5 and 6. Compare this data with the design data and installed conditions.

E. Examine system and equipment installations to verify that they are complete and that testing, cleaning, adjusting, and commissioning specified in individual Sections have been performed.

F. Examine system and equipment test reports.

G. Examine HVAC system and equipment installations to verify that indicated balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are properly installed, and that their locations are accessible and appropriate for effective balancing and for efficient system and equipment operation.

H. Examine systems for functional deficiencies that cannot be corrected by adjusting and balancing.

I. Examine HVAC equipment to ensure that clean filters have been installed, bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

J. Examine equipment for installation and for properly operating safety interlocks and controls.

K. Examine automatic temperature system components to verify the following:
   1. Dampers, valves, and other controlled devices are operated by the intended controller.
   2. Dampers and valves are in the position indicated by the controller.
   3. Integrity of valves and dampers for free and full operation and for tightness of fully closed and fully open positions.
   4. Thermostats and humidistats are located to avoid adverse effects of sunlight, drafts, and cold walls.
   5. Sensors are located to sense only the intended conditions.
   6. Sequence of operation for control modes is according to the Contract Documents.
   7. Controller set points are set at indicated values.
   8. Interlocked systems are operating.

L. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

A. Prepare a TAB plan that includes strategies and step-by-step procedures.

B. Complete system readiness checks and prepare system readiness reports. Verify the following:
   1. Permanent electrical power wiring is complete.
   2. Automatic temperature-control systems are operational.
   3. Equipment and duct access doors are securely closed.
   4. Balance, smoke, and fire dampers are open.
   5. Isolating and balancing valves are open and control valves are operational.
   6. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
   7. Windows and doors can be closed so indicated conditions for system operations can be met.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in ASHRAE 111, AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems", NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems", SMACNA's TABB "HVAC Systems - Testing, Adjusting, and Balancing" and this Section.
   1. Comply with requirements in ASHRAE 62.1-2016, Section 7.2.2 - "Air Balancing."

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to insulation Specifications for this Project.

C. Mark equipment and balancing device settings with paint or other suitable, permanent identification material, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, to show final settings.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. Determine the best locations in main and branch ducts for accurate duct airflow measurements.

D. Check airflow patterns from the outside-air louvers and dampers and the return- and exhaust-air dampers, through the supply-fan discharge and mixing dampers.

E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

F. Verify that motor starters are equipped with properly sized thermal protection.

G. Check dampers for proper position to achieve desired airflow path.

H. Check for airflow blockages.

I. Check condensate drains for proper connections and functioning.

J. Check for proper sealing of air-handling unit components.

K. Check for proper sealing of air duct system.

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
   1. Measure fan static pressures to determine actual static pressure as follows:
      a. Measure outlet static pressure as far downstream from the fan as practicable and upstream from restrictions in ducts such as elbows and transitions.

b. Measure static pressure directly at the fan outlet or through the flexible connection.
c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from flexible connection and downstream from duct restrictions.
d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

2. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.
   a. Simulate dirty filter operation and record the point at which maintenance personnel must change filters.
3. Measure static pressures entering and leaving other devices such as sound traps, heat recovery equipment, and air washers, under final balanced conditions.
4. Compare design data with installed conditions to determine variations in design static pressures versus actual static pressures. Compare actual system effect factors with calculated system effect factors to identify where variations occur. Recommend corrective action to align design and actual conditions.
5. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Make required adjustments to pulley sizes, motor sizes, and electrical connections to accommodate fan-speed changes.
6. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full cooling, full heating, economizer, and any other operating modes to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.
1. Measure static pressure at a point downstream from the balancing damper and adjust volume dampers until the proper static pressure is achieved.
   a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
2. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.

3.6 PROCEDURES FOR MOTORS

A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:
1. Manufacturer, model, and serial numbers.
2. Motor horsepower rating.
3. Motor rpm.
4. Efficiency rating.
5. Nameplate and measured voltage, each phase.
6. Nameplate and measured amperage, each phase.
7. Starter thermal-protection-element rating.

B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass for the controller to prove proper operation. Record observations, including controller manufacturer, model and serial numbers, and nameplate data.

3.7 PROCEDURES FOR TEMPERATURE MEASUREMENTS

A. During TAB, report the need for adjustment in temperature regulation within the automatic temperature-control system.

B. Measure indoor wet- and dry-bulb temperatures every other hour for a period of two successive eight-hour days, in each separately controlled zone, to prove correctness of final temperature settings. Measure when the building or zone is occupied.

C. Measure outside-air, wet- and dry-bulb temperatures.

3.8 TEMPERATURE-CONTROL VERIFICATION

A. Verify that controllers are calibrated and commissioned.

B. Check transmitter and controller locations and note conditions that would adversely affect control functions.

C. Record controller settings and note variances between set points and actual measurements.

D. Check the operation of limiting controllers (i.e., high- and low-temperature controllers).

E. Check free travel and proper operation of control devices such as damper and valve operators.

F. Check the sequence of operation of control devices. Note air pressures and device positions and correlate with airflow and water flow measurements. Note the speed of response to input changes.

G. Check the interaction of electrically operated switch transducers.

H. Check the interaction of interlock and lockout systems.

I. Check main control supply-air pressure and observe compressor and dryer operations.

J. Record voltages of power supply and controller output. Determine whether the system operates on a grounded or nongrounded power supply.

K. Note operation of electric actuators using spring return for proper fail-safe operations.

3.9 TOLERANCES

A. Set HVAC system airflow and water flow rates within the following tolerances:
   1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus 5 to plus 10 percent.
   2. Air Outlets and Inlets: 0 to minus 10 percent.

3.10 FINAL REPORT

A. General: Typewritten, or computer printout in letter-quality font, on standard bond paper, in three-ring binder, tabulated and divided into sections by tested and balanced systems.

B. Include a certification sheet in front of binder signed and sealed by the certified testing and balancing engineer.

1. Include a list of instruments used for procedures, along with proof of calibration.

C. Final Report Contents: In addition to certified field report data, include the following:
1. Fan curves.
2. Manufacturers' test data.
3. Field test reports prepared by system and equipment installers.
4. Other information relative to equipment performance, but do not include Shop Drawings and Product Data.

D. General Report Data: In addition to form titles and entries, include the following data in the final report, as applicable:
1. Title page.
2. Name and address of TAB firm.
3. Project name.
4. Project location.
5. Architect's name and address.
6. Engineer's name and address.
7. Contractor's name and address.
8. Report date.
9. Signature of TAB firm who certifies the report.
10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
11. Summary of contents including the following:
    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.
12. Nomenclature sheets for each item of equipment.
13. Data for terminal units, including manufacturer, type size, and fittings.
14. Notes to explain why certain final data in the body of reports varies from indicated values.
15. Test conditions for fans and pump performance forms including the following:
    a. Settings for outside-, return-, and exhaust-air dampers.
    b. Conditions of filters.
    c. Cooling coil, wet- and dry-bulb conditions.
    d. Fan drive settings including settings and percentage of maximum pitch diameter.
    e. Settings for supply-air, static-pressure controller.
    f. Other system operating conditions that affect performance.

E. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:
1. Quantities of outside, supply, return, and exhaust airflows.
2. Water and steam flow rates.
3. Duct, outlet, and inlet sizes.
4. Balancing stations.
5. Position of balancing devices.

3.11 ADDITIONAL TESTS

A. Within 90 days of completing TAB, perform additional testing and balancing to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional testing, inspecting, and adjusting during near-peak summer and winter conditions.

END OF SECTION

SECTION 230700 - HVAC INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Insulation Materials:
      a. Flexible elastomeric.
      b. Mineral fiber.
   2. Adhesives.
   3. Mastics.
   4. Factory-applied jackets.
   5. Tapes.
   6. Securements.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:
   1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
   2. Detail attachment and covering of heat tracing inside insulation.
   3. Detail insulation application at pipe expansion joints for each type of insulation.
   4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
   5. Detail removable insulation at piping specialties, equipment connections, and access panels.
   6. Detail application at linkages of control devices.

C. Field quality-control reports.

1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.
   1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
   2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in Part 3 schedule articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Aeroflex USA Inc.; Aerocel.
      b. Armacell LLC; AP Armaflex.
      c. RBX Corporation; Insul-Sheet 1800 and Insul-Tube 180.

G. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type I or II with factory-applied vinyl jacket, III with factory-applied FSK jacket or III with factory-applied FSP jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. CertainTeed Corp.; Duct Wrap.
      b. Johns Manville; Microlite.
      c. Knauf Insulation; Duct Wrap.
      d. Manson Insulation Inc.; Alley Wrap.
      e. Owens Corning; All-Service Duct Wrap.

H. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IA or Type IB. For duct and plenum applications, provide insulation with factory-applied ASJ or with factory-applied FSK jacket. For equipment applications, provide insulation with factory-applied ASJ or with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. CertainTeed Corp.; Commercial Board.
      b. Fibrex Insulations Inc.; FBX.
      c. Johns Manville; 800 Series Spin-Glas.
      d. Knauf Insulation; Insulation Board.
      e. Manson Insulation Inc.; AK Board.
      f. Owens Corning; Fiberglas 700 Series.

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

B. Flexible Elastomeric: Comply with MIL-A-24179A, Type II, Class I.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Aeroflex USA Inc.; Aeroseal.
      b. Armacell LCC; 520 Adhesive.

c. Foster Products Corporation, H. B. Fuller Company; 85-75.
d. RBX Corporation; Rubatex Contact Adhesive.

2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
a. Childers Products, Division of ITW; CP-82.
b. Foster Products Corporation, H. B. Fuller Company; 85-20.
c. ITW TACC, Division of Illinois Tool Works; S-90/80.
d. Marathon Industries, Inc.; 225.
e. Mon-Eco Industries, Inc.; 22-25.

2. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.3 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-C-19565C, Type II.

B. Vapor-Barrier Mastic: Water based; suitable for indoor and outdoor use on below ambient services.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
a. Childers Products, Division of ITW; CP-35.
b. Foster Products Corporation, H. B. Fuller Company; 30-90.
c. ITW TACC, Division of Illinois Tool Works; CB-50.
d. Marathon Industries, Inc.; 590.
e. Mon-Eco Industries, Inc.; 55-40.
f. Vimasco Corporation; 749.

2. Water-Vapor Permeance: ASTM E 96, Procedure B, 0.013 perm at 43-mil dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F.
4. Solids Content: ASTM D 1644, 59 percent by volume and 71 percent by weight.
5. Color: White.

2.4 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.
5. PVDC Jacket for Indoor Applications: 4-mil-thick, white PVDC biaxially oriented barrier film with a permeance at 0.02 perms when tested according to ASTM E 96 and with a flame-spread index of 5 and a smoke-developed index of 20 when tested according to ASTM E 84.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   1) Dow Chemical Company (The); Saran 540 Vapor Retarder Film and Saran 560 Vapor Retarder Film.

2.5 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.

C. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105 or 5005, Temper H-14.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Childers Products, Division of ITW; Metal Jacketing Systems.
      b. PABCO Metals Corporation; Surefit.
      c. RPR Products, Inc.; Insul-Mate.
   2. Sheet and roll stock ready for shop or field sizing.
   3. Finish and thickness are indicated in field-applied jacket schedules.
   4. Moisture Barrier for Outdoor Applications: 3-mil- thick, heat-bonded polyethylene and kraft paper 2.5-mil- thick Polysurlyn.
   5. Factory-Fabricated Fitting Covers:
      a. Same material, finish, and thickness as jacket.
      b. Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
      c. Flange and union covers.
      d. Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

2.6 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0835.
      b. Compac Corp.; 104 and 105.
      c. Ideal Tape Co., Inc., an American Biltrite Company; 428 AWF ASJ.
      d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.
   2. Width: 3 inches.
   3. Thickness: 11.5 mils.
   4. Adhesion: 90 ounces force/inch in width.
   5. Elongation: 2 percent.
   6. Tensile Strength: 40 lbf/inch in width.
   7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
      b. Compac Corp.; 110 and 111.

c. Ideal Tape Co., Inc., an American Biltrite Company; 491 AWF FSK.
d. Venture Tape; 1525 CW, 1528 CW, and 1528 CW/SQ.

2. Width: 3 inches.
3. Thickness: 6.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.

7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive. Suitable for indoor and outdoor applications.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0555.
b. Compac Corp.; 130.
c. Ideal Tape Co., Inc., an American Biltrite Company; 370 White PVC tape.
d. Venture Tape; 1506 CW NS.

2. Width: 2 inches.
3. Thickness: 6 mils.
4. Adhesion: 64 ounces force/inch in width.
5. Elongation: 500 percent.
6. Tensile Strength: 18 lbf/inch in width.

D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
b. Compac Corp.; 120.
c. Ideal Tape Co., Inc., an American Biltrite Company; 488 AWF.
d. Venture Tape; 3520 CW.

2. Width: 2 inches.
3. Thickness: 3.7 mils.
4. Adhesion: 100 ounces force/inch in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch in width.

2.7 SECUREMENTS

A. Insulation Pins and Hangers:
1. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
1) AGM Industries, Inc.; Tactoo Insul-Hangers, Series T.
2) GEMCO; Perforated Base.
3) Midwest Fasteners, Inc.; Spindle.
b. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.

c. Spindle: Copper- or zinc-coated, low carbon steel Aluminum or Stainless steel, fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.
d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.

2. Nonmetal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate fastened to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
   a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      1) GEMCO; Nylon Hangers.
      2) Midwest Fasteners, Inc.; Nylon Insulation Hangers.
   b. Baseplate: Perforated, nylon sheet, 0.030 inch thick by 1-1/2 inches in diameter.
   c. Spindle: Nylon, 0.106-inch-diameter shank, length to suit depth of insulation indicated, up to 2-1/2 inches.
   d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.

3. Self-Sticking-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
   a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      1) AGM Industries, Inc.; Tactoo Insul-Hangers, Series TSA.
      2) GEMCO; Press and Peel.
      3) Midwest Fasteners, Inc.; Self Stick.
   b. Baseplate: Galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
   c. Spindle: Copper- or zinc-coated, low carbon steel, Aluminum or Stainless steel, fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.
   d. Adhesive-backed base with a peel-off protective cover.

4. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick, galvanized-steel, aluminum, stainless-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
   a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      1) AGM Industries, Inc.; RC-150.
      2) GEMCO; R-150.
      3) Midwest Fasteners, Inc.; WA-150.
      4) Nelson Stud Welding; Speed Clips.
   b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.

5. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
   a. Products: Subject to compliance with requirements available products that may be incorporated into the Work include, but are not limited to, the following:
      1) GEMCO.
      2) Midwest Fasteners, Inc.

