DONOFRO ARCHITECTS
2910 Caledonia Street Marianna, Florida 32446
Phone (850) 482-5261

RESTORATION, PRESERVATION, AND ADDITION TO THE

HISTORIC GRAHAMS PLACE

FOR THE

RENAISSANCE PARK, YOUTH CAMP AND FAMILY CENTER, INC.
MARIANNA, FLORIDA

Job # M-2022-21

October 11.2024

PROJECT DIRECTORY

OWNER:	**Renaissance Park Youth Camp and Family Center, Inc** 4285 Forehand Road Marianna, Florida 32448 Phone: (850) 482-7497 / (850) 272-4167 Philip Sylvester, Owner Representative
ARCHITECT:	**Donofro Architects** 2910 Caledonia St./ P.O. Box 861 Marianna, Florida 32446/32447 Phone: (850) 482-5261 Fax: (850) 482-8609 Paul A. Donofro, Jr., Project Architect, AR Sean Donofro, Contract Administration
CIVIL ENGINEER:	**D.H.M – Melvin Engineering** 4428 Lafayette Street Marianna, Florida 32446 Phone: (850) 482-3045 Mary Farris, Project Civil Engineer
STRUCTURAL ENGINEER:	**D.H.M – Melvin Engineering** 2541-1 Barrington Circle Tallahassee, Florida 32308 Phone: (850) 671-7221 Jamie Graham, EOR
MECHANICAL ENGINEER:	**Watford Engineering** 4471 Clinton Street Marianna, FL 32446 Phone: (850) 526-3447 David Watford, PE, EOR
ELECTRICAL ENGINEER:	**Watford Engineering** 4471 Clinton Street Marianna, FL 32446 Phone: (850) 526-3447 Anthony Davis, PE, EOR
LANDSCAPING:	**D.H.M – Melvin Engineering** 4428 Lafayette Street Marianna, Florida 32446 Phone: (850) 482-3045

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DIVISION I

BIDDING CONDITIONS

INVITATION TO BID

Bids will be received by the Renaissance Park Youth Camp and Family Center, Inc, Marianna, Florida, on April 3, 2025, at 2:00 p.m. C.T., in the City Commission Board Room at Marianna City Hall located at 2898 Green Street, Marianna, Florida. At that time and place, all bids received will be officially opened and read aloud for furnishing all labor and materials for the construction of:

RESTORATION, PRESERVATION, AND ADDITION TO THE HISTORIC GRAHAMS PLACE
FOR THE RENAISSANCE PARK YOUTH CAMP AND FAMILY CENTER, INC
MARIANNA, FLORIDA

All work shall be done according to plans and specifications prepared by Donofro Architects, 2910 Caledonia Street, Marianna, Florida 32446. The plans are on file and open to inspection in the Architect's office.

Drawings and specifications may be viewed at the office of the Architect at 2910 Caledonia Street, Marianna, Florida 32446. Drawings, specifications, and addendums may also be emailed or viewed thru Dropbox link upon request to karen@donofroarchitects.com

Each bid must be accompanied by a bid bond or a cashier's check, made payable to the Renaissance Park Youth Camp and Family Center, Inc., Marianna, Florida, in the sum of 5% of the base bid as a guarantee and with an agreement that the bidder will not revoke or cancel his bid or withdraw from the competition for a period of thirty (30) days after the opening of bids, and that in the event the contract is awarded to the bidder, he will within ten (10) consecutive days after it is submitted, enter into a written contract with the Renaissance Park Youth Camp and Family Center, Inc. in accordance with the accepted bid. The bond cost will be included in the bidder’s base-bid proposal.

The Owner reserves the right to waive informalities in any bid, to reject any or all bids, or to accept any bid and any combination of alternates or separate bid prices that, in their judgment, will be in the best interest of Renaissance Park Youth Camp and Family Center, Inc.

NOTE: There will be a Mandatory Pre-Bid Conference held on March 25, 2025, at 9:00 am CT in the City Commission Board Room at Marianna City Hall located at 2898 Green Street, Marianna, Florida

RENAISSANCE PARK YOUTH CAMP AND FAMILY CENTER, INC
Marianna, Florida

SECTION B
INSTRUCTIONS TO BIDDERS

B-1 INTENT OF INSTRUCTIONS:

Instructions for bidders are included in the contract documents to amplify the Advertisement and the Proposal Form and to give other details that interested parties must or should know to prepare their bid correctly.

B-2. PROJECT DESCRIPTION:

Generally, this project can be described as a renovation and addition type construction project to be executed as required to restore, refurbish, and upgrade a vacant two-story building utilizing Historic Preservation Funding through the Department of State. The program will include a community meeting space on the second floor, leasable shell space on the first floor, and a two-story addition to be constructed at the north end of the existing building to house an entrance lobby, a two-stop elevator, and an elevator equipment room. The addition will also include a full width single-story covered entrance porch. Site development will include new utilities, a new H/C parking stall, and minor landscaping.

B-3 EXAMINATION OF CONTRACT DOCUMENTS AND SITE OF THE WORK:

Before submitting a proposal for the work, the bidders shall carefully examine the contract documents, visit the site, and satisfy themselves as to the nature and location of the work and the general and local conditions, including weather, the general character of the site, any other work being performed thereon at the time of the submission of their bids. They shall obtain full knowledge of transportation, disposal, handling, and storage of materials, availability of water, electric power, and all other facilities in the area, which will have a bearing on the performance of the work for which they submit their proposals. Submitting a proposal shall be prima facie evidence that the bidder has made such an examination and visit and has judged for and satisfied himself as to the conditions to be encountered, the materials and equipment to be furnished, and the contract requirements and contingencies involved.

B-4 EXPLANATIONS AND INTERPRETATIONS:

Should any bidder observe any ambiguity, discrepancy, omission, or errors in the drawings and specifications, or any of the contract documents, or be in doubt as to the intention and meaning thereof, he should at once report such to the Architect and request clarification, preferably in writing, from the Architect.

Clarification will be made by Addenda and sent to all prospective bidders as time permits. No addendum will be mailed out after 24 hours before the time that bids are received. Each bidder is requested to report such questions before that time.

Neither the Owner nor the Architect will be responsible in any manner for verbal answers regarding the intent or meaning of the contract documents or any verbal instructions by whomsoever made before the award of the contract. For their protection, Bidders should request in writing any answers or instructions concerning any matter affecting their bids. Should conflict occur in or between drawings and specifications, the bidder will be deemed to have

estimated the more expensive way of doing the work involved unless he has asked for and obtained the written decision of the Architect before submission of his proposal as to method, or equipment, which will be required.

B-5 SUBSTITUTIONS:

No substitution will be considered unless a written request has been submitted to the Architect for approval at least ten (10) days before the date for receipt of bids. Each such request shall include a complete description of the proposed substitute, the name of the material or equipment for which it will be substituted, drawings, cuts, performance and test data, and any other information necessary for a complete evaluation.

All requests for substitutions shall be submitted to the Architect.

B-6 DRAWINGS AND SPECIFICATIONS:

Consider complementary to each other. What is called for by one shall be as binding as if called for by both. Where conflicts occur, secure clarification from the Architect in advance of bidding, otherwise, provide the more expensive quality and quantity. Follow figures in preference to scale dimensions and verify all measurements and existing conditions.

B-7 FAMILIARITY WITH LAWS:

The bidder is assumed to be familiar with all federal, state, and local laws, ordinances, rules, and regulations that may, in any manner, affect the work. Ignorance on the part of the bidder will in no way relieve him of responsibility.

B-8 PREPARATION AND SUBMISSION OF BIDS:

A. Procedure: Proposals shall be submitted on the Proposal Form as bound with these specifications or a reproduced form. Any erasures or other corrections in the proposal must be explained or noted on the bidder's signature. Proposals containing any conditions, omissions, unexplained erasures, alterations, items not called for, or irregularities of any kind may be rejected by the Owner.

Proposals must be submitted in duplicate.

Each bid must give the bidder's full business name and address, state whether he is an individual, corporation, or partnership. Proposals by a corporation must be signed with the legal name, and proposals by associations shall show the terms of all partners and must be signed in the partnership name by one of the partners. Bidders shall be licensed as Contractors by the Florida Construction Industry Licensing Board.

Proposals with the bid guarantee shall be enclosed in a sealed envelope which shall be marked:

"SEALED BID FOR RESTORATION, PRESERVATION, AND ADDITION TO THE HISTORIC GRAHAMS PLACE
FOR THE RENAISSANCE PARK YOUTH CAMP AND FAMILY CENTER, INC

MARIANNA, FLORIDA"

B. Irregular Proposals: Proposals may be rejected if they contain any omissions, alterations of forms, additions not called for, incomplete bids, erasures, or irregularities of any kind.

C. Errors in Bid: In case of discrepancies between the prices shown in the figures and words, the words govern.

D. All bids **must** include the Proposal Form (Division C) with the bid guarantee and the completed Public Entity Crimes Form (Division PEC).