B. Staples: Outward-clinching insulation staples, nominal 3/4-inch- (19-mm-) wide, stainless steel or Monel.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment, ducts and fittings, and piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment, duct system, and pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
   1. Install insulation continuously through hangers and around anchor attachments.
   2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to

structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.

3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Install insulation with factory-applied jackets as follows:
1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.
   a. For below ambient services, apply vapor-barrier mastic over staples.
4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct and pipe flanges and fittings.

M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

P. For above ambient services, do not install insulation to the following:
1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Manholes.
5. Handholes.
6. Cleanouts.

3.3 PENETRATIONS

A. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.

4. Seal jacket to wall flashing with flashing sealant.

B. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

3.4 FLEXIBLE ELASTOMERIC INSULATION INSTALLATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:
1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:
1. Install mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.5 MINERAL-FIBER INSULATION INSTALLATION

A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
   a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
   b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
   c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
   d. Do not overcompress insulation during installation.
   e. Impale insulation over pins and attach speed washers.
   f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from 1 edge and 1 end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-

clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to 2 times the insulation thickness but not less than 3 inches.

5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

B. Board Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
   a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
   b. On duct sides with dimensions larger than 18 inches, space pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
   c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
   d. Do not overcompress insulation during installation.
   e. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from 1 edge and 1 end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
   a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
   b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to 2 times the insulation thickness but not less than 3 inches.

5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:
1. Inspect ductwork, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to one location(s) for each duct system defined in the "Duct Insulation Schedule, General" Article.
2. Inspect field-insulated equipment, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to one location(s) for each type of equipment defined in the "Equipment Insulation Schedule" Article. For large equipment, remove only a portion adequate to determine compliance.

C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.7 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. Concealed, Supply-Air Duct and Plenum Insulation: Mineral-fiber blanket , 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.

B. Exposed, Rectangular Supply-Air Duct and Plenum Insulation: Mineral-fiber board, 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.

C. Exposed, Round Supply-Air Duct Insulation: Flexible Elastomeric duct liner, 1 inches thick and cleanable. Comply with Division 23 Section "Metal Ducts" for duct liner requirements.

3.8 PIPING INSULATION SCHEDULE

A. Refrigerant Suction and Hot-Gas Piping: Flexible elastomeric or Mineral-fiber, preformed pipe insulation, 1 inch thick.

END OF SECTION

SECTION 231123 – FACILITY NATURAL-GAS PIPING

PART 1 - GENERAL

1.1 This section specifies the material, installation, and performance requirements for the facility natural gas piping system. Including connection to the exterior natural gas distribution system.

1.2 Reference to manufacturers by name, make or catalog number shall be interpreted as establishing a minimum standard of quality and shall not be construed as limiting competition. If only one manufacturer's product is acceptable, it will be so stated.

1.3 All quantities of each item of specified material and equipment shall be provided by one manufacturer.

1.4 SUMMARY

A. Section Includes:
   1. Pipes, tubes, and fittings.
   2. Piping specialties.
   3. Piping and tubing joining materials.
   4. Valves.
   5. Pressure regulators.

1.5 DEFINITIONS

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

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

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

1.6 PERFORMANCE REQUIREMENTS

A. Minimum Operating-Pressure Ratings:
   1. Piping and Valves: 100 psig minimum unless otherwise indicated.
   2. Service Regulators: 100 psig minimum unless otherwise indicated.

B. Natural-Gas System Pressures within Buildings: Two pressure ranges. Primary pressure is more than 0.5 psig but not more than 2 psig, and is reduced to secondary pressure of 0.5 psig or less.

1.7 SHOP DRAWINGS AND RELATED SUBMITTALS.

A. Submittals shall be made in accordance with Paragraph "Submittals" in Section 220500 – Common Work Results for Plumbing.

B. Corrections or comments made on the submittals during the Engineer's review do not relieve the Contractor from compliance with the Drawings and Specifications. The Engineer's review of submittals is only for general conformance with design concept and general compliance with the information given in the Contract Documents. The

Contractor's responsibility includes, but is not limited to, confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating his work with that of all other trades, and performing his work in a safe and satisfactory manner.

C. Manufacturer's catalog data, dimensional data, and specification data shall be submitted on the following:
   1. Piping specialties.
   2. Piping and tubing joining materials.
   3. Valves.
   4. Pressure regulators.

D. Certificate of Materials shall be submitted on the following:
   1. Pipes, tubes, and fittings

E. Test Reports shall be submitted on the following:
   1. As described in Article “Field Quality Control

1.8 QUALITY ASSURANCE

A. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Source Limitations: Obtain piping, fittings and other components of each material through one source from a single manufacturer.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Handling Flammable Liquids: Remove and dispose of liquids from existing natural-gas piping according to requirements of authorities having jurisdiction.

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

C. Store and handle pipes and tubes having factory-applied protective coatings to avoid damaging coating, and protect from direct sunlight.

1.10 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided.

B. Coordinate requirements for access panels and doors for valves installed concealed behind finished surfaces.

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

A. Steel Pipe: ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.
   1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
   2. Wrought-Steel Welding Fittings: ASTM A 234/A 234M for butt welding and socket welding.
   3. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.
   4. Forged-Steel Flanges and Flanged Fittings: ASME B16.5, minimum Class 150, including bolts, nuts, and gaskets of the following material group, end connections, and facings:
      a. Material Group: 1.1.
      b. End Connections: Threaded or butt welding to match pipe.
      c. Lapped Face: Not permitted underground.
      d. Gasket Materials: ASME B16.20, metallic, flat, asbestos free, aluminum o-rings, and spiral-wound metal gaskets.
      e. Bolts and Nuts: ASME B18.2.1, carbon steel aboveground and stainless steel underground.
   5. Protective Coating for Underground Piping: Factory-applied, three-layer coating of epoxy, adhesive, and PE.
      a. Joint Cover Kits: Epoxy paint, adhesive, and heat-shrink PE sleeves.

2.2 PIPING SPECIALTIES

A. Y-Pattern Strainers:
   1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
   2. End Connections: Threaded ends for 2” and smaller; flanged ends for 2-1/2” and larger.
   3. Strainer Screen: 60-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.
   4. CWP Rating: 125 psig.

B. Weatherproof Vent Cap: Cast- or malleable-iron increaser fitting with corrosion-resistant wire screen, with free area at least equal to cross-sectional area of connecting pipe and threaded-end connection.

2.3 JOINING MATERIALS

A. Joint Compound and Tape: Suitable for natural gas.

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

2.4 MANUAL GAS SHUTOFF VALVES

A. See "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles for where each valve type is applied in various services.

B. General Requirements for Metallic Valves, 2” and Smaller: Comply with ASME B16.33.
   1. CWP Rating: 125 psig.

2. Threaded Ends: Comply with ASME B1.20.1.
3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.
4. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
5. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1” and smaller.
6. Service Mark: Valves 1-1/4” to 2” shall have initials "WOG" permanently marked on valve body.

C. General Requirements for Metallic Valves, 2-1/2” and Larger: Comply with ASME B16.38.
1. CWP Rating: 125 psig.
2. Flanged Ends: Comply with ASME B16.5 for steel flanges.
3. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
4. Service Mark: Initials "WOG" shall be permanently marked on valve body.

D. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: MSS SP-110.
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   a. BrassCraft Manufacturing Company; a Masco company.
   b. Conbraco Industries, Inc.; Apollo Div.
   c. Lyall, R. W. & Company, Inc.
   d. McDonald, A. Y. Mfg. Co.
2. Body: Bronze, complying with ASTM B 584.
3. Ball: Chrome-plated bronze.
4. Stem: Bronze; blowout proof.
5. Seats: Reinforced TFE; blowout proof.
6. Packing: Threaded-body packnut design with adjustable-stem packing.
7. Ends: Threaded, flared, or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
8. CWP Rating: 600 psig.
9. Listing: Valves 1” and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

E. Bronze Plug Valves: MSS SP-78.
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   a. Lee Brass Company.
   b. McDonald, A. Y. Mfg. Co.
2. Body: Bronze, complying with ASTM B 584.
3. Plug: Bronze.
4. Ends: Threaded, socket, or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
5. Operator: Square head or lug type with tamperproof feature where indicated.
6. Pressure Class: 125 psig.
7. Listing: Valves 1” and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.

8. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

F. Cast-Iron, Nonlubricated Plug Valves: MSS SP-78.
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   a. McDonald, A. Y. Mfg. Co.
   b. Mueller Co.; Gas Products Div.
   c. Xomox Corporation; a Crane company.
2. Body: Cast iron, complying with ASTM A 126, Class B.
3. Plug: Bronze or nickel-plated cast iron.
4. Seat: Coated with thermoplastic.
5. Stem Seal: Compatible with natural gas.
6. Ends: Threaded or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
7. Operator: Square head or lug type with tamperproof feature where indicated.
8. Pressure Class: 125 psig.
9. Listing: Valves 1” and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

G. Cast-Iron, Lubricated Plug Valves: MSS SP-78.
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   a. Homestead Valve; a division of Olson Technologies, Inc.
   b. McDonald, A. Y. Mfg. Co.
   c. Milliken Valve Company.
   d. Mueller Co.; Gas Products Div.
2. Body: Cast iron, complying with ASTM A 126, Class B.
3. Plug: Bronze or nickel-plated cast iron.
4. Seat: Coated with thermoplastic.
5. Stem Seal: Compatible with natural gas.
6. Ends: Threaded or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
7. Operator: Square head or lug type with tamperproof feature where indicated.
8. Pressure Class: 125 psig.
9. Listing: Valves 1” and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

2.5 PRESSURE REGULATORS

A. General Requirements:
1. Single stage and suitable for natural gas.
2. Steel jacket and corrosion-resistant components.
3. Elevation compensator.
4. End Connections: Threaded for regulators 2” and smaller; flanged for regulators 2-1/2” and larger.

B. Line Pressure Regulators: Comply with ANSI Z21.80.
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
      a. Actaris.
      b. American Meter Company.
      c. Fisher Control Valves and Regulators; Division of Emerson Process Management.
      d. Maxitrol Company.
      e. Richards Industries; Jordan Valve Div.
   2. Body and Diaphragm Case: Cast iron or die-cast aluminum.
   3. Springs: Zinc-plated steel; interchangeable.
   4. Diaphragm Plate: Zinc-plated steel.
   5. Seat Disc: Nitrile rubber resistant to gas impurities, abrasion, and deformation at the valve port.
   6. Orifice: Aluminum; interchangeable.
   7. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
   8. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet, and no pressure sensing piping external to the regulator.
   9. Pressure regulator shall maintain discharge pressure setting downstream, and not exceed 150 percent of design discharge pressure at shutoff.
   10. Overpressure Protection Device: Factory mounted on pressure regulator.
   11. Atmospheric Vent: Factory- or field-installed, stainless-steel screen in opening if not connected to vent piping.
   12. Maximum Inlet Pressure: 2 psig.

C. Appliance Pressure Regulators: Comply with ANSI Z21.18.
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
      a. Eaton Corporation; Controls Div.
      b. Harper Wyman Co.
      c. Maxitrol Company.
   2. Body and Diaphragm Case: Die-cast aluminum.
   3. Springs: Zinc-plated steel; interchangeable.
   4. Diaphragm Plate: Zinc-plated steel.
   5. Seat Disc: Nitrile rubber.
   6. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
   7. Factory-Applied Finish: Minimum three-layer polyester and polyurethane paint finish.
   8. Regulator may include vent limiting device, instead of vent connection, if approved by authorities having jurisdiction.
   9. Maximum Inlet Pressure: 1 psig 2 psig 5 psig.

2.6 DIELECTRIC FITTINGS

A. Dielectric fittings are specified in Division 22 section “Common Work Results for Plumbing”.

2.7 SLEEVES AND MECHANICAL SEALS

A. Sleeves and Mechanical Seals are specified in Division 22 section “Common Work Results for Plumbing”.

2.8 ESCUTCHEONS

A. Escutcheons are specified in Division 22 section “Common Work Results for Plumbing”.

2.9 GROUT

A. Grout is specified in Division 22 section “Common Work Results for Plumbing”.

2.10 LABELING AND IDENTIFYING

A. Refer to Division 22 Section “Identification for Plumbing Piping and Equipment”.

B. Detectable Warning Tape: Acid- and alkali-resistant, PE film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored yellow.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for natural-gas piping system to verify actual locations of piping connections before equipment installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Close equipment shutoff valves before turning off natural gas to premises or piping section.

B. Inspect natural-gas piping according to the International Fuel Gas Code to determine that natural-gas utilization devices are turned off in piping section affected.

C. Comply with the International Fuel Gas Code requirements for prevention of accidental ignition.

3.3 OUTDOOR PIPING INSTALLATION

A. Comply with the International Fuel Gas Code for installation and purging of natural-gas piping.

B. Install underground, natural-gas piping buried at least 36 inches below finished grade.
   1. If natural-gas piping is installed less than 36 inches below finished grade, install it in containment conduit.

C. Steel Piping with Protective Coating:
   1. Apply joint cover kits to pipe after joining to cover, seal, and protect joints.
   2. Repair damage to PE coating on pipe as recommended in writing by protective coating manufacturer.

D. Install fittings for changes in direction and branch connections.

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

F. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

G. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

H. Install pressure gage upstream and downstream from each regulator.

3.4 INDOOR PIPING INSTALLATION

A. Comply with the International Fuel Gas Code for installation and purging of natural-gas piping.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction, to allow for mechanical installations.

D. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

E. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

G. Locate valves for easy access.

H. Install natural-gas piping at uniform grade of 2 percent down toward drip and sediment traps.

I. Install piping free of sags and bends.

J. Install fittings for changes in direction and branch connections.

K. Install escutcheons at penetrations of walls, ceilings, and floors.

L. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials.

M. Verify final equipment locations for roughing-in.

N. Comply with requirements in Sections specifying gas-fired appliances and equipment for roughing-in requirements.

O. Drips and Sediment Traps: Install drips at points where condensate may collect, including service-meter outlets. Locate where accessible to permit cleaning and emptying. Do not install where condensate is subject to freezing.
   1. Construct drips and sediment traps using tee fitting with bottom outlet plugged or capped. Use nipple a minimum length of 3 pipe diameters, but not less than 3 inches long and same size as connected pipe. Install with space below bottom of drip to remove plug or cap.

P. Provide gas regulator at final connections to all gas fired equipment.

Q. Extend relief vent connections for service regulators, line regulators, and overpressure protection devices to outdoors and terminate with weatherproof vent cap.

R. Conceal pipe installations in walls, pipe spaces, utility spaces, above ceilings, below grade or floors, and in floor channels unless indicated to be exposed to view.

S. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.