All forms shall be fully completed and signed as indicated. Please complete all required forms to avoid rejection of the bid.

B-9 WITHDRAWAL OF BIDS:

Bids may be withdrawn by written or telegraphic request from the bidders before the time fixed for opening. Negligence on the part of the bidder in preparing his bid confers no right to withdraw the bid after it has been opened.

B-10 RECEIPT AND OPENING OF BIDS:

Bids will be opened publicly at the time and place stated in the Advertisement for Bids. The officer whose duty is to open them will decide when the specified time has arrived, and no bids received after that will be considered. No responsibility will be attached to any officer for the premature opening of a bid not properly addressed and identified. At the time fixed for the opening of bids, their contents will be made public for the information of bidders and others interested who may be present.

B-11 BID MODIFICATIONS:

Bid modifications will be accepted from bidders if addressed as indicated in Advertisement for Bids and if received before the opening of bids. No bid modification will be accepted after the close for receiving bids has been announced. Changes may be in telegraphic or other written or printed form. Amendments shall be submitted in separate sealed envelopes, or the modifications may be written or printed outside of the sealed bid envelope. **An authorized representative of the bidder must sign all bid modifications. Changes** will be read by the officer in charge before the opening of bids.

B-12 BID CUT OFF TIME:

Bidders will abide by a two-hour cut-off in receiving bids from subcontractors and suppliers. Prices from subcontractors and suppliers will not be accepted by contractors two hours before the time for the opening of bids.

B-13 REJECTION OF BIDS:

The Owner reserves the right to reject all bids when such rejection is in the interest of the Owner and to reject the bid of a bidder who cannot perform the contract. The Owner reserves

the right to waive informalities in any bid, reject any or all bids, or accept any bid and any combination of alternates or separate bid prices that, in their judgment, will be in the best interest of the Renaissance Park Youth Camp and Family Center, Inc.

B-14 QUALIFICATION OF BIDDERS:

Only those General Contractors qualified to provide general construction contracting in the State of Florida will be eligible to submit contracting bids for this project.

Contractors who propose to submit a bid for this project shall be responsible contractors qualified by registration, licenses, experience, and financial position to do the work specified in the contract documents.

B-15 DISQUALIFICATION OF BIDDERS:

Any bidder using the same or different names for submitting more than one proposal upon any unit, portion, part, or section of work will be disqualified from further consideration on that part of the work. Evidence that any bidder is interested as a principal in more than one proposal for the work (example: bidding in partnership, association, or individual) will cause the rejection of any such proposal. A bidder may, however, submit a proposal as a principal and as a subcontractor to some other principals, as he desires and by so doing will not be liable for disqualification. If there is any reason for believing there is collusion among the bidders, any or all proposals may be rejected and participants in such collusion may not be considered in future proposals for the same work. Proposals in which prices are obviously unbalanced or unresponsive to the Advertisement may be rejected.

The right is reserved to reject a proposal from a bidder who has not paid for or satisfactorily settled all bills due for labor and materials on former contracts in force at the time of letting.

B-16 MANDATORY PRE-BID CONFERENCE:

Unless notified otherwise, a mandatory pre-bid conference will held at a date, time, and place to be determined for all bidders and others who may have questions regarding this project.

The Pre-Bid Conference will be mandatory for all General Contractors proposing to submit a bid. All bidders are required to attend the Pre-Bid Conference, and failure to attend will result in their bid being disqualified.

B-17 BID GUARANTEE:

Bids shall be accompanied by a bid guarantee of not less than five percent (5%) of the amount of the bid, which may be a certified check, a cashier's check, a treasurer's check, bank draft, or bid bond made payable to the Owner. Such check or bid bond shall be submitted with the understanding that it shall guarantee that bidder will not withdraw his bid for a period of thirty (30) days after the scheduled closing time for receipt of bids; that if his bid is accepted, he will enter into a written contract with the Owner in accordance with the form of agreement included as a part of the contract documents, and that the required performance and payment bonds will be given and that in the event of the withdrawal of said bid within said period, or failure to enter

into said agreement and give said bonds within ten (10) days after he has received notice of acceptance of his bid, the bidder shall be liable to the Owner for the full amount of the bid guarantee in any particular thereof. The bid bond or check shall be returned to all except the lowest two bidders after the formal opening of bids. The remaining bid bonds or checks will be returned to the two lowest bidders after the Owner and the accepted bidder have executed the agreement and performance bond has been approved by the Owner. If the required agreement and bond have not been executed within thirty (30) days after the date of opening of bids, then the bid bond or check of any bidder will be returned upon his request, provided he has not been notified of the acceptance of his bid prior to the date of such request.

B-18 AWARD OF CONTRACT:

The contract will be awarded as soon as possible to the lowest responsible bidder, provided his bid is reasonable and it is to the interest of the Owner to accept it.

The Owner reserves the right to waive any informality in bids received when such waiver is in the interest of the Owner.

Each bidder shall, if requested by the Owner, present evidence of his experience, qualifications, and ability to carry out the terms of the contract, including a financial statement.

B-19 TIME OF COMPLETION AND LIQUIDATED DAMAGES:

The work to be performed under the contract shall be commenced as of the date of the Notice to Proceed, and work for the total project shall be substantially completed within three hundred (300) calendar days from the date of the Notice to Proceed.

The “Notice to Proceed Date” will be established after the date of the Owner / Contractor Agreement and as agreed upon by both the Owner and the Contractor but no later than the date that the County Building Permit has been issued for construction work, whichever of the two dates occurs first. **A copy of the building permit showing the date issued shall be submitted to the Architect for his records.**

In as much as the failure to complete the work within the time fixed in the agreement will result in substantial injury to the Owner, and damages arising from such failure cannot be calculated with any degree of certainty, it is hereby agreed that if the work is not substantially completed in accordance with the provisions of the contract documents the contractor shall pay the Owner as liquidated damages for such delay, and not as a penalty, five hundred dollars ($500.00) for each and every calendar day lapsing between the date fixed for substantial completion, and the date such substantial completion shall have been fully accomplished. This amount shall be deducted by the Owner from the final estimate and shall be retained by the Owner out of monies otherwise due the contractor in the final payment under the Provisions of Article 8, of the General Conditions, and shall not exclude the recovery of damages by the Owner under other provisions of the contract documents, except for contractor’s delays.

This provision for liquidated damages for delay shall in no manner affect the Owners right to terminate the contract as provided in Article 14 of the General Conditions, or elsewhere in the contract documents. The Owners exercise of the right to terminate shall not release the contractor from his obligation to pay said liquidated damages in the amounts set out in the agreement.

It is further agreed that the Owner may deduct from the balance retained by the Owner the liquidated damages stipulated therein, or such portion thereof as the said retained balance will cover.

B-20 DIRECT PURCHASE: N.A.

B-21 JESSICA LUNSFORD ACT: N.A.

B-22 PUBLIC ENTITY CRIMES:

Any person submitting a bid or proposal in response to this Invitation must execute the Form PUR 7068, as included in these Specifications, SWORN STATEMENT UNDER SECTION 287.133(3)(a), FLORIDA STATUTES, ON PUBLIC ENTITY CRIMES, including proper check(s), in the space(s) provided, and enclose it with the Bid/Proposal.

B-23 BUILDING PERMIT COSTS:

The Owner will pay for **all** permit costs associated with this project, including (but not limited to) the general building permit, roofing permit, mechanical permit, plumbing permit, electrical permit, and development order permit.

B-24 OWNER CONTINGENCY:

Each bidder shall include in their base bid a lump sum of **$50,000.00 to** be used by the Owner as a contingency fund to compensate the contractor for the execution of any unforeseen work, not included as part of the work scope designated in these bid documents.

The expenditure of these contingency dollars can only occur after a written scope of work by the Architect and a written price proposal by the Contractor have been reviewed and approved by the Owner in the form of an approved contingency change notification (CCN) form.

At the close out of the project, any unexpended contingency funds shall be deducted from the contract amount via a deductive change order.

B-26. UNIT COSTS:

Unit Cost A: The Contractor shall provide a unit cost ($/ 1 Cu. Yd.) for excavating, removing from the site, and disposing of 1 cubic yard of any existing soils determined as being unsuitable for use as bearing soil material for supporting new building or vehicle parking/drive construction. The amount of material to be excavated, removed, and disposed of shall be mutually determined and agreed to by the Architect, Project Manager, Contractor, and Soil Testing Lab before initiating excavation. The method to be used to determine the amount of excavated material that the contractor will be compensated for will be the volume of the excavated area in cubic yards increased by 25% as a conversion rate times the Unit Cost A**.**

Unit Cost B: The Contractor shall provide a unit cost ($/1 Cu. Yd) for importing and compacting to a specified density one cubic yard of suitable sand clay fill as required to infill the excavated area due to excavation of unsuitable soil material. The method of determining the amount of fill

material needed to infill the excavated volume shall be the volume of the excavated area in cubic yards increased by 40% for compaction, times the Unit Cost B.

END OF SECTION

PROPOSAL FORM

(May be reproduced by the Bidder)

DATE: _____
TIME: _____

TO: JACKSON COUNTY BOARD OF COUNTY COMMISSIONERS
MARIANNA, FLORIDA

The undersigned, hereinafter called "Bidder," having visited the site of the proposed project, familiarized himself with the local conditions, nature, and extent of the work, the drawings, specifications, and contract and bond requirements, proposes to furnish all labor, materials, and equipment necessary and to construct:

RESTORATION, PRESERVATION, AND ADDITION TO THE HISTORIC GRAHAMS PLACE FOR THE RENAISSANCE PARK YOUTH CAMP AND FAMILY CENTER, INC MARIANNA, FLORIDA

in full accordance with the Advertisement for Bids, Instructions to Bidders, contract and contract documents relating thereto, on file in the office of the Architect, Marianna, Florida, for the following bid prices:

BASE BID: _____ Dollars

($_____), including contingency of $50,000.00.

Unit Cost A: The Contractor shall provide a unit cost ($/ 1 Cu. Yd.) for excavating, removing from the site, and disposing of 1 cubic yard of any existing soils determined as being unsuitable for use as bearing soil material for supporting new building or vehicle parking/drive construction.

_____ Dollars ($_____/Cu. Yd.)

Unit Cost B: The Contractor shall provide a unit cost ($/1 Cu. Yd) for importing and compacting to a specified density one cubic yard of suitable sand clay fill as required to infill the excavated area due to excavation of unsuitable soil material.

_____ Dollars ($_____/Cu. Yd.)

There is enclosed a cashier's check or bid bond in the amount of _____

_____ Dollars ($_____), which is not less than 5% of the base bid, payable to the **RENAISSANCE PARK YOUTH CAMP AND FAMILY CENTER, INC.,** Marianna, Florida as the required bid deposit as a guarantee and for the purposes set out in your Advertisement for Bids and Instructions to

Bidders.

The bidder hereby agrees that:

A. The above proposal shall remain in full force and effect for a period of sixty (60) calendar days after the time of the opening of this proposal and that bidder will not revoke or cancel his proposal or withdraw from the competition within the said sixty (60) calendar days.

B. In the event the contract is awarded to this bidder, he will enter a formal written contract with the Owner in accordance with the accepted bid within ten (10) calendar days after said contract is submitted to you and will furnish to the Owner a Contract Performance and Material Payment bond with good and sufficient sureties, satisfactory to the Owner, in the amount of 100% of the accepted bid. The bidder further agrees that in the event of the bidder's default or breach of any of the agreements of this Proposal, the said bid deposit shall be forfeited as liquidated damages.

The bidder agrees to substantially complete all work from date of "Notice to Proceed" within three hundred (300) calendar days.

Acknowledgment is hereby made of receipt of the following addenda issued during the bidding period.

Addendum No. _____ Dated _____
Addendum No. _____ Dated _____
(Add further addenda as necessary)

IN WITNESS WHEREOF, the bidder has hereunto set his signature and affixed this seal this.

_____day of _____, AD, 2023.

_____

BY: _____

TITLE: _____
Florida Construction Industry Licensing Board
Certificate No.: _____

SECTION D

LIST OF SUBCONTRACTORS

NOTICE:

Each bidder shall submit, with his Proposal, a list of his subcontractors as shown below in duplicate. The list of subcontractors submitted by the apparent low General Contractor bidder will be read aloud at the bid opening. No change may be made to the subcontractor list submitted except upon written approval of the Owner / Architect. This form must be submitted in duplicate.

All subcontractors must be listed and noted on this form and attached to and with the bid form. Failure to complete this form will be cause for rejection of the bid.

This list is attached to and is an integral part of the proposal submitted by:

NAME: _____

ADDRESS: _____

_____

FOR: **RESTORATION, PRESERVATION, AND ADDITION TO THE HISTORIC GRAHAMS PLACE**
FOR THE RENAISSANCE PARK YOUTH CAMP AND FAMILY CENTER, INC
MARIANNA, FLORIDA

The undersigned, hereinafter called the bidder, lists below the names of the subcontractors who will perform the phase of the work indicated.

1	Site Work Subcontractor	Name: _____
		Address: _____
		Contact No. _____
		Email: _____
2	Masonry Sub Contractor	Name: _____
		Address: _____
		Contact No. _____
		Email: _____
3	Structural Steel Fabricator / Erector	Name: _____
		Address: _____
		Contact No. _____

		Email:_____
4	Glass, Glazing, & Storefront	Name:_____
		Address: _____
		Contact No. _____
		Email:_____
5	Finish Hardware	Name:_____
		Address: _____
		Contact No. _____
		Email:_____
6	Ceramic Tile Sub-contractor	Name:_____
		Address: _____
		Contact No. _____
		Email:_____
7	Acoustical Ceiling	Name:_____
		Address: _____
		Contact No. _____
		Email:_____
8	Painting	Name:_____
		Address: _____
		Contact No. _____
		Email:_____
9	Plumbing Contractor	Name:_____
		Address: _____
		Contact No. _____
		Email:_____
10	HVAC Contractor	Name:_____
		Address: _____
		Contact No. _____
		Email:_____

11	Electrical Contractor	Name:_____ Address: _____ Contact No. _____ Email:_____
12	Test and Balancing (Independent Contractor)	Name:_____ Address: _____ Contact No. _____ Email:_____
13	Communication Structure Cabling System Subcontractor (if required)	Name:_____ Address: _____ Contact No. _____ Email:_____
14	IP Security Camera System (if required)	Name:_____ Address:_____ Contact No._____ Email:_____
15	Access Control and Intrusion Alarm System (if required)	Name:_____ Address:_____ Contact No. _____ Email:_____

The undersigned declares that he has fully investigated each subcontractor listed and has received, and has in his files, evidence that the subcontractor is properly and currently licensed in the place where required by local or state laws, has been engaged successfully in his line of work and his organization is capable, technically and financially, of performing the pertinent work, and that he has made similar installations in a satisfactory manner.

IN WITNESS WHEREOF, the bidder has hereunto set his signature and affixed his seal this

_____ day of _____, AD, 20_____

By: _____ (SEAL)

SWORN STATEMENT PURSUANT TO SECTION 287.133(3)(a),
FLORIDA STATUES, ON PUBLIC ENTITY CRIMES

THIS FORM MUST BE SIGNED AND SWORN TO IN THE PRESENCE OF A NOTARY PUBLIC OR OTHER OFFICIAL AUTHORIZED TO ADMINISTER OATHS.

1. This sworn statements is submitted to _____
(print name of the public entity)

by _____
(print individual's name and title)

for _____

whose business address is: _____

_____

and (if applicable) its Federal Employer Identification Number (FEIN) is _____

(If the entity has no FEIN, include the Social Security Number of the individual signing this sworn statement:_____.

2. I understand that a "public entity crime" as defined in Paragraph 287.133(1)(g). **Florida Statues** means a violation of any state or federal law a person with respect to and directly related to the transaction of business with any public entity or with an agency or political subdivision of any other state or the United States, including, but not limited to, any bid or contract for goods or services to be provided to any public entity or an agency or political subdivision of any other state or of the United States and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.

3. I understand that "convicted" or "conviction" as defined in Paragraph 287.133(1)(b) **Florida Statues,** means a finding of guilt or a conviction of a public entity crime, with or without an adjudication of guilt, in any federal or state trial court of record relating to charges brought by indictment or information after July 1, 1989, as a result of a jury verdict, non-jury trial, or entry of a plea of guilty or nolo contendere.

4. I understand that an "affiliate" as defined in Paragraph 287.133(1)(a). **Florida Statutes** means:

1. A predecessor or successor of a person convicted of a public entity crime or
2. An entity under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity crime. The term "affiliate" includes those officers, directors executives, partners, shareholders, employees, members and agents who are active in the management of an affiliate. The ownership by one person of shares constituting a controlling interest in another person, or a pooling of equipment or income among persons when not for fair market value under an arm's length agreement, shall be a prima facie case that one person controls another person. A person who knowingly enters into a joint venture with another person who has been convicted of a public entity crime in Florida during the preceding 36 months shall be considered an affiliate.

5. I understand that a "person" as defined in Paragraph 287.133(1)(e). **Florida Statues** means any natural person or entity organized under the laws of any state or of the United States with the legal power to enter into a binding contract and which bids or applies to bid on contracts for the provision of goods or services let by a public entity, or which otherwise transacts or applies to transact business with a public entity. The term "person" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an

entity.

6. Based on information and belief, the statement which I have marked below is in true relation to the entity submitting this sworn statement. [Indicate which statement applies]

_____Neither the entity submitting this sworn statement, nor any of its officers directors, executives, partners, shareholders, employees, members or agents who are active in the management of the entity, nor any affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989.

_____The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989.

_____The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989. However, there has been a subsequent proceeding before a Hearing Officer of the State of Florida, Division of Administrative Hearings and the Final Order entered by the Hearing Officer determined that it was not in the public interest to place the entity submitting this sworn statement on the convicted vendor list. [Attach a copy of the Final Order].