T. Connect branch piping from top or side of horizontal piping.

U. Install unions in pipes 2” and smaller, adjacent to each valve, at final connection to each piece of equipment. Unions are not required at flanged connections.

V. Do not use natural-gas piping as grounding electrode.

W. Install strainer on inlet of each line-pressure regulator and automatic or electrically operated valve.

X. Install pressure gage upstream and downstream from each line regulator.

3.5 VALVE INSTALLATION

A. Install manual gas shutoff valve for each gas appliance ahead of corrugated stainless-steel tubing.

B. Install regulators and overpressure protection devices with maintenance access space adequate for servicing and testing.

C. Install anode for metallic valves in underground PE piping.

3.6 PIPING JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Threaded Joints:
   1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
   2. Cut threads full and clean using sharp dies.

3. Ream threaded pipe ends to remove burrs and restore full inside diameter of pipe.
4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.
5. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. Welded Joints:
1. Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators.
2. Bevel plain ends of steel pipe.
3. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.

E. Flanged Joints: Install gasket material, size, type, and thickness appropriate for natural-gas service. Install gasket concentrically positioned.

F. Flared Joints: Cut tubing with roll cutting tool. Flare tube end with tool to result in flare dimensions complying with SAE J513. Tighten finger tight, then use wrench. Do not overtighten.

3.7 HANGER AND SUPPORT INSTALLATION

A. Install hangers for horizontal steel piping with the following maximum spacing and minimum rod sizes:
1. 1” and Smaller: Maximum span, 96 inches; minimum rod size, 3/8 inch.
2. 1-1/4”: Maximum span, 108 inches; minimum rod size, 3/8 inch.
3. 1-1/2” and 2”: Maximum span, 108 inches; minimum rod size, 3/8 inch.
4. 2-1/2” to 3-1/2”: Maximum span, 10 feet; minimum rod size, 1/2 inch.
5. 4” and Larger: Maximum span, 10 feet; minimum rod size, 5/8 inch.

3.8 CONNECTIONS

A. Install natural-gas piping electrically continuous, and bonded to gas appliance equipment grounding conductor of the circuit powering the appliance according to NFPA 70.

B. Install piping adjacent to appliances to allow service and maintenance of appliances.

C. Connect piping to appliances using manual gas shutoff valves and unions. Install valve within 72 inches of each gas-fired appliance and equipment. Install union between valve and appliances or equipment.

D. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance.

3.9 LABELING AND IDENTIFYING

A. Comply with requirements in Division 22 Section "Identification for Plumbing Piping and Equipment" for piping and valve identification. Install detectable warning tape directly above gas piping, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.10 PAINTING

A. Paint exposed, exterior metal piping, valves, service regulators, service meters and meter bars, earthquake valves, and piping specialties, except components, with factory-applied paint or protective coating.

B. Damage and Touchup: Repair marred and damaged factory-applied finishes with materials and by procedures to match original factory finish.

3.11 CONCRETE BASES

A. Concrete Bases: Anchor equipment to concrete base.

3.12 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. INTERIOR PIPING. Fuel gas piping system tests shall be made in accordance with the rules and regulations of the utility serving the building. However, if no such rules exist or if the test pressure to be used is less than 100 pounds per square inch, the entire fuel gas piping system shall be tested as follows: Air or inert gas shall be pumped into the system until the pressure reaches 100 pounds per square inch. These pressures shall remain constant for not less than thirty minutes with no further pumping of air into the system. Repair leaking joints with new materials and retest until no leaks exist. Submit separate reports for each test.
2. TESTING PIPE COATING. After visual examination prior to backfilling, the entire length of the finished coating shall be checked for defects. A holiday detector test shall be performed on the exterior of the first five sections and every tenth section thereafter of coated metallic conduit. The tests shall be accomplished with silicone rubber electric wire brush, or a coil probe testing set, with an operating bell, buzzer, or other audible signal which will sound when a holiday is detected at 10,000 crest voltage plus or minus 5%. The tester shall be a type so fixed that field adjustment cannot be made. Calibration by the manufacturer of the tester shall be required at 6-month intervals or at such time as crest voltage is questionable. The manufacturer of the tester shall certify in writing the date of calibration and crest voltage setting. The battery shall be maintained at ample charge to produce the crest voltage during all tests. Voids or defective coating detected by either visual examination or by the holiday test shall be repaired by removing the defective coating and the area washed with a non-oily solvent and cleaned with a wire brush. Apply one coat of primer to the area and wrap the defective area with a 10 mil vinyl tape (double thickness). The field wrapping shall extend 3” over the undisturbed factory applied coating. The repaired section shall again be tested to prove that there are no holidays evident.
3. PURGING. When piping is full of air is placed in operation, the air in the piping shall be displaced with fuel gas. The air can be safely displaced with fuel gas, provided that a moderately rapid and continuous flow of fuel gas is introduced at one end of the line and air is vented out at the other end. The fuel gas flow shall be continued without interruption until the vented gas is free of air. The point of discharge shall not be left unattended during purging. After purging, the vent shall then be closed. The open end of piping systems being purging shall not discharge into a confined spaces or areas where there are sources of ignition. After the

piping system has been places in operation, all appliances and equipment shall be purged and then placed in operation, as necessary.

C. Natural-gas piping will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.13 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain earthquake valves.

3.14 OUTDOOR PIPING SCHEDULE

A. Underground natural-gas piping shall be one of the following:
   1. Steel pipe with wrought-steel fittings and welded joints, or mechanical couplings. Coat pipe and fittings with protective coating for steel piping.

B. Aboveground natural-gas piping 2-1/2” and smaller shall be the following:
   1. Steel pipe with malleable-iron fittings and threaded joints .

C. Aboveground natural-gas piping 3” and larger shall be the following:
   1. Steel pipe with wrought-steel fittings and welded joints.

D. Containment Conduit: Steel pipe with wrought-steel fittings and welded joints. Coat pipe and fittings with protective coating for steel piping.

3.15 INDOOR PIPING SCHEDULE

A. Aboveground piping 2” and smaller shall be the following:
   1. Steel pipe with malleable-iron fittings and threaded joints.

B. Aboveground piping 2 1/2" and larger shall be the following:
   1. Steel pipe with wrought-steel fittings and welded joints.

C. Underground below building, piping 2” and smaller shall be the following:
   1. Steel pipe with malleable-iron fittings and threaded joints.

D. Underground below building piping 2 1/2" and larger shall be the following:
   1. Steel pipe with wrought-steel fittings and welded joints.

3.16 ABOVEGROUND MANUAL GAS SHUTOFF VALVE SCHEDULE

A. Valves for pipe sizes 2” and smaller at service meter shall be one of the following:
   1. Two-piece, full-port, bronze ball valves with bronze trim.
   2. Bronze plug valve.

B. Valves for pipe sizes 2-1/2” and larger at service meter shall be the following:
   1. Cast-iron, nonlubricated plug valve.

C. Distribution piping valves for pipe sizes 2” and smaller shall be one of the following:
   1. Two-piece, full-port, bronze ball valves with bronze trim.
   2. Bronze plug valve.

D. Distribution piping valves for pipe sizes 2-1/2” and larger shall be the following:
   1. Cast-iron, lubricated plug valve.

END OF SECTION

SECTION 232300 – REFRIGERANT PIPING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Refrigerant piping shall be sized, selected, and designed either by the equipment manufacturer or in strict accordance with the manufacturer's published instructions. The schematic piping diagram shall show all accessories such as, stop valves, level indicators, liquid receivers, oil separator, gauges, thermostatic expansion valves, solenoid valves, moisture separators and driers to make a complete installation.

B. Definitions:

1. Refrigerating system: Combination of interconnected refrigerant-containing parts constituting one closed refrigeration circuit in which a refrigerant is circulated for the purpose of extracting heat.
   a. Low side means the parts of a refrigerating system subjected to evaporator pressure.
   b. High side means the parts of a refrigerating system subjected to condenser pressure.
2. Brazed joint: A gas-tight joint obtained by the joining of metal parts with alloys which melt at temperatures higher than 449 degrees C (840 degrees F) but less than the melting temperatures of the joined parts.

1.3 QUALITY ASSURANCE

A. Refer to specification Section 23 05 00, COMMON WORK RESULTS FOR HVAC.

B. Comply with ASHRAE Standard 15, Safety Code for Mechanical Refrigeration. The application of this Code is intended to assure the safe design, construction, installation, operation, and inspection of every refrigerating system employing a fluid which normally is vaporized and liquefied in its refrigerating cycle.

C. Comply with ASME B31.5: Refrigerant Piping and Heat Transfer Components.

D. Products shall comply with UL 207 "Refrigerant–Containing Components and Accessories, "Nonelectrical"; or UL 429 "Electrical Operated Valves."

1.4 SUBMITTALS

A. Certification: Copies of certificates for welding procedure, performance qualification record and list of welders' names and symbols.

PART 2 - PRODUCTS

2.1 PIPING AND FITTINGS

A. Refrigerant Piping: For piping up to 100 mm (4 inch) use Copper refrigerant tube, ASTM B280, cleaned, dehydrated, and sealed, marked ACR on hard temper straight lengths. Coils shall be tagged ASTM B280 by the manufacturer. For piping over 100 mm (4 inch) use A53 Black SML steel.

B. Water and Drain Piping: Copper water tube, ASTM B88M, Type B or C (ASTM B88, Type M or L). Optional drain piping material: Schedule 80 flame retardant Polypropylene plastic.

C. Fittings, Valves and Accessories:
   1. Copper fittings: Wrought copper fittings, ASME B16.22.
      a. Brazed Joints, refrigerant tubing: Cadmium free, AWS A5.8/A5.8M, 45 percent silver brazing alloy, Class BAg-5.
      b. Solder Joints, water and drain: 95-5 tin-antimony, ASTM B32 (95TA).
   2. Steel fittings: ASTM wrought steel fittings.
      a. Refrigerant piping – Welded Joints.
   3. Flanges and flanged fittings: ASME B16.24.
   4. Refrigeration Valves:
      a. Stop Valves: Brass or bronze alloy, packless, or packed type with gas tight cap, frost proof, back seating.
      b. Pressure Relief Valves: Comply with ASME Boiler and Pressure Vessel Code; UL listed. Forged brass with nonferrous, corrosion resistant internal working parts of high strength, cast iron bodies conforming to ASTM A126, Grade B. Set valves in accordance with ASHRAE Standard 15.
   5. Strainers: Designed to permit removing screen without removing strainer from piping system, and provided with screens 80 to 100 mesh in liquid lines DN 25 (NPS 1) and smaller, 60 mesh in liquid lines larger than DN 25 (NPS 1), and 40 mesh in suction lines. Provide strainers in liquid line serving each thermostatic expansion valve, and in suction line serving each refrigerant compressor not equipped with integral strainer.
   6. Refrigerant Moisture/Liquid Indicators: Double-ported type having heavy sight glasses sealed into forged bronze body and incorporating means of indicating refrigerant charge and moisture indication. Provide screwed brass seal caps.

2.2 PIPE SUPPORTS

A. Refer to specification Section 23 05 00, COMMON WORK RESULTS FOR HVAC.

2.3 REFRIGERANTS AND OIL

A. Provide EPA approved refrigerant and oil for proper system operation.

2.4 PIPE INSULATION FOR DX HVAC SYSTEMS

A. Refer to specification Section 230700 HVAC Insulation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install refrigerant piping and refrigerant containing parts in accordance with ASHRAE Standard 15 and ASME B31.5
   1. Install piping as short as possible, with a minimum number of joints, elbow and fittings.
   2. Install piping with adequate clearance between pipe and adjacent walls and hangers to allow for service and inspection. Space piping, including insulation, to provide 25 mm (1 inch) minimum clearance between adjacent piping or other surface. Use pipe sleeves through walls, floors, and ceilings, sized to permit installation of pipes with full thickness insulation.
   3. Locate and orient valves to permit proper operation and access for maintenance of packing, seat and disc. Generally locate valve stems in overhead piping in horizontal position. Provide a union adjacent to one end of all threaded end valves.

Control valves usually require reducers to connect to pipe sizes shown on the drawing.

4. Use copper tubing in protective conduit when installed below ground.
5. Install hangers and supports per ASME B31.5 and the refrigerant piping manufacturer's recommendations.

B. Joint Construction:
   1. Brazed Joints: Comply with AWS "Brazing Handbook" and with filler materials complying with AWS A5.8/A5.8M.
      a. Use Type BcuP, copper-phosphorus alloy for joining copper socket fittings with copper tubing.
      b. Use Type BAg, cadmium-free silver alloy for joining copper with bronze or steel.
      c. Swab fittings and valves with manufacturer's recommended cleaning fluid to remove oil and other compounds prior to installation.
      d. Pass nitrogen gas through the pipe or tubing to prevent oxidation as each joint is brazed. Cap the system with a reusable plug after each brazing operation to retain the nitrogen and prevent entrance of air and moisture.

C. Protect refrigerant system during construction against entrance of foreign matter, dirt and moisture; have open ends of piping and connections to compressors, condensers, evaporators and other equipment tightly capped until assembly.

D. Pipe relief valve discharge to outdoors for systems containing more than 45 kg (100 lbs) of refrigerant.

E. Firestopping: Fill openings around uninsulated piping penetrating floors or fire walls, with firestop material. For firestopping insulated piping refer to Section 23 07 00, HVAC INSULATION.

3.2 PIPE AND TUBING INSULATION

A. Apply two coats of weather-resistant finish as recommended by the manufacturer to insulation exposed to outdoor weather.

3.3 SIGNS AND IDENTIFICATION

A. Each refrigerating system erected on the premises shall be provided with an easily legible permanent sign securely attached and easily accessible, indicating thereon the name and address of the installer, the kind and total number of pounds of refrigerant required in the system for normal operations, and the field test pressure applied.

B. Systems containing more than 50 kg (110 lb) of refrigerant shall be provided with durable signs, in accordance with ANSI A13.1 and ANSI Z535.1, having letters not less than 13 mm (1/2 inch) in height designating:
   1. Valves and switches for controlling refrigerant flow, the ventilation and the refrigerant compressor(s).
   2. Signs on all exposed high pressure and low pressure piping installed outside the machinery room, with name of the refrigerant and the letters "HP" or "LP."

3.4 FIELD QUALITY CONTROL

Prior to initial operation examine and inspect piping system for conformance to plans and specifications and ASME B31.5. Correct equipment, material, or work rejected because of defects or nonconformance with plans and specifications, and ANSI codes for pressure piping.

A. After completion of piping installation and prior to initial operation, conduct test on piping system according to ASME B31.5. Furnish materials and equipment required for tests. Perform tests in the presence of Resident Engineer. If the test fails, correct defects and perform the test again until it is satisfactorily done and all joints are proved tight.
   1. Every refrigerant-containing parts of the system that is erected on the premises, except compressors, condensers, evaporators, safety devices, pressure gages, control mechanisms and systems that are factory tested, shall be tested and proved tight after complete installation, and before operation.
   2. The high and low side of each system shall be tested and proved tight at not less than the lower of the design pressure or the setting of the pressure-relief device protecting the high or low side of the system, respectively, except systems erected on the premises using non-toxic and non-flammable Group A1 refrigerants with copper tubing not exceeding DN 18 (NPS 5/8). This may be tested by means of the refrigerant charged into the system at the saturated vapor pressure of the refrigerant at 20 degrees C (68 degrees F) minimum.

B. Test Medium: A suitable dry gas such as nitrogen or shall be used for pressure testing. The means used to build up test pressure shall have either a pressure-limiting device or pressure-reducing device with a pressure-relief device and a gage on the outlet side. The pressure relief device shall be set above the test pressure but low enough to prevent permanent deformation of the system components.

3.5 SYSTEM TEST AND CHARGING

A. System Test and Charging: As recommended by the equipment manufacturer or as follows:
   1. Connect a drum of refrigerant to charging connection and introduce enough refrigerant into system to raise the pressure to 70 kPa (10 psi) gage. Close valves and disconnect refrigerant drum. Test system for leaks with halide test torch or other approved method suitable for the test gas used. Repair all leaking joints and retest.
   2. Connect a drum of dry nitrogen to charging valve and bring test pressure to design pressure for low side and for high side. Test entire system again for leaks.
   3. Evacuate the entire refrigerant system by the triplicate evacuation method with a vacuum pump equipped with an electronic gage reading in mPa (microns). Pull the system down to 665 mPa (500 microns) 665 mPa (2245.6 inches of mercury at 60 degrees F) and hold for four hours then break the vacuum with dry nitrogen (or refrigerant). Repeat the evacuation two more times breaking the third vacuum with the refrigeration to be charged and charge with the proper volume of refrigerant.

END OF SECTION

SECTION 233113 - METAL DUCTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Single-wall rectangular ducts and fittings.
2. Sheet metal materials.
3. Sealants and gaskets.
4. Hangers and supports.

B. Related Sections:
1. Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.

1.2 PERFORMANCE REQUIREMENTS

A. Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.

B. Structural Performance: Duct hangers and supports and seismic restraints shall withstand the effects of gravity and seismic loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and International Building Code’s seismic requirements.

C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2016. No insulation surfaces shall contact air stream.

D. Carefully coordinate duct construction, color, painting, location, etc. with the Architectural drawings, Architect, and construction manager. Submit all ductwork features before fabrication, ordering, etc. The exposed ductwork is an architectural feature of this facility.

1.3 SUBMITTALS

A. Product Data: For each type of the following products:
1. Adhesives.
2. Sealants and gaskets.

B. Shop Drawings:
1. Factory- and shop-fabricated ducts and fittings.
2. Fittings.
3. Reinforcement and spacing.
4. Seam and joint construction.
5. Hangers and supports, including methods for duct and building attachment and vibration isolation.

C. Design Submittal:
1. Sheet metal thicknesses.
2. Joint and seam construction and sealing.
3. Reinforcement details and spacing.
4. Materials, fabrication, assembly, and spacing of hangers and supports.
5. Design Calculations: Calculations for selecting hangers and supports and seismic restraints.

D. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
   1. Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
   2. Suspended ceiling components.
   3. Size and location of initial access modules for acoustical tile.
   4. Items penetrating finished ceiling including the following:
      a. Lighting fixtures.
      b. Air outlets and inlets.
      c. Speakers.
      d. Sprinklers.
      e. Access panels.

E. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2016, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up."

B. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2016, Section 6.4.4 - "HVAC System Construction and Insulation."

PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-4, "Transverse (Girth) Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-5, "Longitudinal Seams - Rectangular Ducts," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 2, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct

construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
   1. Galvanized Coating Designation: G90 (Z275).
   2. Finishes for Surfaces Exposed to View: Mill phosphatized. Ductwork shall also be paint grip for field painting.

2.3 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Two-Part Tape Sealing System:
   1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
   2. Tape Width: 3 inches (76 mm); 4 inches (102 mm); and 6 inches (152 mm)-dependant on duct size.
   3. Sealant: Modified styrene acrylic.
   4. Water resistant.
   5. Mold and mildew resistant.
   6. Maximum Static-Pressure Class: 10-inch wg (2500 Pa), positive and negative.
   7. Service: Indoor and outdoor.
   8. Service Temperature: Minus 40 to plus 200 deg F (Minus 40 to plus 93 deg C).
   9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
   10. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Water-Based Joint and Seam Sealant:
   1. Application Method: Brush on.
   2. Solids Content: Minimum 65 percent.
   3. Shore A Hardness: Minimum 20.
   4. Water resistant.
   5. Mold and mildew resistant.
   6. VOC: Maximum 75 g/L (less water).
   7. Maximum Static-Pressure Class: 10-inch wg (2500 Pa), positive and negative.
   8. Service: Indoor or outdoor.
   9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

D. Solvent-Based Joint and Seam Sealant:
   1. Application Method: Brush on.
   2. Base: Synthetic rubber resin.
   3. Solvent: Toluene and heptane.
   4. Solids Content: Minimum 60 percent.
   5. Shore A Hardness: Minimum 60.
   6. Water resistant.
   7. Mold and mildew resistant.
   8. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
   9. VOC: Maximum 395 g/L.
   10. Maximum Static-Pressure Class: 10-inch wg (2500 Pa), positive or negative.

11. Service: Indoor or outdoor.
12. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

E. Flanged Joint Sealant: Comply with ASTM C 920.
1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.
5. Use: O.
6. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

F. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

2.4 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1 (Table 4-1M), "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct."

C. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.

B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

C. Install ducts with fewest possible joints.

D. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

E. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

F. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

G. Install ducts with a clearance of 6” (150 mm), plus allowance for insulation thickness.

H. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.

I. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches (38 mm).

J. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Division 23 Section "Air Duct Accessories" for fire and smoke dampers.

K. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Generally comply with SMACNA's "Duct Cleanliness for New Construction Guidelines."

L. Flexible connections shall be provided at all connections between ducts and equipment such as fans or air handling units.

M. Provide access doors at all fire damper locations and such other locations as required to allow servicing or inspection of equipment or accessories.

N. All offsets, fittings, and accessories required by the Contract Documents but not specifically indicated shall be furnished and installed in strict accordance with the Specifications.

3.2 INSTALLATION OF EXPOSED DUCTWORK

A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.

B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.

C. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.

D. Repair or replace damaged sections and finished work that does not comply with these requirements.

E. Remove or hide duct (or shop) installation tags.

3.3 DUCT SEALING

A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

3.4 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Hangers and Supports."

B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
   1. Where practical, install concrete inserts before placing concrete.
   2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.

3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches (100 mm) thick.
4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches (100 mm) thick.
5. Do not use powder-actuated concrete fasteners for seismic restraints.

C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1 (Table 4-1M), "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches (610 mm) of each elbow and within 48 inches (1200 mm) of each branch intersection. In addition, locate hangers as follows:

D. Hangers Exposed to View: Threaded rod and angle or channel supports. The use of cable hangers is prohibited. Conceal hangers: The use of cable hangers is prohibited.

E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet (5 m).

F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.5 CONNECTIONS

A. Make connections to equipment with flexible connectors.

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Leakage Tests:
1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual." Submit a test report for each test.
2. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
3. Test for leaks before applying external insulation.
4. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure.

C. Duct System Cleanliness:
1. Visually inspect duct system to ensure that no visible contaminants are present.
2. Clean duct system(s) before testing, adjusting, and balancing.
   a. Acceptable Cleanliness Level: Net weight of debris collected on the filter media shall not exceed 0.75 mg/100 sq. cm.
3. Clean the following components by removing surface contaminants and deposits:
   a. Exhaust fans including fan housings, plenums, scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
   b. Dedicated exhaust and ventilation components.

3.7 DUCT LINER

A. Flexible Elastomeric Duct Liner: Preformed, cellular, closed-cell, sheet materials complying with ASTM C 534, Type II, Grade 1; and with NFPA 90A or NFPA 90B.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Aeroflex USA Inc.
      b. Armacell LLC.
      c. Rubatex International, LLC
   2. Surface-Burning Characteristics: Maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
   3. Liner Adhesive: As recommended by insulation manufacturer and complying with NFPA 90A or NFPA 90B.
      a. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

3.8 START UP

A. Air Balance: Comply with requirements in Division 23 Section "Testing, Adjusting, and Balancing for HVAC."

3.9 DUCT SCHEDULE

A. Fabricate ducts with galvanized sheet steel except as otherwise indicated and as follows:

B. Supply Ducts:
   1. Ducts Connected to Packaged Units:
      a. Pressure Class: Positive 2-inch wg.

C. Return Ducts:
   1. Ducts Connected to Packaged Units:
      a. Pressure Class: Negative 3-inch wg.

D. Exhaust Ducts:
   1. Ducts Connected to Fans Exhausting Air:
      a. Pressure Class: Negative 3-inch wg.

E. Elbow Configuration:
   1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."
      a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
      b. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
   2. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-3, "Round Duct Elbows."
      a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
         1) Radius-to Diameter Ratio: 1.5.
      b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.

c. Round Elbows, 14 Inches and Larger in Diameter: Standing seam or Welded.

F. Branch Configuration:
1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-6, "Branch Connections."
   a. Rectangular Main to Rectangular Branch: 45-degree entry.
   b. Rectangular Main to Round Branch: Spin in with damper.
2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees."
   a. Velocity 1000 to 1500 fpm (5 to 7.6 m/s): Conical tap.
   b. Velocity 1500 fpm (7.6 m/s) or Higher: 45-degree lateral.

END OF SECTION

SECTION 233300 - AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Backdraft and pressure relief dampers.
2. Manual volume dampers.
3. Flange connectors.
4. Turning vanes.
5. Duct-mounted access doors.
6. Flexible connectors.
7. Flexible ducts.
8. Duct accessory hardware.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For duct accessories. Include plans, elevations, sections, details and attachments to other work.
1. Detail duct accessories fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances; and method of field assembly into duct systems and other construction. Include the following:
a. Manual volume damper installations.
b. Control damper installations.
c. Wiring Diagrams: For power, signal, and control wiring.

C. Operation and maintenance data.

1.3 QUALITY ASSURANCE

A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

B. Comply with AMCA 500-D testing for damper rating.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
1. Galvanized Coating Designation: G90 (Z275).
2. Exposed-Surface Finish: Mill phosphatized.

C. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

2.2 BACKDRAFT AND PRESSURE RELIEF DAMPERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Air Balance Inc.; a division of Mestek, Inc.
   2. American Warming and Ventilating; a division of Mestek, Inc.
   3. Cesco Products; a division of Mestek, Inc.
   4. Duro Dyne Inc.
   5. Greenheck Fan Corporation.
   6. Lloyd Industries, Inc.
   7. Nailor Industries Inc.
   8. NCA Manufacturing, Inc.
   9. Pottorff; a division of PCI Industries, Inc.
   10. Ruskin Company.
   11. SEMCO Incorporated.
   12. Vent Products Company, Inc.

B. Description: Gravity balanced.

C. Maximum Air Velocity: 2000 fpm.

D. Maximum System Pressure: 1-inch wg.

E. Frame: 0.052-inch-thick, galvanized sheet steel 0.063-inch-thick extruded aluminum or 0.052-inch- thick stainless steel, with welded corners and mounting flange.

F. Blades: Multiple single-piece blades, center-pivoted, maximum 6-inch width, 0.025-inch-thick, roll-formed aluminum or 0.050-inch-thick aluminum sheet with sealed edges.

G. Blade Action: Parallel.

H. Blade Seals: Felt, Vinyl foam, Extruded vinyl, mechanically locked or Neoprene, mechanically locked.

I. Blade Axles:
   1. Material: Nonferrous metal, Galvanized steel, Plated steel, Stainless steel, Non-metallic or Aluminum.
   2. Diameter: 0.20 inch.

J. Tie Bars and Brackets: Aluminum or Galvanized steel.

K. Return Spring: Adjustable tension.

L. Bearings: Steel ball or synthetic pivot bushings.

M. Accessories:
   1. Adjustment device to permit setting for varying differential static pressure.
   2. Counterweights and spring-assist kits for vertical airflow installations.
   3. Screen Mounting: Rear mounted.
   4. Screen Material: Galvanized steel or Aluminum.
   5. Screen Type: Bird.
   6. 90-degree stops.

2.3 MANUAL VOLUME DAMPERS

A. Standard, Steel, Manual Volume Dampers:
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Air Balance Inc.; a division of Mestek, Inc.
      b. American Warming and Ventilating; a division of Mestek, Inc.
      c. Flexmaster U.S.A., Inc.
      d. McGill AirFlow LLC.
      e. METALAIRE, Inc.
      f. Nailor Industries Inc.
      g. Pottorff; a division of PCI Industries, Inc.
      h. Ruskin Company.
      i. Trox USA Inc.
      j. Vent Products Company, Inc.
   2. Standard leakage rating, with linkage outside airstream.
   3. Suitable for horizontal or vertical applications.
   4. Frames:
      a. Hat-shaped, galvanized or stainless-steel channels, 0.064-inch minimum thickness.
      b. Mitered and welded corners.
      c. Flanges for attaching to walls and flangeless frames for installing in ducts.
   5. Blades:
      a. Multiple or single blade.
      b. Parallel- or opposed-blade design.
      c. Stiffen damper blades for stability.
      d. Galvanized Stainless-steel, 0.064 inch thick.
   6. Blade Axles: Galvanized steel, Stainless steel or Nonferrous metal.
   7. Bearings:
      a. Oil-impregnated bronze, Molded synthetic or Stainless-steel sleeve.
      b. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
   8. Tie Bars and Brackets: Galvanized steel.

B. Jackshaft:
   1. Size: 1-inch diameter.
   2. Material: Galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
   3. Length and Number of Mountings: As required to connect linkage of each damper in multiple-damper assembly.

C. Damper Hardware:
   1. Zinc-plated, die-cast core with dial and handle made of 3/32-inch-thick zinc-plated steel, and a 3/4-inch hexagon locking nut.
   2. Include center hole to suit damper operating-rod size.
   3. Include elevated platform for insulated duct mounting.

2.4 FLANGE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Ductmate Industries, Inc.
   2. Nexus PDQ; Division of Shilco Holdings Inc.
   3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.