I UNDERSTAND THAT THE SUBMISSION OF THIS FORM TO THE CONTRACTING OFFICER FOR THE PUBLIC ENTITY IDENTIFIED IN PARAGRAPH 1(ONE) ABOVE IS FOR THAT PUBLIC ENTITY ONLY AND, THAT THIS FORM IS VALID THROUGH DECEMBER 31 OF THE CALENDAR YEAR IN WHICH IT IS FILED. I ALSO UNDERSTAND THAT I AM REQUIRED TO INFORM THE PUBLIC ENTITY PRIOR TO ENTERING INTO A CONTRACT IN EXCESS OF THE THRESHOLD AMOUNT PROVIDED IN SECTION 287.017 FLORIDA STATUES FOR CATEGORY TWO OF ANY CHANGE IN THE INFORMATION CONTAINED IN THIS FORM.

_____
(Signature)

Sworn to and subscribed before me this _____day of _____, 20_____.

Personally known _____
OR Produced identification

_____
Notary Public - State of - _____

_____
_____
(Type of identification)

My commission expires _____

_____
(Printed, typed or stamped commissioned name of notary public)

Form PUR 7068 (Rev 06/11/92)

(This form to be submitted in duplicate)

DIVISION II

CONTRACTUAL CONDITIONS

SECTION E

AIA DOCUMENT A-201-2017

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

(Dated 2017)

The General Conditions, AIA Document A-201, dated 2017, or most current edition, shall apply to and form a part of these Specifications, as if written in full herein.

A printed copy of A-201 will be made available to each General Contractor upon request. All others may have a set of these General Conditions upon request and payment of two dollars ($2.00)per sheet, or they may be viewed in the office of the Architect and / or the Owner, who will have a copy available to any bidder.

SECTION F

SUPPLEMENTARY AND SPECIAL CONDITIONS

F-01 GENERAL:

The General Conditions, Section E, AIA Document A-201, dated 2017, or latest edition, shall apply to and form a part of this Section as if written in full herein.

F-02 SCOPE:

This Section sets forth all modifications and additions to the General Conditions, Section E.

F-03 ARTICLE 1 GENERAL PROVISIONS:

Add the following to Paragraph 1.1.5:

Should the drawings disagree in themselves or with the specifications, the contractor shall estimate and furnish the more expensive, better quality, greater amount of work, and/or materials unless otherwise instructed in writing by the Architect. Should minor omissions occur between or within the drawings or the specifications, the Contractor will furnish the item to meet the general intent and/or scope of the project documents.

Add the following to Paragraph 1.1.5:

Drawings and Specifications: Consider each as complementary to the other. What is called for by one shall be as binding as if called for by both. Where conflicts occur, secure clarification from the Architect in advance of bidding, otherwise provide the more expensive quality and quantity. Follow figures in preference to scale dimensions, verify all dimensions and existing conditions.

F-04 ARTICLE 2 OWNER:

Add the following to Paragraph 2.1.1 Definition:

Where the term "Owner" is used on the drawings or in the specifications, it shall refer to the Renaissance Park Youth Camp and Family Center, Inc., Marianna, Florida.

F-05 ARTICLE 3 CONTRACTOR:

Add the following to Paragraph 3.1, Definition:

Where the words "The Contractor" are used, they shall be understood to refer to the contractor operating under the specifications of which these General Conditions are a part, unless particularly noted otherwise. In using the pronoun designation, the contractor, the third person singular is adopted herein, whether the contract is in the hands of an individual, a firm, a corporation, or their successors.

Paragraph 3.9.1, add the following:

Should the Architect find any person employed on the project incompetent or unfit for his duties, and so certified the facts to the contractor, the contractor shall immediately dismiss the employee and said employee shall not be re-employed on this project without written consent of the Architect.

Add the following to Paragraph 3.18, Indemnification:

Indemnification by the Contractor shall be in the full dollar amount of the Contract.

F-06 ARTICLE 4 ADMINISTRATION OF THE CONTRACT:

Add the following to Paragraph 4.1 Architect:

Where the words "The Architect" are used, they shall be understood to refer to Donofro Architects, Marianna, Florida, or an authorized representative of that firm.

F-07 ARTICLE 7 CHANGES IN THE WORK:

Add the following to Paragraph 7.3.3:

Change orders under this contract whether adding to or deducting from the contract sum will be based as follows for overhead and profit:

- For all work done by his own organization, or subsidiaries of his own organization, the contractor may add 10% of his actual costs for combined overhead and profit.
- For all work done by his subcontractors, the respective subcontractors may add 10% of their actual costs for combined overhead and profit, and the Contractor may add 10% of the above subcontractor's cost for his overhead and profit.
- The above percentages shall be considered a reasonable allowance for overhead and profit due the contractors.
- Labor costs for the subcontractors and / or the Contractor may include supervision, estimation, layout, mechanics, and labor wages, including payroll taxes, assessments, and insurance provisions. Costs may also include material and equipment rental cost which shall be the trade discount plus sales tax where applicable. Other items of cost may include freight or other transportation, special permits, or fees, and unusual or excessively high expenses for communication, special testing, or other transportation of personnel. Any of the above costs shall be itemized and shall be reasonable.
- A bond cost of 2% of the total amount of added costs will be allowed the contractor as a legitimate item of cost. No bond costs will be allowed for subcontractor bond cost.
- All proposals for change orders, shall be in written form itemizing all costs included in the change order, and submitted to the Architect. If required by the

Architect, the contractor shall submit receipts, invoices for materials and other evidence showing his costs and his right to the payment claims.

F-08 ARTICLE 9 PAYMENTS AND COMPLETION:

Add the following to Paragraph 9.2:

The contractor shall within ten (10) days from date of contract deliver to the Architect three (3) copies of Schedule of Contract Values according to Sections of specifications and addition of item, profit and overhead showing values for all items listed, the total of which shall equal the contract price.

This schedule shall be for use of the Owner, at his discretion, in checking requisitions for payments, but it shall not be binding against the judgement of the Owner. The Unit Schedule shall also contain a chart giving the estimated time schedule for each portion of the contract.

The following form is given as a guide for the contractor's use in preparing the Unit Schedule Cost Breakdown and Payment Requests required under these Supplementary General Conditions. Monthly Pay Requests shall be submitted in triplicate.

SCHEDULE OF COSTS

Project Name and Location
Contractors Name: Date:

ITEM_____UNIT_____QUANTITY_____MATERIAL_____LABOR_____TOTAL_____

1. General Conditions
   - Bond L.S.
   - Office and Sheds L.S.
   - Taxes & Insurance L.S.
   - Utilities
   - Etc.

2. Demolition

3. Repair Work

4. Roofing

NOTE: With each division broken down into appropriate items.

TOTAL CONTRACT AMOUNT _____

_____Dollars ($_____).

F-09 ARTICLE 9 PAYMENTS AND COMPLETION:

Add the following to Paragraph 9.3.1:

The Contractor shall submit with his second monthly request for payment, and with every request for monthly payments thereafter, a Certificate of Partial Payment as included in these specifications. AIA document G702 & G703 (1992 Edition) will be acceptable. Certificates shall be notarized affirming that all subcontractors, suppliers, labor, etc., that have earned payment shown on the immediately previous monthly estimate have been paid in full accordance with the contract that exists between the Contractor and that or those agencies. Pay requests will not be approved by the Architect without submission of this certificate.

Each payment request shall be for the cost of work done and the value of materials suitably stored at the site or in suitably insured warehouses since the time of the last previous request for payment. The Architect shall certify a payment of 90% of the value of the work and materials as above noted according to his best judgement of the correct amount.

Requests for payment shall be itemized in the same subdivisions as "Unit Schedule," and all pay requests shall be submitted in triplicate.

Add the following to Paragraph 9.3.1.2.:

The above-noted retainage amount (Ten (10%) percent of the completed work and stored materials) shall be retained until the project is complete and has been accepted by the Owner.

Add the following to Paragraph 9.3.2.:

The Owner's approval regarding payment for materials stored off site will not be unreasonably withheld. **For payment of materials delivered and stored offsite the contract shall furnish with his monthly pay request documentation showing that the materials have been delivered and received and location noted where stored.**

F-10 ARTICLE 11 INSURANCE AND BONDS:

Article 11 shall be amended as follows:

A. Contractor's Liability Insurance: The contractor shall not commence work under this contract until he has obtained all insurance required under this paragraph and such insurance has been approved by the Owner, nor shall the contractor allow any subcontractor to commence work on his subcontract until all similar insurance required of the subcontractor has been so obtained and approved. All insurance policies shall be with insurers qualified and doing business in Florida.