B. Description: Add-on or roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.

C. Material: Galvanized steel.

D. Gage and Shape: Match connecting ductwork.

2.5 TURNING VANES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Ductmate Industries, Inc.
   2. Duro Dyne Inc.
   3. METALAIRE, Inc.
   4. SEMCO Incorporated.
   5. Ward Industries, Inc.; a division of Hart & Cooley, Inc.

B. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.

C. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 2-3, "Vanes and Vane Runners," and 2-4, "Vane Support in Elbows."

D. Vane Construction: Single wall for ducts up to 48 inches wide and double wall for larger dimensions.

2.6 DUCT-MOUNTED ACCESS DOORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. American Warming and Ventilating; a division of Mestek, Inc.
   2. Cesco Products; a division of Mestek, Inc.
   3. Ductmate Industries, Inc.
   4. Flexmaster U.S.A., Inc.
   5. Greenheck Fan Corporation.
   6. McGill AirFlow LLC.
   7. Nailor Industries Inc.
   8. Pottorff; a division of PCI Industries, Inc.
   9. Ventfabrics, Inc.
   10. Ward Industries, Inc.; a division of Hart & Cooley, Inc.

B. Duct-Mounted Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 2-10, "Duct Access Doors and Panels," and 2-11, "Access Panels - Round Duct."
   1. Door:
      a. Double wall, rectangular.
      b. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
      c. Hinges and Latches: 1-by-1-inch butt or piano hinge and cam latches.
      d. Fabricate doors airtight and suitable for duct pressure class.
   2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
   3. Number of Hinges and Locks:
      a. Access Doors Less Than 12 Inches Square: No hinges and two sash locks.
      b. Access Doors up to 18 Inches Square: Two hinges and two sash locks.
      c. Access Doors up to 24 by 48 Inches: Three hinges and two compression latches with outside and inside handles.
      d. Access Doors Larger Than 24 by 48 Inches: Four hinges and two compression latches with outside and inside handles.

2.7 FLEXIBLE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Ductmate Industries, Inc.
   2. Duro Dyne Inc.
   3. Ventfabrics, Inc.
   4. Ward Industries, Inc.; a division of Hart & Cooley, Inc.

B. Materials: Flame-retardant or noncombustible fabrics.

C. Coatings and Adhesives: Comply with UL 181, Class 1.

D. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to 2 strips of 2-3/4-inch-wide, 0.028-inch-thick, galvanized sheet steel or 0.032-inch-thick aluminum sheets. Provide metal compatible with connected ducts.

E. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
   1. Minimum Weight: 26 oz./sq. yd..
   2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
   3. Service Temperature: Minus 40 to plus 200 deg F.

F. Thrust Limits: Combination coil spring and elastomeric insert with spring and insert in compression, and with a load stop. Include rod and angle-iron brackets for attaching to fan discharge and duct.
   1. Frame: Steel, fabricated for connection to threaded rods and to allow for a maximum of 30 degrees of angular rod misalignment without binding or reducing isolation efficiency.
   2. Outdoor Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
   3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
   4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
   5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
   6. Elastomeric Element: Molded, oil-resistant rubber or neoprene.

7. Coil Spring: Factory set and field adjustable for a maximum of 1/4-inch movement at start and stop.

2.8 FLEXIBLE DUCTS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Ductmate Industries, Inc.
2. Flexmaster U.S.A., Inc
3. McGill AirFlow LLC.
4. Ward Industries, Inc.; a division of Hart & Cooley, Inc.

B. Insulated, Flexible Duct: UL 181, Class 1, black polymer film supported by helically wound, spring-steel wire; fibrous-glass insulation; polyethylene or aluminized vapor-barrier film.
1. Pressure Rating: 4-inch wg positive and 0.5-inch wg negative.
2. Maximum Air Velocity: 4000 fpm.
3. Temperature Range: Minus 20 to plus 175 deg F.
4. Insulation R-Value: Comply with ASHRAE/IESNA 90.1-2004 <Insert value>.

C. Flexible Duct Connectors:
1. Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action or Nylon strap in sizes 3 through 18 inches, to suit duct size.

2.9 DUCT ACCESSORY HARDWARE

A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.

B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.

B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.

C. Install backdraft dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.

D. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts.

E. Set dampers to fully open position before testing, adjusting, and balancing.

F. Install test holes at fan inlets and outlets and elsewhere as indicated.

G. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:
   1. On both sides of duct coils.
   2. At outdoor-air intakes.
   3. Downstream from manual volume dampers, control dampers, backdraft dampers, and equipment.
   4. Upstream from turning vanes.
   5. Control devices requiring inspection.
   6. Main trunk of lined ductwork.
   7. Elsewhere as indicated.

H. Install access doors with swing against duct static pressure.

I. Access Door Sizes:
   1. One-Hand or Inspection Access: 8 by 5 inches.
   2. Two-Hand Access: 12 by 6 inches.
   3. Head and Hand Access: 18 by 10 inches.
   4. Head and Shoulders Access: 21 by 14 inches.

J. Install flexible connectors to connect ducts to equipment.

K. Connect diffusers to ducts with maximum 60-inch lengths of flexible duct clamped or strapped in place.

L. Connect flexible ducts to metal ducts with draw bands.

M. Install duct test holes where required for testing and balancing purposes.

N. Install thrust limits at centerline of thrust, symmetrical on both sides of equipment. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch (6-mm) movement during start and stop of fans.

O. Install turning vanes in supply duct only.

3.2 FIELD QUALITY CONTROL

A. Tests and Inspections:
   1. Operate dampers to verify full range of movement.
   2. Inspect locations of access doors and verify that purpose of access door can be performed.
   3. Operate fire dampers to verify full range of movement and verify that proper heat-response device is installed.
   4. Inspect turning vanes for proper and secure installation.

END OF SECTION

SECTION 233713 - DIFFUSERS, REGISTERS AND GRILLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Louver face diffusers.
2. Fixed grille.

B. Related Sections:
1. Division 23 Section "Air Duct Accessories" for fire and volume-control dampers not integral to diffusers, registers, and grilles.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated, include the following:
1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

B. Samples: For each exposed product and for each color and texture specified.

PART 2 - PRODUCTS

2.1 CEILING DIFFUSERS

A. Louver Face Diffuser
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
a. A-J Manufacturing Co., Inc.
b. Anemostat Products; a Mestek company.
c. Carnes.
d. METALAIRE, Inc.
e. Nailor Industries Inc.
f. Price Industries.
g. Titus.
h. Tuttle & Bailey.
3. Devices shall be specifically designed for variable-air-volume flows.
4. Material: Steel.
5. Finish: Baked enamel, color selected by Architect.
6. Face Size: As scheduled.
7. Mounting: As scheduled.
8. Pattern: Core style, as scheduled.

2.2 REGISTERS AND GRILLES

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

2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
   a. A-J Manufacturing Co., Inc.
   b. Anemostat Products; a Mestek company.
   c. Carnes.
   d. Dayus Register & Grille Inc.
   e. Hart & Cooley Inc.
   f. Krueger.
   g. Nailor Industries Inc.
   h. Price Industries.
   i. Titus.
   j. Tuttle & Bailey.
3. Material: Steel or Aluminum.
4. Finish: Baked enamel, color selected by Architect.
5. Face Arrangement: Core, as scheduled.
6. Core Construction: Integral.
7. Frame: As scheduled.
8. Mounting: As scheduled.

2.3 SOURCE QUALITY CONTROL

A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install diffusers, registers, and grilles level and plumb.

B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

C. Install diffusers and grilles with airtight connections to ducts and to allow service and maintenance of dampers and fire dampers.

3.2 ADJUSTING

A. After installation, adjust diffusers and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION

SECTION 235416.13 – GAS-FIRED FURNACES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Gas-fired, condensing furnaces and accessories complete with controls.
   2. Air filters.
   3. Air cleaners.
   4. UV germicidal lights.
   5. Ventilation heat exchangers.
   6. Refrigeration components.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include rated capacities, operating characteristics, furnished specialties, and accessories.

B. Shop Drawings:
   1. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
   2. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each furnace to include in emergency, operation, and maintenance manuals.
   1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
      a. Furnace and accessories complete with controls.
      b. Air filter.
      c. Air cleaner.
      d. UV germicidal light.
      e. Ventilation heat exchanger.
      f. Refrigeration components.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Disposable Air Filters: Furnish two complete sets.

1.7 QUALITY ASSURANCE

A. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."

B. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

C. Comply with NFPA 70.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace the following components of furnaces that fail in materials or workmanship within specified warranty period:
   1. Warranty Period, Commencing on Date of Substantial Completion:
      a. Furnace Heat Exchanger: 10 years.
      b. Integrated Ignition and Blower Control Circuit Board: Five years
      c. Draft-Inducer Motor: Five years
      d. Refrigeration Compressors: 10 years
      e. Evaporator and Condenser Coils: Five years

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a qualified testing agency, and marked for intended location and application.

B. General Requirements for Noncondensing Gas-Fired Furnaces: Factory assembled, piped, wired, and tested; complying with ANSI Z21.47/CSA 2.3 and NFPA 54.

2.2 GAS-FIRED FURNACES, CONDENSING

A. Cabinet: Steel.
   1. Cabinet interior around heat exchanger shall be factory-installed insulation.
   2. Lift-out panels shall expose burners and all other items requiring access for maintenance.
   3. Factory paint external cabinets in manufacturer's standard color.
   4. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

B. Fan: Centrifugal, factory balanced, resilient mounted, direct drive.
   1. Fan Motors: Comply with requirements in Section 230513 "Common Motor Requirements for HVAC Equipment."
   2. Special Motor Features: Single speed, premium efficiency, as defined in Section 230513 "Common Motor Requirements for HVAC Equipment," and with internal thermal protection and permanent lubrication.
   3. Special Motor Features: Multitapped, multispeed with internal thermal protection and permanent lubrication.
   4. Special Motor Features: Electronically controlled motor (ECM) controlled by integrated furnace/blower control.

C. Type of Gas: Natural

D. Heat Exchanger:
   1. Primary: Aluminized steel.
   2. Secondary: Polyethylene-coated steel.

E. Burner:
   1. Gas Valve: 100 percent safety two-stage main gas valve, main shutoff valve, pressure regulator, safety pilot with electronic flame sensor, limit control, transformer, and combination ignition/fan timer control board.
   2. Ignition: Electric pilot ignition, with hot-surface igniter or electric spark ignition.

F. Gas-Burner Safety Controls:
   1. Electronic Flame Sensor: Prevents gas valve from opening until pilot flame is proven; stops gas flow on ignition failure.
   2. Flame Rollout Switch: Installed on burner box; prevents burner operation.
   3. Limit Control: Fixed stop at maximum permissible setting; de-energizes burner on excessive bonnet temperature; automatic reset.

G. Combustion-Air Inducer: Centrifugal fan with thermally protected motor and sleeve bearings prepurges heat exchanger and vents combustion products; pressure switch prevents furnace operation if combustion-air inlet or flue outlet is blocked.

H. Furnace Controls: Solid-state board integrates ignition, heat, cooling, and fan speeds; adjustable fan-on and fan-off timing; terminals for connection to accessories diagnostic light with viewport.

I. Accessories:
   1. Combination Combustion-Air Intake and Vent: PVC plastic fitting to combine combustion-air inlet and vent through roof.
   2. CPVC Plastic Vent Materials:
      a. CPVC Plastic Pipe: Schedule 40, complying with ASTM F 441/F 441M.
      b. CPVC Plastic Fittings: Schedule 40, complying with ASTM F 438, socket type.
      c. CPVC Solvent Cement: ASTM F 493.

2.3 UV GERMICIDAL LIGHTS

A. Description: Lighting unit in metal housing arranged for installation in supply-air duct and controlled to cycle on and off with furnace fan, with one 75-W UV-light bulb(s).

2.4 REFRIGERATION COMPONENTS

A. General Refrigeration Component Requirements:
   1. Refrigeration compressor, coils, and specialties shall be designed to operate with CFC-free refrigerants.
   2. Energy Efficiency: Equal to or greater than prescribed by ASHRAE/IES 90.1.

B. Refrigerant Coil: Copper tubes mechanically expanded into aluminum fins. Comply with AHRI 210/240. Match size with furnace. Include condensate drain pan with accessible drain outlet complying with ASHRAE 62.1.
   1. Refrigerant Coil Enclosure: Steel, matching furnace and evaporator coil, with access panel and flanges for integral mounting at or on furnace cabinet and galvanized sheet metal drain pan coated with black asphaltic base paint.

C. Refrigerant Line Kits: Annealed-copper suction and liquid lines factory cleaned, dried, pressurized with nitrogen, sealed, and with suction line insulated. Provide in standard lengths for installation without joints, except at equipment connections.
   1. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534/C 534M, Type I, 1 inch thick.

D. Refrigerant Piping: Comply with requirements in Section 232300 "Refrigerant Piping."

E. Air-Cooled Compressor-Condenser Unit:
   1. Casing: Steel, finished with baked enamel, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.
   2. Compressor: Hermetically sealed scroll type.
      a. Crankcase heater.
      b. Vibration isolation mounts for compressor.
      c. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.
      d. Two-speed compressor motors shall have manual-reset high-pressure switch and automatic-reset low-pressure switch.
      e. Refrigerant Charge: R-410A
      f. Refrigerant: R-407C or R-410A.
   3. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with AHRI 210/240, and with liquid subcooler.
   4. Heat-Pump Components: Reversing valve and low-temperature air cut-off thermostat.
   5. Fan: Aluminum-propeller type, directly connected to motor.
   6. Motor: Permanently lubricated, with integral thermal-overload protection.
   7. Low Ambient Kit: Permits operation down to 45 deg F (7 deg C).
   8. Mounting Base: Polyethylene.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine factory-installed insulation before furnace installation. Reject units that are wet, moisture damaged, or mold damaged.

C. Examine roughing-in for gas and refrigerant piping systems to verify actual locations of piping connections before equipment installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install gas-fired furnaces and associated fuel and vent features and systems according to NFPA 54.

B. Suspended Units: Suspend from structure using threaded rods, spring hangers, and building attachments. Secure rods to unit hanger attachments. Adjust hangers so unit is level and plumb.

1. Install seismic restraints to limit movement of furnace by resisting code-required seismic acceleration.

C. Base-Mounted Units: Secure units to substrate. Provide optional bottom closure base if required by installation conditions.
   1. Anchor furnace to substrate to resist code-required seismic acceleration.

D. Controls: Install thermostats at mounting height of 60 inches above floor.

E. Wiring Method: Install control wiring in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Conceal control wiring except in unfinished spaces.

F. Install roof-mounted compressor-condenser components on equipment supports specified in Section 077200 "Roof Accessories." Anchor units to supports with removable, cadmium-plated fasteners.