1. Workmen's Compensation Insurance: The contractor shall take out and maintain during the life of this contract, workmen's compensation, and in case any work is sublet, the contractor shall require the subcontractor to similarly provide workmen's compensation insurance for all the latter's employees unless such employees are covered by the protection afforded by the contractor. Such insurance shall comply with the Florida Workmen's Compensation Law. In case any class of employees engaged in hazardous work under the contract at the site of the project is not protected under the Workmen's Compensation Statute, the

contractor shall provide and cause each subcontractor to provide adequate insurance, satisfactory to the Owner, for the protection of his employees not otherwise protected. Workmen's compensation policy shall include employer's liability in an amount of not less than:

Body Injury by Accident; Each Accident.....	$ 500,000
Bodily Injury by Disaster; Each Employee.....	$ 500,000
Bodily Injury by Disease; Policy Limit.....	$ 500,000

2. Public Liability and Property Damage Insurance: The contractor shall take out and maintain for the life of the contract, such public liability and property damage insurance as shall protect him and any subcontractor performing work covered by this contract from claims for damages, for personal injury, including accidental death, as well as from claims for property damages, which may arise from operations under this contract, whether such operations be by himself or either of them. The policy shall include comprehensive general liability, contractual liability, employer's liability, and products and completed operations liability. Automobile property damage liability shall include coverage for Owners, nonowners, and hired vehicles under the Contractor's Business Auto Policy.

   The Renaissance Park Youth Camp and Family Center, Inc., Marianna, FL, shall be named as the insured, and the Architect shall be named as the additional insured. Units shall be set as follows:

Combined single limit per occurrence.....	$1,000,000
Products and completed operations.....	$1,000,000
Personal Injury Liability.....	$ 500,000
Fire Legal Liability.....	$ 50,000
Medical Payments.....	$ 5,000
Automobile Liability Combined Single Limit.....	$1,000,000

   Ensuring clause for both bodily injury and property damage shall be amended to provide coverage on an occurrence basis.

   The contractor shall also carry an Owners and Contractors protective liability insurance policy for the **Renaissance Park Youth Camp and Family Center, Inc.,** Marianna, Florida and shall be in the same amounts as stipulated above for the contractor's liability insurance policy.

3. Fire and Extended Coverage Insurance: The Owner shall provide Builders Risk Insurance Coverage through the current Owner's building insurance coverage provide to the Renaissance Park Youth Camp and Family Center, Inc., through P.A.F.C. (Panhandle Area Educational Consortium)

4. Proof of Carriage of Insurance: The contractor shall furnish the Owner with satisfactory proof of carriage of the insurance required. **The Owner shall be notified of cancellation at least thirty (30) days prior to cancellation of policy by return-receipt, certified mail.** No other form of notification will relieve the Insurance Company, its agents, or its representatives of responsibility.

F-11 ARTICLE 11 INSURANCE AND BONDS:

Add the following to Paragraph 11.4, Performance and Payment Bonds:

The contractor shall furnish the Owner with a 100% Performance and a Labor and Material Payment Bond written by a surety company acceptable to the Owner and authorized to do business in the State of Florida.

The cost of the Performance Bond shall be borne by the Contractor. The bond shall be accompanied by a duly authenticated or certified document, in duplicate, evidencing that the person executing the bond on behalf of the surety had the authority to do so on the date of the bond. In the usual case the conferring of that authority has occurred prior to the date of the bond, and the document showing the date of appointment and enumeration of powers have not been revoked and remain in effect. The date of that certification cannot be earlier than the date of the bond. The bond shall be dated not earlier than the agreement. The life of the Performance Bond shall extend one year from the date of final acceptance as a maintenance guarantee. The Labor and Material Payment Bond shall extend until all labor and materials have been paid for in full.

Paragraph 11.5, **Add the following:**

The successful contractor shall, before commencing with any work, record in the Public Records of the County, where the work is taking place, the Payment and Performance Bond with a Surety Insurer authorized to do business in the State of Florida and in compliance with the Florida Statues Section 255.05(1)(a).

F-12 ARTICLE 12 UNCOVERING AND CORRECTION OF WORK:

Article 12 shall be amended as follows:

A. Guarantee of Work: Except as otherwise specified, all work shall be guaranteed by the contractor against defects resulting from the use of inferior materials, equipment, or workmanship for one year from the date of final completion of the contract, or from full occupancy, or use of the project (for which it was designed) by the Owner, whichever is earlier.

B. If, within any guarantee period, repairs or changes are required in connection with the guaranteed work, which in the opinion of the Architect or engineer is rendered necessary as the result of the use of materials, equipment, or workmanship, which are defective, inferior, or not in accordance with the terms of the contract, the contractor shall, promptly upon receipt of notice from the Owner, and without expense to the Owner:

1. Place in a satisfactory condition in every all such guaranteed work, correct all defects therein; and

2. Make good all damage to the structure of site, or equipment or contents thereof, which in the opinion of the Architect or engineer is the result of the use of equipment, materials, or workmanship which are inferior, defective, or not in accordance with the terms of the contract; and

3. Make good any work or materials, or the equipment and contents of structures or site disturbed in fulfilling any such guarantee.

C. In any case where in fulfilling the requirements of the contract or any guarantee, embrace in or required thereby, the contractor disturbs any work guaranteed under the contract, he shall restore such disturbed work in a condition satisfactory to the Architect or the engineer and guarantee such restored work to the same extent as it was guaranteed under other such contract.

D. If the contractor, after notice, fails to proceed promptly with the terms of the guarantee, the Owner may have the defects corrected and the contractor and his surety shall be liable for all expenses incurred.

E. All special guarantees applicable to definite parts of the work that may be stipulated in the specifications or other papers forming a part of the contract shall be subject to the terms of this paragraph during the first year of the life of such special guarantee.

F. Deliver to the Owner as part of the closeout documents, three loose leaf binders, each containing all guarantees, certificate of occupancy, warranties, waivers of liens, contractor's final certificate of completion, list of subcontractors and supplies, with addresses, phone and fax numbers, maintenance, and service representatives for all items of equipment, maintenance manuals and test and balance report. Maintenance and service representatives for all items of equipment shall be authorized by the manufacturer, serviced the respective type of equipment for at least five (5) years and maintain an office within 200 miles of the project.

G. Occupancy During Construction: Facilities or portions of facilities shall not be occupied during construction, unless exits, fire detection and early warning systems, fire protection and safety barriers are continuously maintained and clearly always marked, as per 2024 Edition of Florida Building Code, Section 423.6.1

F-13 ADDITIONAL ARTICLES, ARTICLE 15:

15-1 Manufacturers Specifications: Where the name of a concern or manufacturer is mentioned about his required service or product, and no qualifications or specification or such is included on drawings or in specifications, then the material gauges, details, or manufacturer finish, etc., shall be in accordance with his standard practice or directions or specifications. The contractor shall be responsible for any infringement of patents, royalties, or copyrights, which may be incurred thereby.

15-2 Reference to ASTM and Federal Specifications: Where reference is made to the Standard Specifications of the American Society of Testing Materials (ASTM); the United States Government Federal Specifications, or to other standard specifications of associated manufacturers organizations, or trades in connection with the required quality of materials, methods, etc., then the applicable specifications shall be of the latest revised edition.

15-3 Approval of Materials: A list of all materials, equipment, etc., together with manufacturer's drawings and catalog information shall be submitted to the Architect for approval prior to ordering material or equipment. Information submitted shall show capacity, operating conditions and all engineering data and descriptive information necessary for comparison and to enable the Architect to determine whether same meets specifications. The Architects approval will not relieve the contractor of the responsibility for performance of any terms of the contract.

Approval in writing of all materials, equipment, etc., must be obtained from the Architect before any material or equipment is delivered or installed on the job. The Architect will determine the quality of any material or item.

Where one manufacturer's name is listed in the Specifications with "an equal" clause, it is used to establish a standard of quality and design, and to give a general description of the type of item or material desired. Equal items, materials, or equipment will be acceptable, provided approval is received in accordance with the Instruction to Bidders (Substitutions).

Where three (3) or more manufacturer's names are listed, for an item or material, substitutions will not be acceptable.

15-4 Asbestos Containing Materials: **No asbestos containing materials shall be used in the construction of this project.**

The contractor shall provide as part of his close out documents and incorporated with his guarantee an affidavit stating that no asbestos containing materials have been used in the construction of this project.

15-5 Shop Drawings: Shop drawings shall be submitted for all manufactured or fabricated materials and/or as called for in the separate specification sections. Drawings shall be fully identified by project name, location, suppliers name, date, drawing number, specification section reference, etc. The contractor shall submit, with such promptness as to cause no delay in his work, or in that of any other contractor, four (4) copies (in addition to those copies necessary for his own requirements) of all shop drawings and schedules, required for the work of the various trades, to the Architect for approval. The contractor shall make no deviation from the approved drawings, and the changes made thereto by the Architect, Engineer, if any.

It shall be the responsibility of the contractor to properly schedule the submission of shop drawings for approval to allow adequate time for checking of drawings, manufacture, and shipment of items to the job site in enough time to prevent delay in progress schedule.

It shall also be the responsibility of the contractor to coordinate the preparation of shop drawings of items which will be furnished by more than one manufacturer but are designed to interface when installed.

Shop drawings submitted to the Architect-Engineer for his approval shall first be checked and approved by the Contractor, the prima facie evidence of which shall be a "checked" stamp marked "Approved" or "Approved as Noted" on each copy of each shop drawing, placed thereon by the contractor. Shop drawings received without the contractors "checked" stamp shall be cause for immediate return without further action.

The subcontractors for all phases of the contract shall submit through the contractor complete brochures covering all materials and/or equipment proposed for use in the execution of the work as required by their respective divisions of the specifications. These brochures shall be indexed and properly cross referenced to the plans and specifications for easy identification.

All shop drawings, setting drawings, material brochures, samples and/or color selection

of materials which are required are not included in the foregoing shall be submitted via the Contractor. Insofar as is possible or practical, all shop drawings or descriptive literature of equipment for the mechanical or electrical trades shall be submitted in a complete brochure for each trade as soon as possible after notice to proceed is executed.

The Owner will not grant time extension based on delays due to improper scheduling of work; and the Owner, at his discretion may withhold progress payments until such time as these requirements are fully satisfied.

15-6 Product Approval: Submittals for the following products (materials) shall have included with the submittal, the product approval numbers and other supporting documentation showing compliance to Chapter 17 of the Florida Building Code.

- Single Ply Membrane Roofing System
- Concealed Fastener Metal Roofing System, including insulation and single ply.
- Exterior Window Units
- Exterior Louvers
- Exterior
- Doors and Frames

Any other products that may be required or listed in the 2024 Florida Building code shall be submitted accompanied by Product Approval Numbers.

15-7 Pre-Construction Conference: Before beginning work at the site the Contractor shall attend a preconstruction conference and bring with him the superintendent employed for this project and any other subcontractor or supplier as may be requested by the Architect or Owner. In the event the contractor is unable to attend he shall send a letter of introduction by the superintendent in which he advises the superintendent's full name and states that he is assigned to the project and will be in full responsible charge. At this time, all parties concerned will discuss the project under contract and prepare a program of procedure in keeping with requirements of the drawings and specifications. The superintendent shall henceforth make every effort to expeditiously coordinate all phases of the work, including the required reporting procedure, to obtain the result within the full purpose and intent of the plans and specifications for the project.

15-8 Job Superintendent: This project will require a full-time job superintendent. The superintendent shall always be on the job site during normal working hours. He shall be responsible for this project only and no change of superintendent may be made during the construction of this project without approval of the Architect.

15-9 Storage and Work Areas: The Owner will make available work and storage areas within the building site. At the start of the operation the contractor shall decide with the Architect’s field representative and Owner’s representatives for the assignment of the area. During construction, the contractor shall maintain the building and storage areas in a neat condition.

15-10 Additional Drawings and Specifications: Additional Drawings and Specifications: The successful General Contractor shall be provided with ten (10) sets of drawings and specifications. Additional sets of documents may be procured from the office of the Architect at a cost of printing at the rate of $2.50/sheet of drawings, and 25¢/page of

specifications.

15-11 Permits, Licenses, Etc.: The Owner will pay for all necessary permits which include construction building permit and mechanical, electrical, and plumbing construction permits. **See "Instructions to Bidders", paragraph B-23**.

15-12 Codes: Construction of educational facilities shall conform to and comply with the Florida Building Code 2024 and the State Requirements for Educational Facilities. All or portions of the following codes and requirements are incorporated.

a. Florida Building Code, 2024, (State requirement for Educational Facilities)
b. Florida Plumbing Code, 2024
c. National Electrical Code, 2024
d. Florida Mechanical Code, 2024
e. Florida Gas Code, 2024
f. NFPA 101 Life Safety Code 2024
g. Florida Fire Prevention Code 2024

NOTE: Where compliance with the Florida Building Code 2024 is indicted elsewhere in these specifications, **all** supplements are to be included.

In case of conflicting requirements, the more or most stringent shall apply. Where conflicts occur between a code and contract drawings or specifications, most stringent requirement shall apply.

15-13 Temporary Utilities: If available, the contractor will be allowed usage of water and power at the site.

15-14 Safety and Protection: Safety Procedures shall be the sole responsibility of the contractor. The contractor shall provide for the safety and protection of his workers, the students, the school staff, and the public, and shall be held liable for any injury to any of the above by lack of, or inadequate, protection. Workers, tenants, and visitors to the job site shall be protected from any damage from falling material, tools or equipment, or any other damage that might be caused from this operation, by means of adequate covering, barricades, fencing, scaffolds, etc., as may be required. The contractor's attention is called to Article 10 of the AIA General Conditions referenced in this specification. The Contractor shall inform the Owner and the Architect at the pre-construction conference either verbally or by drawings his plans for safety and protection around the site of new construction.

15-15 Additional Protection: The contractor shall be held liable for any injury due to lack of, or inadequate, protection. Existing buildings, windows, doorways, roofs, walls, walks, all equipment, and all persons using the building shall be protected from any damage from falling material, tools, or equipment, or any other damage that might be caused from this operation, by means of adequate covering, barricades, fencing, scaffolds, etc., as may be required. The contractor's attention is called to Article 10 of the AIA General Conditions referenced in these specifications. The general contractor shall inform the Owner and the Architect at the pre-construction conference either verbally or by drawings his plans for safety and protection around the site of new construction.

15-16 Construction Fence: The contractor will be allowed to provide and install fencing as required to protect and secure the site while construction work is being carried on. The program manager, the contractor, and the Architect mutually determine the amount and location of fencing at the sites.

Access to the site and material storage areas shall be mutually determined at the time of the Pre-Construction Conference between the Owner, the Architect, and the successful contractor.

15-17 Indemnification: It is understood and agreed by the Contractor, that the Architect has no constructive use of Owner's site; has no control or authority over the means, methods, and sequences of construction; and therefore, has no ongoing responsibility whatsoever for construction site safety, a responsibility that is wholly vested in the Contractor or others engaged in the construction of this project. Notwithstanding the above, the Architect has a duty to preserve and protect public health, safety, and welfare. Accordingly, it is his professional responsibility to take what he believes are prudent measures, should he encounter situations that he believes create a danger to public health, safety, or welfare. Contractor understands this situation and agrees to defend the Architect and hold him harmless from claims arising from claims arising from his exercise of professional responsibility in this regard.

It is further understood that the Architect's observation of safety violations is casual and not of primary consideration during site visits.

15-18 Coordination: The contractor will coordinate all his work with the various trades. All work to be done will be accomplished from areas approved at the Pre-Construction Conference and the Contractor will coordinate access and restrict traffic in and/or through the property.

15-19 Phone Requirement: **The job superintendent shall be required to have a handheld cellular phone and it shall always be kept on his person during working hours, from the starting date of construction thru completion of the project**. A truck installed cellular phone is not acceptable as an equivalent.

15-20 Toilet Accommodations: Toilet accommodations shall be provided for by the contractor at the project for the use of workmen and kept in a clean and sanitary condition. Provide sewer and water connections. Remove at the completion of project and leave the premises clean. School toilet facilities shall not be used by the construction workers.

15-21 Dress and Restrictions: Workers will always be fully clothed and with hard hats during working hours. No cut-offs, bare tops, or profanity will be allowed within the construction areas. Eating, except in a designated area outside the building, will not be allowed. **The work area will be policed daily, with all trash removed and area left broom clean. Tobacco and alcohol products are not allowed on County property**.

15-22 Project Drawings: Prior to beginning any work, the contractor shall indicate conspicuously and plainly in the field set of drawings and at appropriate paragraphs in the specifications, all changes or corrections made by addenda and change orders as they are required.

15-23 Record Drawings: One set of drawings shall be kept clean and in good condition to serve as a "Record Set" of drawings. Any changes in conduit runs, piping, sewer work, drainage, locations of clean-outs, and existing underground lines not indicated on contract drawings shall be plainly marked on this set which shall not be used for other purposes. **At completion of the work and with request for final payment, this set of drawings shall be turned over to the Owner for file reference. Final pay request will not be processed prior to delivery of the "Record Set" of drawings.**

15-24 Progress Reports: Written reports of all site visits by the Architect or his representative will be sent to the contractor after each site visit. The Contractor will be responsible for the distribution of these reports to his subs and job superintendent. Items listed for correction will be corrected as quickly as possible and within a reasonable time. Uncorrected work, under the provisions of the contract (paragraph 9.5.1), will be the basis for withholding approval of monthly estimates.

15-25 Final Payment and Retainage: Final payment (retainage) will be approved for payment only after all the following has been completed:

a. All warranties and guarantees received. **Each to contain waiver of lien. AIA document G706-A (1994)**

b. Record set of drawings received.

c. Final inspection made, and all items noted on final inspection report completed and/or corrected and letter received from Contractor stating completion and verification of completion by Architect.

d. Certificate of Final Inspection and Certificate of Occupancy received from the City of Marianna.

e. Receipt of completed Statement of Contract Completion as included in these specifications.