3.3 CONNECTIONS

A. Gas piping installation requirements are specified in Section 231123 "Facility Natural-Gas Piping." indicate general arrangement of piping, fittings, and specialties. Connect gas piping with union or flange and appliance connector valve.

B. Install piping adjacent to equipment to allow service and maintenance.

C. Vent and Outside-Air Connection, Condensing, Gas-Fired Furnaces: Connect plastic piping vent material to furnace connections and extend outdoors. Terminate vent outdoors with a cap and in an arrangement that will protect against entry of birds, insects, and dirt.
   1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
   2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
   3. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
      a. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
      b. CPVC Piping: Join according to ASTM D 2846/D 2846M, Appendix.

D. Connect ducts to furnace with flexible connector. Comply with requirements in Section 233300 "Air Duct Accessories."

E. Connect refrigerant tubing kits to refrigerant coil in furnace and to air-cooled compressor-condenser unit.
   1. Flared Joints: Use ASME B16.26 fitting and flared ends, following procedures in CDA's "Copper Tube Handbook."
   2. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
   3. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8/A5.8M.

F. Comply with requirements in Section 232300 "Refrigerant Piping" for installation and joint construction of refrigerant piping.

3.4 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:
   1. Perform electrical test and visual and mechanical inspection.
   2. Leak Test: After installation, charge systems with refrigerant and test for leaks. Repair leaks, replace lost refrigerant, and retest until no leaks exist.
   3. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation, product capability, and compliance with requirements.
   4. Verify that fan wheel is rotating in the correct direction and is not vibrating or binding.
   5. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Verify that vibration isolation and flexible connections properly dampen vibration transmission to structure.

3.5 STARTUP SERVICE

A. Complete installation and startup checks according to manufacturer's written instructions and perform the following:
   1. Inspect for physical damage to unit casings.
   2. Verify that access doors move freely and are weathertight.
   3. Clean units and inspect for construction debris.
   4. Verify that all bolts and screws are tight.
   5. Adjust vibration isolation and flexible connections.
   6. Verify that controls are connected and operational.

B. Adjust fan belts to proper alignment and tension.

C. Start unit according to manufacturer's written instructions and complete manufacturer's operational checklist.

D. Measure and record airflows.

E. Verify proper operation of capacity control device.

F. After startup and performance test, lubricate bearings.

3.6 ADJUSTING

A. Adjust initial temperature and humidity set points.

B. Set controls, burner, and other adjustments for optimum heating performance and efficiency. Adjust heat-distribution features, including shutters, dampers, and relays, to provide optimum heating performance and system efficiency.

3.7 CLEANING

A. After completing installation, clean furnaces internally according to manufacturer's written instructions.

B. Install new filters in each furnace within 14 days after Substantial Completion.

3.8 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain condensing units. Refer to Section 017900 "Demonstration and Training."

END OF SECTION

SECTION 238126 – SPLIT SYSTEM AIR CONDITIONERS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes split-system air-conditioning and heat pump units consisting of separate evaporator-fan and compressor-condenser components. Units are designed for exposed or concealed mounting, and may be connected to ducts.

1.2 SUBMITTALS

A. Product Data: For each unit indicated. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.

B. Operation and maintenance data.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2004, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."

C. ASHRAE/IESNA 90.1-2004 Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2004, Section 6 - "Heating, Ventilating, and Air-Conditioning."

1.4 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace split-system air-conditioning units that fail in materials and workmanship within five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Carrier Air Conditioning; Div. of Carrier Corp.
2. Lennox Industries Inc.
3. Trane Co. (The); Unitary Products Group.
4. York International Corp.

2.2 AIR-COOLED, COMPRESSOR-CONDENSER UNIT

A. Casing steel, finished with baked enamel, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.

B. Compressor: Hermetically sealed scroll type with crankcase heater and mounted on vibration isolation. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.

C. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with liquid subcooler.

D. Fan: Aluminum-propeller type, directly connected to motor.

E. Motor: Permanently lubricated, with integral thermal-overload protection.

F. Low Ambient Kit.

2.3 ACCESSORIES

A. Thermostat: Low voltage with subbase to control compressor and evaporator fan.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.

B. Install ground-mounted, compressor-condenser components on 4-inch- (100-mm-) thick, reinforced concrete base; 4 inches (100 mm) larger on each side than unit. Concrete, reinforcement, and formwork are specified in Division 03 Section "Cast-in-Place Concrete." Coordinate anchor installation with concrete base.

C. Install roof-mounted, compressor-condenser components on equipment supports. Anchor units to supports with removable, cadmium-plated fasteners.

3.2 CONNECTIONS

A. Connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

B. Install piping adjacent to unit to allow service and maintenance.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing.

B. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

C. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Remove malfunctioning units, replace with new components, and retest.

D. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section applies to all work specified in Divisions 26 and 28.

B. Provide all required materials, labor, equipment, installation, fabrication, and testing required for a complete, safe, and fully operational system. System shall include all required materials and features whether specified or shown on drawings or not to comply with applicable codes and authorities having jurisdiction.

C. The electrical installation shall be made in strict conformance with the latest edition and supplements in force at the time of bid opening of the National Electrical Code, the Rules and Regulations of the New Jersey Building Code, the applicable Standards of the National Fire Protection Association, and applicable requirements of the Occupational Safety and Health Act of the United States Department of Labor. All materials and equipment employed shall be approved by and bear the label of Underwriters' Laboratories, Inc., where such labeling is made available by any manufacturer for said materials or equipment. All codes and regulations applicable shall be considered as jointly governing and the requirements of either and all will prevail. If it occurs that Drawings conflict with any applicable code, then this Contractor shall immediately bring same to attention of Architect or his representative for resolution.

1.3 DESCRIPTION OF DOCUMENTS

A. The Drawings are generally diagrammatic and indicate the general design and arrangement of the proposed work. Do not scale drawings for the exact location of equipment and work. The exact routing of circuits and final location of all the electrical equipment, lighting fixtures, and other systems, unless specifically dimensioned on the Drawings, shall be subject to building and structural conditions, grid systems, and work of other trades involved in the construction, and subject to the approval of the Architect. The Contractor shall familiarize himself with the Contract Documents and shall be responsible for the final location of his particular equipment to suit field conditions encountered and to avoid interferences with other trades' work, without extra cost to the Owner or the Architect. The Contractor shall visit the job site to determine the job conditions. The Architect reserves the right to make minor changes in outlet and equipment locations at any time prior to rough-in of the electrical work without incurring any additional costs.

B. Where sizes are not provided for material and equipment, the material and equipment shall be sized in accordance with the latest addition of the National Electrical Code and in accordance with the manufacturer’s recommendations.

1.4 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. The term “finished space” shall mean any space designated for the general or specific use of the occupants.

C. The term “concealed space” shall mean all furred spaces, pipe chases, spaces above finished ceilings, crawl spaces, and other areas not generally accessible to the occupants.

D. The term “electrical space” as used in this division of the specifications shall mean any space designated primarily for the installation of electrical equipment.

E. “Provide” - Furnish and install the specific item, equipment, and/or system.

F. “Furnish” - Supply the specific item, equipment, and/or system.

G. “Install” - Set in position and adjust for use the specific item, equipment, and/or system unless otherwise specifically noted to be installed by others.

H. “Concealed” - Hidden from sight in walls, chases, furred spaces, above ceilings, underground, in concrete, etc.

I. “Exposed” - Not hidden from sight.

J. “Work” - Labor and installation, including materials, equipment, and systems required for completion of all portions of the project.

1.5 CODES AND STANDARDS

A. Following is a list of abbreviations for codes and standards which are referred to in the Specifications. Where such reference is made, the code or standard becomes a part of these Specifications as if the code or standard were included herein. Reference is always to the latest edition of the code or standard unless otherwise specifically noted.

ANSI - American National Standards Institute, Inc.
NFPA - National Fire Protection Association
ASTM - American Society for Testing and Materials
NBS - National Bureau of Standards
NEMA - National Electrical Manufacturers Association
UL - Underwriters' Laboratories, Inc.
NEC - National Electrical Code
NESC - National Electrical Safety Code
IPCEA - Insulated Power Cable Engineers Assn.
IEEE - Institute of Electrical and Electronics Engineers
OSHA - Occupational Safety and Health Act
IES - Illuminating Engineering Society
JIC - Joint Industrial Council

1.6 GUARANTEES AND WARRANTIES

A. This Contractor shall guarantee all equipment, apparatus, materials, and workmanship entering into the Contract to be the best of its respective kind and shall replace all parts at his expense which are defective within one year from final acceptance of the work by the Architect. Items of equipment which may have longer guarantees shall have warranties and guarantees completed, in order, and in effect at the time of final acceptance of the work by the Architect. This Contractor shall furnish all such warranties and guarantees at the time of final acceptance of the work.

B. All work that is not installed in accordance with the Contract Documents shall be repaired or replaced at the direction of the Architect.

1.7 SUBMITTAL

A. Submittals shall be made in accordance with Submittals paragraph in Division 1.

B. Submittal data shall include specification data, such as metal gauges, finishes, optional accessories; even though such equipment and materials may be as specified. In addition, the submittal data shall include performance (certification) data, wiring diagrams where applicable, accurate dimensional data, and a recommended spare parts list. Outline or dimensional drawings alone are not acceptable.

C. No roughing-in or connections shall be done until accepted equipment submittals are in the hands of the Contractor. It shall be this Contractor's responsibility to obtain accepted drawings and to make all connections in the neatest and most workmanlike manner possible. This Contractor shall coordinate with all other Contractors having any connections or roughing-in to the equipment.

D. In general, normal catalog information (with the particular items underlined or otherwise denoted as being the submitted item) will be accepted as submittal data. Installation, operating and maintenance instructions must be that information specifically applicable to the items furnished, which is ordinarily supplied with the equipment to the Owner, for any modifications indicated. Wiring diagrams must be correct for the application. Generalized wiring diagrams, showing alternate methods of connection, will not be acceptable unless all unrelated sections are marked out. Submittal data sheets which indicate several different model numbers, figure numbers, optional accessories, or installation arrangements shall be clearly marked to indicate the specific items of equipment being furnished. Samples and certificates shall be furnished as requested. Submittal data must be complete for each piece of equipment; piecemeal data will not be processed.

E. It shall be noted that acceptance of shop drawings by the Architect applies only to general design, arrangement, type, capacity, and quality. Such acceptance does not relieve the Contractor of the responsibility for furnishing the proper equipment.

F. Corrections or comments made on the submittals during the Architect's review do not relieve the Contractor from compliance with the Drawings and Specifications. The Architect's review of submittals is only for general conformance with design concept and general compliance with the information given in the Contract Documents. The Contractor's responsibility includes, but is not limited to, conforming, and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating his work with that of all other trades, and performing his work in a safe and satisfactory manner.

G. Product Data: For sleeve seals.

1.8 SUBSTITUTIONS

A. When this Contractor requests approval of substitute materials and/or equipment, except where under formal alternate proposal, it shall be understood that such substitution, if approved, will be made without cost to the Owner and Architect, regardless of changes. In all cases where substitutions affect other trades, the Contractor offering such substitutions shall reimburse all affected contractors for all necessary changes in their work.

1.9 OPERATION AND MAINTENANCE MANUALS

A. Operation and maintenance data shall be submitted in accordance with the requirements of Division “GENERAL REQUIREMENTS”.

B. Furnish owner with three (3) bound sets of the O&M manuals at completion of project. The manuals shall be furnished by the manufacturer of each item of equipment or system. Each set is to be bound separately in a loose leaf binder. Manuals shall include Contractor’s Name and telephone numbers that can be called for service calls. The standard manufacturer’s data shall be supplemented by such special instructions as may be necessary for the particular application. Also, include the following in the manuals:

All project stamped acceptable shop drawings and copies of all certificates.
Lubrication schedules and procedures
Spare parts list, indicate all items that should be maintained at the site by owner.
Maintenance and trouble-shooting suggestions for equipment.
Non-Lien Affidavits
Wiring Diagrams
Certification of owner instruction of system and equipment
Record drawings

C. The operating instructions shall integrate each piece of equipment in any one system into a numbered step-by-step sequence of operation.

D. The parts list shall consist of a complete list of replacement items with all component parts numbered for each piece of mechanical or electrical equipment and shall include directions for ordering said replacement items.

E. Maintenance procedure shall outline required routine maintenance for all equipment and systems and instructions for repair of the equipment.

1.10 RECORD DRAWINGS

A. This Contractor shall submit to the Owner Record Drawings. Drawings shall be identified with the Contractor’s name, the date, and title “RECORD DRAWINGS” on the paper copies.

1.11 COORDINATION

A. Coordinate arrangement, mounting, and support of electrical equipment:
1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
3. To allow right of way for piping and conduit installed at required slope.
4. So connecting raceways and cables will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames".

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping".

E. The Contractor shall coordinate with all other contractors in locating conduit, light fixtures, boxes, sleeves, and equipment in order to avoid conflict with all other trades' work. No extra compensation will be allowed to cover the cost of relocating light fixtures, conduit, boxes, sleeves, or other electrical equipment found encroaching on space required by others.

PART 2 - PRODUCTS

2.1 GENERAL

A. Material and equipment shall be furnished as specified in this section and each individual electrical section of these Specifications and shall be in strict accordance with applicable ANSI, NBS, ASTM, NESC, NEMA, IEEE, IPCEA, UL, NEC, OSHA and NFPA standards, codes, and specifications. Applicable codes, standards, and manufacturers' products referred to in these Specifications shall establish minimum requirements for materials and equipment furnished for this installation.

B. When two or more articles of the same material or equipment are required, they shall be of the same manufacturer.

C. New material and equipment shall be provided for the entire project, unless noted otherwise.

2.2 Reinforcing steel, welded wire fabric, forms, and curing compounds shall comply with the requirements of Division “CONCRETE”. The minimum reinforcement shall be 6 x 6 10/10 welded wire fabric.

2.3 GROUT

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

2.4 Bolting shall be carbon steel conforming to ASTM A-307 with heavy hexagonal nuts.

2.5 Angles, Channels, Beams, Bars and Rods shall be steel conforming to ASTM A-36 as applicable.

2.6 SLEEVES FOR RACEWAYS AND CABLES

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

B. Sleeves for Rectangular Openings: Galvanized sheet steel.
   1. Minimum Metal Thickness:
      a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
      b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

2.7 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Advance Products & Systems, Inc.
      b. Calpico, Inc.
      c. Metraflex Co.
      d. Pipeline Seal and Insulator, Inc.
   2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
   3. Pressure Plates: Include two for each sealing element.
   4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1.