Substantial completion and occupancy of any of the spaces will not warrant reduction in amount of, or payment of, the retain monies.

15-26 Existing Work: The Contractor shall be responsible for checking all existing conditions in relation to the work, whether shown or not, and shall remove, relocate, or modify any existing work as may be required to complete the new work as shown and/or specified. Any mechanical or electrical items, equipment, fixtures, etc., or structural items that may interfere with the new work shall be relocated, modified, etc., as may be required to complete the work as implied or shown on the drawings.

The Contractor shall be responsible for the protection of any existing areas due to construction of this project. This shall include protection against damage from weather, water and damage incurred from work being carried on in the area.

If damage occurs due to negligence or failure to provide proper protection by the contractor, the contractor shall correct the damage and restore or refinish the area to its prior state and to the satisfaction of the Owner and/or Architect.

15-27 Existing Utilities: N.A.

15-28 Cutting and Patching: All penetrations through fire rated construction shall be fire stopped as per N.E.C. 300-21, using a through penetration fire stop system (XHE2) as listed in the Underwriters Lab Fire Resistant Directory.

15-29 Protection of Existing Areas: During construction, the contractor shall make all arrangements for the protection of existing areas, outside the areas of construction, from dust and debris to the satisfaction of the Owner and those working in the unaffected

areas.

15-30 Penetrations Through Existing Construction: Where new work necessitates the cutting through or modifying of existing construction, the contractor shall do all patch work as required to match existing materials, details, etc. and to make for a first-class job. This includes penetrations through existing roofs, exterior and interior walls, ceilings, and floors.

15-31 Salvageable and Obsolete Items: The contractor, in connection with this work, shall remove all items, materials, equipment, etc. necessary to complete the work described on the drawings and in these specifications. All items damaged or deemed obsolete shall be removed. All salvageable items are to remain the property of the Owner. All else is to be removed from the site. Salvageable items shall be stockpiled in one area, designated by the Owner, within the construction area. The Architect or the Owner will determine what items are salvageable.

15-32 Scheduling of Work: It shall be the contractor's sole responsibility to schedule and coordinate all work as required to complete the contracted work within the contract time. The contractor will keep the Architect and the Owner's representative advised at all times of the work schedule and the type of work being carried on.

15-33 Direct Purchase of Materials by Owner: N.A. `

15-34 Cleaning: All debris, unused material, etc., because of this work, shall be removed from the site. The Contractor shall make every effort to keep the work areas clean at each day's end as a condition of safety and for neatness.

15-35 Workmanship: The workmanship of all trades shall be first class, regardless of the quality of material used. All materials called for and/or shown shall be new.

END OF SECTION.

AIA® Document G702™ – 1992

Application and Certificate for Payment

TO OWNER:	PROJECT:	APPLICATION NO:	Distribution to:
		PERIOD TO:	OWNER: ☐
		CONTRACT FOR:	ARCHITECT: ☐
FROM CONTRACTOR:	VIA ARCHITECT:	CONTRACT DATE:	CONTRACTOR: ☐
		PROJECT NOS: / /	FIELD: ☐
			OTHER: ☐

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract. Continuation Sheet, AIA Document G703, is attached.

1. ORIGINAL CONTRACT SUM	$
2. Net change by Change Orders	$
3. CONTRACT SUM TO DATE (Line 1 ± 2)	$
4. TOTAL COMPLETED & STORED TO DATE (Column G on G703)	$
5. RETAINAGE:	
a. 0 % of Completed Work (Column D + E on G703)	$
b. 0 % of Stored Material (Column F on G703)	$
Total Retainage (Lines 5a + 5b or Total in Column I of G703)	$
6. TOTAL EARNED LESS RETAINAGE (Line 4 Less Line 5 Total)	$
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT (Line 6 from prior Certificate)	$
8. CURRENT PAYMENT DUE	$
9. BALANCE TO FINISH, INCLUDING RETAINAGE (Line 3 less Line 6)	$

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	$	$
Total approved this Month	$	$
TOTALS	$	$
NET CHANGES by Change Order	$	

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By: _____ Date: _____

State of:

County of:

Subscribed and sworn to before me this _____ day of _____

Notary Public:

My Commission expires:

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED ..... $ _____

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:

By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract

STATEMENT OF CONTRACT COMPLETION

AIA® Document G704™ – 2000

Certificate of Substantial Completion

PROJECT:
(Name and address):
SAMPLES

PROJECT NUMBER: /
CONTRACT FOR: General Construction
CONTRACT DATE:

OWNER: ☐
ARCHITECT: ☐
CONTRACTOR: ☐
FIELD: ☐
OTHER: ☐

TO OWNER:
(Name and address):

TO CONTRACTOR:
(Name and address):

PROJECT OR PORTION OF THE PROJECT DESIGNATED FOR PARTIAL OCCUPANCY OR USE SHALL INCLUDE:

The Work performed under this Contract has been reviewed and found, to the Architect's best knowledge, information and belief, to be substantially complete. Substantial Completion is the stage in the progress of the Work when the Work or designated portion is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. The date of Substantial Completion of the Project or portion designated above is the date of issuance established by this Certificate, which is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below:

Warranty **Date of Commencement**

ARCHITECT	BY	DATE OF ISSUANCE

A list of items to be completed or corrected is attached hereto. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Unless otherwise agreed to in writing, the date of commencement of warranties for items on the attached list will be the date of issuance of the final Certificate of Payment or the date of final payment.

Cost estimate of Work that is incomplete or defective: $ 0.00

The Contractor will complete or correct the Work on the list of items attached hereto within Zero (0) days from the above date of Substantial Completion.

CONTRACTOR	BY	DATE

The Owner accepts the Work or designated portion as substantially complete and will assume full possession at (time) on (date).

OWNER	BY	DATE

The responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance shall be as follows:
(Note: Owner's and Contractor's legal and insurance counsel should determine and review insurance requirements and coverage.)

STATEMENT OF CONTRACT COMPLETION

STATEMENT OF THE ARCHITECT

PROJECT:

To the best of my knowledge, information, and belief, the work under the above-named contract has been satisfactorily completed under the terms of the contract; that the project is recommended for occupancy by the owning agency; that the contractor has submitted satisfactory evidence that he has paid all labor, materials, and other charges against the project in accordance with the terms of the contract.

	DATE	DAYS
Contract Date:		
Contractor Notified to Proceed:		
Days Allowed by Contract:		
Extensions Granted by Change Order:		
Total Days Allowable:		
Work Began:		
Project Substantially Completed:		
Days to Complete:		
Under Run / Over Run		

A/E Firm Name: **DONOFRO ARCHITECTS**

DATE:_____ BY: _____.

STATEMENT OF ACCEPTANCE BY OWNER

To the best of my knowledge and belief, the statements made above is true, and the project is satisfactorily completed under the terms of the contract and is hereby accepted for occupancy, operation and maintenance.

OWNER: _____.

BY: _____.

DATE: _____ TITLE:_____.

STATEMENT OF CONTRACT COMPLETION

STATEMENT OF THE CONTRACTOR

PROJECT:

CONTRACTOR: _____

CONTRACT FOR: _____

CONTRACT DATE: _____ CONTRACT AMOUNT $_____

I solemnly affirm that the work under the above named contract and all amendments thereto have been satisfactorily completed; that all amounts payable for materials, labor and other charges against the project have been paid; that no liens have been attached against the project; that no suits are pending for any reason of work on the project under the contract; that all Workmen's Compensation claims are covered by Workmen's Compensation Insurance as required by law; that all public liability claims are covered by insurance.

CONTRACTOR: _____

_____
SEAL

TITLE: _____

DATE: _____

STATE OF _____ COUNTY OF _____

Personally appeared before me this _____ day of _____, 20 __, known (or made known) to me to be the _____ of (Owner/Partner/Corp Off.)

Contractor(s), who being by me duly sworn, subscribed to the foregoing affidavit in my presence.

_____(SEAL)

Notary Public

Type Name:

My Commission Expires:

DIVISION III

TECHNICAL SECTIONS

SECTION 1A

TERMITE CONTROL TREATMENT

1A-01. GENERAL CONDITIONS:

The General and Special Conditions, Division II, Sections E and F of these specifications shall apply to and form a part of this Section as if written in full herein.

1A-02. SCOPE:

The compacted soil under all new interior concrete floor slabs and around all foundation walls shall be chemically treated prior to vapor barrier being placed. Materials, applications, and standards shall comply with the Florida Building Code 2024, Section 1816.

1A-03. MATERIALS:

Shall be Termidor or a chemical that is approved by the State of Florida for pretreatment. Proof shall be provided that no toxic effects to humans or beneficial plant or animal life will result from its use.

1A-04. RATES OF APPLICATION:

A. Rate of application shall be as per manufacturer's label for chemical use at full label rate.

B. Treatment shall be full coverage below the concrete slabs and along the inside of all foundation walls or interior partitions, and around any openings in the interior of the slab cut or left for pipes, conduits, etc.