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

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

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

E. Right of Way: Give to piping systems installed at a required slope.

F. Any electrical box, device, conduit, or enclosure installed in any fire rated column, wall, or ceiling shall not reduce the fire rating of said column or wall. The Contractor providing the device, box, conduit, or enclosure shall provide the required material to maintain the fire rating of the column, wall, or ceiling.

G. At penetrations of fire walls provide fire barrier penetration sealing system in conformance with Section FIRESTOPPING. The seal shall also be provided at all floor penetrations in a multi-story building. The sealing system shall have a 3 hour rating when tested in accordance with the provisions of ASTM E-119. Installation of penetration sealing systems shall be in accordance with manufacturer's instructions.

H. Provide cover plates where conduit and raceways pass through floor, ceiling, or walls and are exposed in finished rooms. Flanges shall fit snugly and shall be sized to cover the openings. All escutcheons shall be chromium plated wing type with fastening screws.

3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

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

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

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

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

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

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

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

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry
   1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

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

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

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

3.3 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

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

3.4 FIRESTOPPING

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

3.5 EQUIPMENT CONNECTION AND WIRING

A. Unless specifically noted otherwise on the Drawings or elsewhere in the Specifications, all wiring, and all equipment connections shall be provided by the Electrical Contractor, including equipment requiring electrical services furnished under other sections of the Specifications or by the Owner.

B. The Electrical Contractor shall furnish and install all disconnect switches, NEC circuit protection, motor controllers, relays, and devices as required for all equipment to provide complete and operable electrical systems, unless the items are specifically noted elsewhere as being provided with, or as part of, the equipment.

3.6 PERMITS, CERTIFICATES, LAWS AND ORDINANCES

A. The Electrical Contractor shall, at his own expense, procure all permits, certificates, and licenses required of him by law for the execution of his work. He shall comply with all Federal, State, and local laws, ordinances, rules, and regulations relating to the performance of the work.

B. Following completion, a certificate of approval shall be secured from the local code enforcement authority and delivered to the Architect.

3.7 INSPECTION

A. The Electrical Contractor shall, at his own expense, furnish electrical inspection as required by the local code enforcing agency, when applicable. The Contractor shall notify the Electrical Inspector in writing upon the start of the job and a copy of the notice shall be sent to the Architect. The Contractor shall furnish certificates of final approval by the Electrical Inspection Bureau and final payment shall be withheld until he has presented the Architect with the aforementioned certificates of approval.

3.8 PAINTING

A. Refinish surfaces marred or damaged by electrical work to original or specified condition.

B. Replace marred or discolored factory, multiple coat, baked on finish surfaces. Minor inconspicuous scratches may be “touched-up”.

C. The following items do not require painting.
   1. Equipment with a factory baked on finish.
   2. Receptacle and switch cover plates.
   3. Faceplates of instruments, equipment, and control panels.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Building wires and cables rated 600 V and less.
   2. Connectors, splices, and terminations rated 600 V and less.
   3. Metal-clad cable, Type MC.

B. Related Sections include the following:
   1. Division 26 Sections:
      a. “Common Work Results for Electrical”
      b. “Identification for Electrical Systems”

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Field quality-control test reports.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Wire and cable shall be manufactured with material selection tests as described in ASMT D3291 and EN 50497 to prevent plasticizer exudation from PVC insulated and sheathed cables.

C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Description: Flexible, insulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both rated 600 volts or less.

B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   1. American Insulated Wire Corp.; a Leviton Company.
   2. General Cable Corporation.
   3. Senator Wire & Cable Company.
   4. Carol Cable.

C. Copper Conductors: Comply with NEMA WC 70.

D. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN and XHHW.

2.2 METAL-CLAD CABLE, TYPE MC

A. Description: A factory assembly of one or more current-carrying insulated conductors in an overall metallic sheath.

B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. Alpha Wire Company.
2. American Bare Conductor.
3. Atkore International (AFC Cable Systems).
4. Belden Inc.
5. Encore Wire Corporation.
6. General Cable Technologies Corporation.
7. Okonite Company (The).
8. Service Wire Co.
9. WESCO.

C. Standards:
1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Comply with UL 1569.
3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

D. Circuits:
1. Single circuit with ground wire.

E. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.

F. Ground Conductor: Insulated.

G. Conductor Insulation:
1. Type TFN/THHN/THWN-2: Comply with UL 83.
2. Type XHHW-2: Comply with UL 44.

H. Armor: Steel, interlocked.

2.3 CONNECTORS AND SPLICES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. AFC Cable Systems, Inc.
2. Hubbell Power Systems, Inc.
3. O-Z/Gedney; EGS Electrical Group LLC.
4. 3M; Electrical Products Division.
5. Tyco Electronics Corp.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper. Solid or stranded for No. 10 AWG and smaller; stranded for No. 8 AWG and larger. Minimum conductor size shall be No. 12 AWG.

B. Branch Circuits: Copper. Solid or stranded for No. 10 AWG and smaller; stranded for No. 8 AWG and larger. Minimum conductor size shall be No. 12 AWG.

C. Control Circuits: Copper. Solid or stranded for No. 10 AWG and smaller. Minimum conductor size shall be No. 14 AWG.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway. Metal-clad cable, type MC, may be used for wiring within rooms. Metal-clad cable, type MC, shall not be used for homeruns.

B. Class 1 Control Circuits: Type THHN-THWN, in raceway.

C. Class 2 Control Circuits: Type THHN-THWN, in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems”.

E. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems".

F. No wiring shall be pulled until construction is such that there is no danger of moisture entering open raceways. Protect all openings with caps or plugs until final connections are made. Conduit shall be swabbed clean before pulling conductors.

G. All insulated bushings shall be installed before pulling conductors.

H. All wiring in panel gutters, pull boxes, and other accessible enclosures shall be tied and bundled with cable ties.

I. Metal-clad cable type MC shall not be used in Production Areas or Warehouse.

J. Wiring shall be installed continuously between terminal points indicated or dictated by field conditions without intermediate splices or taps unless specifically authorized by the Architect. Splices shall be made only in junction or terminal boxes.

K. Conductors shall not be subject to pulling tension in excess of 50 percent of yield strength of conductor. Pulling lugs shall be attached to conductor with a sleeve or grip over the cable sheath to prevent slipping the insulation.

L. Where terminals and splices are taped with insulation tape, apply a minimum of two layers of electrical tape, half-lapped.

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
   1. All joints between conductors shall be made with wire connectors. Splices shall be in boxes and shall be accessible. Branch circuit conductors #10 AWG and smaller shall be spliced together using properly sized and listed spring type insulated conductors (i.e., wire nut). Conductors #8 AWG and larger shall be spliced using a non-insulated compression type sleeve or split-bolt connector with tape covering. Splices in handholes and below grade applications shall be waterproof epoxy type.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:
   1. After installing conductors and cables and before electrical circuitry has been energized, test feeder conductors for compliance with requirements.
   2. Perform each visual and mechanical inspection and electrical test. Certify compliance with test parameters.

C. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes grounding systems and equipment.

B. Related sections include the following:
   1. Division 26 Section:
      a. “Common Work Results for Electrical”

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Field quality-control reports.

C. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
   1. Instructions for periodic testing and inspection of grounding features at test wells grounding connections for separately derived systems.
      a. Tests shall determine if ground-resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if values do not.
      b. Include recommended testing intervals.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:
   1. Solid Conductors: ASTM B 3.
   2. Stranded Conductors: ASTM B 8.
   3. Tinned Conductors: ASTM B 33.
   4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
   5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.

6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

2.2 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, pressure type with at least two bolts.
1. Pipe Connectors: Clamp type, sized for pipe.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid copper conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

B. Conductor Terminations and Connections:
1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Connections to Structural Steel: Welded connectors.

3.2 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install tinned bonding jumper to bond across flexible duct connections to achieve continuity.

3.4 FIELD QUALITY CONTROL

A. Perform the following tests and inspections and prepare test reports.
1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.

B. Grounding system will be considered defective if it does not pass tests and inspections.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Hangers and supports for electrical equipment and systems.
   2. Construction requirements for concrete bases.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. IMC: Intermediate metal conduit.

C. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design supports for multiple raceways.

B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.5 SUBMITTALS

A. Product Data: For the following:
   1. Steel slotted support systems.

B. Welding certificates.

1.6 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel".

B. Comply with NFPA 70.

1.7 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories".

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
   1. Manufacturers: Subject to compliance with requirements, available manufactures offering that may be incorporated into the Work included, but not limited to the following:
      a. Allied Tube & Conduit.
      b. Cooper B-Line, Inc.; a division of Cooper Industries.
      c. ERICO International Corporation.
      d. GS Metals Corp.
      e. Thomas & Betts Corporation.
      f. Unistrut; Tyco International, Ltd.
      g. Wesanco, Inc.
   2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
   3. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
   1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
      a. Manufacturers: Subject to compliance with requirements, available manufactures offering that may be incorporated into the Work included, but not limited to the following:
         1) Hilti Inc.
         2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
         3) MKT Fastening, LLC.
         4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
   2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
      a. Manufacturers: Subject to compliance with requirements, available manufactures offering that may be incorporated into the Work included, but not limited to the following:
         1) Cooper B-Line, Inc.; a division of Cooper Industries.
         2) Empire Tool and Manufacturing Co., Inc.

3) Hilti Inc.
4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
5) MKT Fastening, LLC.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
1. Secure raceways and cables to these supports with two-bolt conduit clamps.
2. Whenever possible, conduit shall be top mounted.
3. Each conduit shall be individually clamped to supports.
4. Parallel runs of conduit shall be grouped and fastened to walls with wall brackets of steel channel or knee-braced angles.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

E. Where conduit runs vertically, approved riser clamps, brackets, or other means shall be utilized to support conduit at 8 foot center-to-center, maximum.

F. Single runs of conduit shall be fastened to walls with one-hole straps or conduit clamps and to beams and trusses with beam clamps.

G. Peforated band iron, piano wire, or steel wire hangers will not be permitted as conduit hangers or supports. Conduit shall not be hung from wire supporting ceiling grid systems.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, RMC may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
   1. To Wood: Fasten with lag screws or through bolts.
   2. To New Concrete: Bolt to concrete inserts.
   3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
   4. To Existing Concrete: Expansion anchor fasteners.
   5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
   6. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.
   7. To Light Steel: Sheet metal screws.
   8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

B. Touchup: Comply with requirements in Division 09 Painting Sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

B. Related Sections include the following:
1. Division 26 Section “Common Work Results for Electrical”.
2. Division 26 Section “Hangers and Supports for Electrical Systems” for raceway and box supports.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. FMC: Flexible metal conduit.

C. IMC: Intermediate metal conduit.

D. LFMC: Liquidtight flexible metal conduit.

1.4 SUBMITTALS

A. Product Data: For conduit, boxes, wireways and fittings, hinged-cover enclosures.

B. Source quality-control test reports.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Allied Tube & Conduit; a Tyco International Ltd. Co.
4. Anamet Electrical, Inc.; Anaconda Metal Hose.
5. Electri-Flex Co.
6. Manhattan/CDT/Cole-Flex.
7. Maverick Tube Corporation.

8. O-Z Gedney; a unit of General Signal.
9. Wheatland Tube Company.

B. Rigid Steel Conduit: ANSI C80.1.

C. IMC: ANSI C80.6.

D. EMT: ANSI C80.3.

E. FMC: Zinc-coated steel.

F. LFMC: Flexible steel conduit with PVC jacket.

G. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
1. Fittings for EMT: Steel compression type. Set screw and indention type fittings are not allowed.
2. Fittings for rigid steel conduit shall be threaded.
3. Expansion fittings shall be galvanized ductile or malleable iron. Rigid conduit expansion fittings shall be DZ/Gedney type AX or approved equal. EMT fittings shall be DZ/Gedney type TX with compression fitting or approved equal.

H. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.2 BOXES AND ENCLOSURES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. EGS/Appleton Electric.
3. Erickson Electrical Equipment Company.
4. Hoffman.
5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
6. O-Z/Gedney; a unit of General Signal.
7. RACO; a Hubbell Company.
8. Robroy Industries, Inc.; Enclosure Division.
9. Scott Fetzer Co.; Adalet Division.
10. Spring City Electrical Manufacturing Company.
11. Thomas & Betts Corporation.
12. Walker Systems, Inc.; Wiremold Company (The).
13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.

D. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

E. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, galvanized, cast iron with gasketed cover.

F. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.
   1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Comply with the following indoor applications, unless otherwise indicated:

   1. Exposed, Not Subject to Physical Damage: EMT.
   2. Exposed, Not Subject to Severe Physical Damage: EMT or rigid metal conduit.
   3. Exposed and Subject to Severe Physical Damage: Rigid steel conduit or IMC. Includes raceways in the following locations:
      a. Loading dock.
      b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
   4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
   5. Connection to Vibrating Equipment: FMC, except use LFMC in damp or wet locations.
   6. Damp or Wet Locations: Rigid steel conduit or IMC.
   7. Raceways for Communications Cable in Spaces Used for Environmental Air: EMT.
   8. Boxes and Enclosures: NEMA 250, Type 1 except use NEMA 250, type 4, stainless steel in damp or wet conditions.
      a. Minimum outlet box depth shall be 2 1/8 inches.
      b. Four inch octagonal outlet boxes shall be provided for wall and ceiling mounted fixtures. Outlet boxes shall be provided with fixture studs as required for mounting fixture. Swivel aligners shall be provided for all suspended fixtures.
      c. Four inch square outlet boxes shall be provided for switches and convenience outlet boxes. A 4 inch by 2 1/8 inch handy box may be used for these devices when only one raceway enters the outlet box.
      d. Four inch square outlet boxes shall be provided for voice outlets, data outlets, and other special system outlets unless larger outlet boxes are specified elsewhere.
      e. Square cornered boxes shall be provided in block and brick wall construction.

B. Minimum Raceway Size: 3/4-inch trade size.

C. Raceway Fittings: Compatible with raceways and suitable for use and location.
   1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

3.2 INSTALLATION

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

B. Keep raceways at least 12 inches away from parallel runs of flues and uninsulated steam or hot-water pipes, 6 inches if crossing. Where lines are insulated, conduit parallel or crossing shall be at least 2 inches away. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation. All conduit shall be swabbed and cleaned before pulling wire.

D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems". Conduit shall be securely fastened in place within 3 feet of each outlet box, junction box, cabinet, or fitting and shall be supported at least every 10 feet. No conduit shall be supported by the equipment to which it is connected.

E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.

H. Do not embed raceways in slabs.

I. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

K. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.

L. Expansion-Joint Fittings:
   1. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
   2. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer’s written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

M. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
   1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
   2. Where otherwise required by NFPA 70.

N. Comply with manufacturer’s written instructions for solvent welding RNC and fittings.

O. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
   1. Use LFMC in damp or wet locations.

P. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block and install box flush with surface of wall.

Q. Metallic conduit systems shall be electrically continuous in their entirety.

R. All conduit shall be capped before concrete is poured.

S. Outlet boxes shall be provided for all devices. Pull boxes and junction boxes shall be provided at all points of splicing and tapping.

T. Boxes shall not be installed back-to-back in any wall but shall be staggered at least 12 inches apart.

U. Boxes and supports shall be fastened to wood with wood screws or screw-type nails of equal holding strength with bolts and expansion shields on concrete or brick, with toggle bolts on hollow masonry block and with screws or welded studs on steel work.

V. Threaded studs driven in by powder charge and provided with lock washers and nuts, or nail-type nylon anchors, may be used in lieu of wood screws, expansion shields or machine screws.

W. Outlet boxes in lay-in ceilings shall be supported by bar hangers anchored to the ceiling construction.

X. Connections between outlet boxes on the opposite sides of a wall shall be made with conduit employing the use of two 90 degree bends from box to box.

Y. All boxes shall be accessible.

Z. Conduit shall be run with smooth, easy bends. Exposed conduit shall be run parallel or perpendicular to walls, ceilings, beams, and columns. Concealed conduit may be run at angles other than parallel or perpendicular to building lines but shall be grouped in a neat and workmanlike manner. Dissimilar angles and crisscross arrangement will not be acceptable.

AA. Conduit bends and elbows shall be long-sweep, large radii when required by cable manufacturer.

BB. Utilize grounding/bonding jumpers with u-bolt connections and tinned copper braid at expansion fittings.

CC. Raceways that pass through insulated metal panels shall be sealed around penetration.

3.3 FIRESTOPPING

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

3.4 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
   1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
   2. Repair damage to paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Identification for raceways.
2. Identification for conductors and communication and control cables.
3. Underground-line warning tape.
4. Warning labels and signs including arc flash labeling.
5. Instruction signs.
6. Equipment identification labels.
7. Miscellaneous identification products.

1.3 SUBMITTALS

A. Product Data: For each electrical identification product indicated.

1.4 QUALITY ASSURANCE

A. Comply with NFPA 70.

B. Comply with NFPA 70E.

C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

D. Comply with ANSI Z535 for arc flash labels.

E. Comply with OSHA requirements for electrical labeling.

1.5 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in the Contract Documents, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 CONDUCTOR IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.

B. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

2.2 EQUIPMENT IDENTIFICATION LABELS

A. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed.
1. Equipment Label Text Height: Equipment name 3/16 inch; all other text 1/8 inch.
2. Equipment Label Minimum Size: 2 inch by 4 inch.
3. Equipment Label shall identify equipment name, equipment ampere and voltage ratings, and circuit feeding equipment.
4. Labels for equipment shall be white letters on black background.

B. Stenciled Legend: In nonfading, waterproof black ink.

2.3 CABLE TIES

A. General-Purpose Cable Ties: Fungus inert, self extinguishing, one piece, self locking, Type 6/6 nylon.
1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black except where used for color-coding.

B. Plenum-Rated Cable Ties: Self extinguishing, UV stabilized, one piece, self locking.
1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F, According to ASTM D 638: 7000 psi.
3. UL 94 Flame Rating: 94V-0.
4. Temperature Range: Minus 50 to plus 284 deg F.
5. Color: Black.

2.4 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in Division 09 painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws, or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

E. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

F. Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.

G. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:
   1. In Spaces Handling Environmental Air: Plenum rated.

H. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.

3.2 IDENTIFICATION SCHEDULE

A. Power-Circuit Conductor Identification, 600 V or Less: For conductors in pull and junction boxes, use color-coding conductor tape to identify the phase.
   1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder, and branch-circuit conductors.
      a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.
      b. Colors for 208/120-V and 240 V Circuits:
         1) Phase A: Black.
         2) Phase B: Red.
         3) Phase C: Blue.
      c. Colors for 480/277-V Circuits:
         1) Phase A: Brown.
         2) Phase B: Orange.
         3) Phase C: Yellow.
      d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

B. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.

C. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
   1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
   2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
   3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.

D. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
   1. Labeling Instructions:
      a. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
      b. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

2. Equipment to Be Labeled:
   a. Enclosed controllers.
   b. Remote-controlled switches and control devices.
   c. Monitoring and control equipment.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Standard-grade receptacles, 125 V, 20 A.
   2. GFCI receptacles, 125 V, 20 A.
   3. Toggle switches, 120/277 V, 20 A.
   4. Wall-box dimmers.

1.3 DEFINITIONS

A. EMI: Electromagnetic interference.

B. GFCI: Ground-fault circuit interrupter.

C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

D. RFI: Radio-frequency interference.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

1.5 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

PART 2 - PRODUCTS

2.1 GENERAL WIRING-DEVICE REQUIREMENTS

A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

B. Comply with NFPA 70.

C. Comply with NEMA WD 1.

D. Device Color:
   1. Wiring Devices Connected to Normal Power System: As selected by Architect unless otherwise indicated or required by NFPA 70 or device listing.

E. Wall Plate Color: For plastic covers, match device color.

F. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 STANDARD-GRADE RECEPTACLES, 125 V, 20 A

A. Duplex Receptacles, 125 V, 20 A:
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
      a. Eaton (Wiring Devices - Arrow Hart).
      b. Leviton Manufacturing Co., Inc.
      c. Pass & Seymour; Legrand North America, LLC.
      d. Wiring Device-Kellems; Hubbell Incorporated, Commercial, and Industrial.
   2. Description: Two pole, three wire, and self-grounding.
   3. Configuration: NEMA WD 6, Configuration 5-20R.
   4. Standards: Comply with UL 498 and FS W-C-596.

2.3 GFCI RECEPTACLES, 125 V, 20 A

A. Duplex GFCI Receptacles, 125 V, 20 A :
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
      a. Eaton (Wiring Devices - Arrow Hart).
      b. Leviton Manufacturing Co., Inc.
      c. Pass & Seymour; Legrand North America, LLC.
      d. Wiring Device-Kellems; Hubbell Incorporated, Commercial, and Industrial.
   2. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two pole, three wire, and self-grounding.
   3. Configuration: NEMA WD 6, Configuration 5-20R.
   4. Type: Non-feed through.
   5. Standards: Comply with UL 498, UL 943 Class A, and FS W-C-596.

2.4 TOGGLE SWITCHES, 120/277 V, 20 A

A. Single-Pole Switches, 120/277 V, 20 A:
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
      a. Eaton (Wiring Devices - Arrow Hart).
      b. Leviton Manufacturing Co., Inc.
      c. Pass & Seymour; Legrand North America, LLC.
      d. Wiring Device-Kellems; Hubbell Incorporated, Commercial, and Industrial.
   2. Standards: Comply with UL 20 and FS W-S-896.

2.5 DIMMERS

A. Wall-Box Dimmers:
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
      a. Eaton (Wiring Devices - Arrow Hart).
      b. Leviton Manufacturing Co., Inc.
      c. Lutron Electronics Co., Inc.
      d. Pass & Seymour; Legrand North America, LLC.
      e. Wiring Device-Kellems; Hubbell Incorporated, Commercial, and Industrial.
   2. Description: Modular, full-wave, solid-state dimmer switch with integral, quiet on-off switches, with audible frequency and EMI/RFI suppression filters.
   3. Control: Continuously adjustable slider; with single-pole or three-way switching.
   4. Standards: Comply with UL 1472.
   5. LED Lamp Dimmer Switches: Modular; compatible with LED lamps; trim potentiometer to adjust low-end dimming; capable of consistent dimming with low end not greater than 20 percent of full brightness.

2.6 WALL PLATES

A. Single Source: Obtain wall plates from same manufacturer of wiring devices.

B. Single and combination types shall match corresponding wiring devices.
   1. Plate-Securing Screws: Metal with head color to match plate finish.
   2. Material for Finished Spaces: Smooth, high-impact thermoplastic 0.035-inch- (1-mm-) thick, satin-finished.
   3. Material for Unfinished Spaces: Galvanized steel.
   4. Material for Damp Locations: Thermoplastic with spring-loaded lift cover and listed and labeled for use in wet and damp locations.

C. Wet-Location, Weatherproof In-Use Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, thermoplastic with lockable cover.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.

B. Coordination with Other Trades:
1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes, and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:
1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall comply with NFPA 70, Article 300, without pigtails.

D. Device Installation:
1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
7. Tighten unused terminal screws on the device.
8. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:
1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the right.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

3.2 IDENTIFICATION

A. Comply with Section 260553 "Identification for Electrical Systems."

3.3 FIELD QUALITY CONTROL

A. Test Instruments: Use instruments that comply with UL 1436.

B. Test Instrument for Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.

C. Perform the following tests and inspections:
   1. Test Instruments: Use instruments that comply with UL 1436.
   2. Test Instrument for Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.

D. Tests for Receptacles:
   1. Line Voltage: Acceptable range is 105 to 132 V.
   2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
   3. Ground Impedance: Values of up to 2 ohms are acceptable.
   4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
   5. Using the test plug, verify that the device and its outlet box are securely mounted.
   6. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault-current path, defective devices, or similar problems. Correct circuit conditions remove malfunctioning units and replace with new ones, and retest as specified above.

E. Wiring device will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

END OF SECTION

PART 1- GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes the following types of LED luminaires:
   1. LED Luminaires.
   2. Exit Signs.
   3. Emergency Lighting.
   4. Materials.
   5. Finishes.
   6. Luminaire support.

1.3 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color Rendering Index.

C. Fixture: See "Luminaire."

D. LED: Light-emitting diode.

E. Lumen: Measured output of lamp and luminaire, or both.

F. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Arrange in order of luminaire designation.
   2. Include data on features, accessories, and finishes.
   3. Include physical description and dimensions of luminaires.
   4. Include emergency lighting units, including batteries and chargers.
   5. Include life, output (lumens, CCT, and CRI), and energy efficiency data.
   6. Photometric data and adjustment factors based on laboratory tests.
      a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products. Retain “Samples” Paragraph for custom luminaires and single-stage samples. Retain “Samples for Initial Selection” and “Samples for Verification" paragraphs for two-stage Samples.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing laboratory providing photometric data for luminaires.

B. Product Certificates: For each type of luminaire.

C. Sample warranty.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.
   1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

1.7 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications: Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.

B. Provide luminaires from a single manufacturer for each luminaire type.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering.

1.9 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

B. Warranty Period: Five year(s) from date of Substantial Completion.

C. Special Warranty for Emergency Lighting Batteries: Manufacturer’s standard form in which manufacturer of battery-powered emergency lighting unit agrees to repair or replace components of rechargeable batteries that fail in materials or workmanship within specified warranty period.
   1. Warranty Period for Emergency Power Unit Batteries: Five years from date of Substantial Completion. Full warranty shall apply for the entire warranty period.

PART 2- PRODUCTS

2.1 MANUFACTURERS

A. In Lighting Fixture Schedule where titles below are column or row headings that introduce lists, the following requirements apply to product selections:
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 LUMINAIRE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Standards:
   1. ENERGY STAR certified.
   2. Recessed luminaires shall comply with NEMA LE 4.
   3. Design Lights Consortium (DLC) certified.

C. Lamps dimmable from 100 percent to 0 percent of maximum light output.

D. Internal driver.

E. Nominal Operating Voltage: As indicated.
   1. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.

2.3 EXIT SIGNS

A. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.
   1. Operating at nominal voltage of 120 V ac as indicated.
   2. Lamps for AC Operation: LEDs; 50,000 hours minimum rated lamp life.
   3. Self-Powered Exit Signs (Battery Type): Internal emergency power unit.

2.4 GENERAL REQUIREMENTS FOR EMERGENCY LIGHTING

A. Electrical components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. NRTL Compliance: Fabricate and label emergency lighting units, exit signs, and batteries to comply with UL 924.

C. Comply with NFPA 70 and NFPA 101.

D. Comply with NEMA LE 4 for recessed luminaries.

E. Internal Type Emergency Power Unit: Self-contained, modular, battery-inverter unit, factory mounted within luminaire body and compatible with driver.
   1. Emergency Connection: Operate lamps continuously upon loss of normal power. Connect unswitched circuit to battery-inverter unit and switched circuit to luminaire ballast.
   2. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
   3. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
      a. Ambient Temperature: Less than 0 deg F or exceeding 104 deg F, with an average value exceeding 95 deg F over a 24-hour period.
      b. Ambient Storage Temperature: Not less than minus 4 deg F and not exceeding 140 deg F.
      c. Humidity: More than 95 percent.
      d. Altitude: Exceeding 3300 feet.

   4. Test Push-Button and Indicator Light: Visible and accessible without opening luminaire or entering ceiling space.
      a. Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
      b. Indicator Light: LED indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
   5. Battery: Sealed, maintenance-free, nickel-cadmium type.

6. Charger: Fully automatic, solid-state, constant-current type with sealed power transfer relay.

2.5 MATERIALS

A. Metal Parts:
   1. Free of burrs and sharp corners and edges.
   2. Sheet metal components shall be steel unless otherwise indicated.
   3. Form and support to prevent warping and sagging.

B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

C. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

2.6 METAL FINISHES

A. Variations in finishes are unacceptable in the same piece.

2.7 LUMINAIRE SUPPORT

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems".

B. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage.

C. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.

D. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with NECA 1.

B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.

C. Install lamps in each luminaire.

D. Supports:
1. Sized and rated for luminaire weight.
2. Able to maintain luminaire position after cleaning and relamping.
3. Provide support for luminaire without causing deflection of ceiling.
4. Luminaire mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and vertical force of 400 percent of luminaire weight.

E. Flush-Mounted Luminaires:
1. Secured to outlet box.
2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
3. Trim ring flush with finished surface.

F. Wall-Mounted Luminaires:
1. Attached to a minimum 20 gauge backing plate attached to wall structural members.
2. Do not attach luminaires directly to gypsum board.

G. Suspended Luminaires:
1. Ceiling Mount:
   a. Pendant mount with rod supports or aircraft cable supports as indicated.
2. Pendants and Rod: Where longer than 48 inches, brace to limit swinging.
3. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
4. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and wire support for suspension for each unit length of luminaire chassis, including one at each end.
5. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

H. Ceiling-Grid-Mounted Luminaires:
1. Secure to any required outlet box.
2. Luminaire installed in or on lay-in ceiling system shall be supported independently of the ceiling system grid with No. 14 galvanized support wires at two opposite corners of the fixture from the building structural system.
3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.

I. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.3 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:
1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.

B. Luminaire will be considered defective if it does not pass operation tests and inspections.

C. Prepare test and inspection reports.

END OF SECTION