1A-05. MATERIAL SAMPLE:

Prior to application of the chemical, if required by Architect, this contractor shall, in the presence of the Architect, fill a sealable sample bottle of at least 8 fluid oz. of the mixture to be applied. Testing of the mixture shall be by the Entomology Department, State of Florida Department of Agriculture. Label of the mixture used shall be provided with the sample of mixture.

1A-06. APPLICATION TECHNIQUE:

Treatment shall not be made when the soil is excessively wet or immediately after heavy rains to avoid surface flow of the toxicant from the application site. Unless the treated soil is to be promptly covered with drainage fill and vapor barrier, adequate precautions must be taken to prevent disturbances of the treatment and human or animal contact with the treated soil.

1A-07. POST TREATMENT:

Upon completion of construction and completion of all grading around the building and in

accordance with material label a final application shall be made entirely around the perimeter of the building and at the rate as directed on the materials label. **Post treatment shall be done at the time of the substantial completion inspection and the Architect shall be present.**

1A-08. SUBMITTAL:

Prior to application, submit all information showing type of chemical and rate of application for approval.

1A-09. WARRANTY:

After all the above has been done, the termite control subcontractor shall provide the Owner a written five (5) year warranty fully guaranteeing his work and providing any treatment and repairs necessary during that period. Five-year warranty shall include all inspections that may be required under the warranty.

END OF SECTION

SECTION 1B

RODENT PROOFING

1B-01. GENERAL CONDITIONS:

The General and Special Conditions, Division II, Sections E and F of these specifications shall apply to and form a part of this Section as if written in full herein.

1B-02. SCOPE:

Buildings or structures and the walls enclosing habitable or occupied rooms and spaces in which persons live, sleep or work or in which feed, food or foodstuffs are stored, prepared, processed, served, or sold, shall be constructed in accordance with the provisions of this section.

1B-03. FOUNDATION WALL VENTILATION OPENINGS: N.A.

1B-04. FOUNDATION AND EXTERIOR WALL SEALING:

Annular spaces around pipes, electric cables, conduits, or other openings in the walls shall be protected against the passage of rodents by closing such openings with cement mortar, close cell spray foam, concrete masonry, or non-corrosive metal. It shall be the contractor's responsibility to inspect all existing exterior wall surfaces as required to determine that there are no unprotected openings in the existing wall surfaces. If unprotected openings are observed, these openings shall be protected against the passage of rodents, as noted above.

1B-05. DOORS:

Hollow metal doors and doors on which metal protection has been applied shall be hinged to be free swinging. When closed, the maximum clearance between any door, door jambs, and sills shall not be greater than 3/8" inch (9.5mm).

1B-06. WINDOWS AND OTHER OPENINGS:

Windows and other openings for light or ventilation located in exterior walls within 2 feet (610mm) above the existing ground level immediately below such openings shall be covered for their entire height and width, including frame, with hardware cloth of at least 0.035-inch (0.89mm) wire or heavier.

A. Rodent-Accessible Openings: Windows and other openings for the purpose of light and ventilation in the exterior walls not covered in this chapter, accessible to rodents by way of exposed pipes, wires, conduits and other appurtenances, shall be covered with wire cloth of at least 0.035 inch (0.89mm) wire. In lieu of wire cloth covering, said pipes, wired, conduits and other appurtenances shall be blocked from rodent usage by installing solid sheet metal guards 0.024 inch (0.61mm) thick or heavier. Guards shall be fitted around pipes, wires, conduits, or other appurtenances. In

addition, they shall be fastened securely to and shall extend perpendicularly from the exterior wall for a minimum distance of 12 inches (305mm) beyond and on either side of pipes, wires, conduits, or appurtenances.

1B-07. PIER AND WOOD CONSTRUCTION:

A. Sill less than 12 inches above ground: Buildings not provided with a continuous foundation shall be provided with protection against rodents at grade by providing either an apron in accordance with Section F101.6.1.1 or a floor slab in accordance with Section F101.6.1.2

1. **F101.6.1.1 Apron**. Where an apron is provided, the apron shall not be less than 8 inches (203mm) above, nor less than 24 inches (610mm) below grade. The apron shall not terminate below the lower edge of the siding material. The apron shall be constructed of an approved non-decayable, water-resistant rodent-proofing material of required strength and shall be installed around the entire perimeter of the building. Where constructed of masonry or concrete materials, the apron shall not be less than 4 inches (102mm) in thickness.
2. **F101.6.1.2. Grade Floors**. Where continuous concrete grade floor slabs are provided, open spaces shall not be left between the slab and walls, and openings in the slab shall be protected.

B. Sill at or above 12 inches above ground: Buildings not provided with a continuous foundation and which have sills12 or more inches (305mm) above the ground level shall be provided with protection against rodents at grade in accordance with any of the following:

1. Section F101.6.1.1 or F101.6.1.2:
2. By installing solid sheet metal collars at least 0.024 inch (0.6mm) thick at the top of each pier or pile and around each pipe, cable, conduit, wire or other item which provides a continuous pathway from the ground to the floor; or
3. By encasing the pipes, cables, conduits, or wires in an enclosure constructed in accordance with Section F101.6.1.1

END OF SECTION

SECTION 2A

SITE WORK

2A-01. GENERAL CONDITIONS:

The General and Special Conditions included in Division II, Section E & F of these specifications shall apply to and form a part of this Section as if written in full herein.

2A-02. SCOPE:

The work contemplated includes all the clearing, excavating, filling, grading, backfilling, as required for the construction of the new building and associated site development. The work includes all exterior below grade utility lines and storm water retention / detention areas.

Grading areas are limited to work shown on the drawings.

2A-03. WORK BY OTHERS:

All excavating, shoring, draining, or pumping and backfilling required to install the mechanical work will be done by the respective sub-contractors.

Removal and relocation of active below grade and overhead utilities within the building area will be by the General Contractor and the respective sub-contractors.

2A-04. VISITING THE SITE:

Before submitting a bid, the contractor shall visit each site and fully inform himself as to the conditions of the site, as the Owner will pay no extras due to any unforeseen or special conditions at the site.

After notice to proceed, the contractor shall verify all dimensions and grades before commencing work and shall in case of discrepancies report such to the Architect and obtain instructions from him prior to proceeding with the work.

2A-05. EXISTING UTILITIES:

Existing on-site utilities, to the extent of what has been noted by the topographic survey and what has been determined by field inspection, are shown on the drawings. These may not be accurate or comprehensive. Any buried utility lines (water, sanitary, waste, data, etc.) that are encountered and abandoned are to be removed unless noted otherwise.

Prior to any clearing and excavation, a comprehensive utility line locate must be executed to identify all existing on-site utilities.

2A-06. TREES:

All trees not located within building, grading and drive areas or specifically noted not to be removed shall be protected from damage. Such protection to include root area. This contractor shall remove all trees located in all areas required for new construction and grading and any other trees designated on the drawings to be removed. This contractor shall also be responsible for trimming or removing branches from existing trees where such foliage or overhangs interferes with new construction. Where branches or limbs are sawn, treat cut areas of tree with black pitch. See “Site Plan” drawings for trees designated to be removed other than those within the building area.

2A-07. GEOTECHNICAL REPORT:

Due to existing conditions, a Geotechnical Soil Investigation has not been conducted for this project. Please see Division 2, Supplementary Instructions to Bidders, for the provision of unit cost for removing and replacing unsuitable soil encounters.

2A-08. SITE GRADING:

A. SITE PREPARATION - Prior to proceeding with construction, all topsoil and vegetation, trees and associated root systems, and any other deleterious non-soil materials found to be present (including the existing asphalt pavement section as well as any remaining substructures associated with the former development of this property) should be stripped from the proposed building footprint. Clean topsoil may be stockpiled and subsequently re-used in landscaped areas. Debris-laden materials should be excavated, transported, and disposed of off-site in accordance with appropriate solid waste rules and regulations. All existing utility locations should be reviewed to assess their impact on the proposed construction and relocated/grouted in-place as appropriate.

   The soils exposed at the stripped grade elevation should be compacted to a minimum soil density of at least 95 percent of the maximum dry density as determined by the Modified Proctor test method (ASTM D-1557).

   The Architect should observe the compaction of the subgrade to locate soft, weak, or excessively wet fill or existing soils present at the time of construction. Any unstable materials observed during the evaluation and compaction operations should be undercut and replaced with structural fill or stabilized in place by scarifying and re-densifying.

   See Division II, Supplemental Instructions to Bidders, for contractors to provide a unit price for remediating unstable soil zones through their chosen means and methods. The Architect recommends that bidding contractors make arrangements with the Owner to thoroughly investigate the subsurface conditions and satisfy themselves with existing conditions so as to be able to determine costs for subgrade stabilization if required.

B. FILL PLACEMENT: Fill materials should be low plasticity soil (i.e., Liquid Limit less than 30 and Plasticity Index less than 15) with fines contents below 30% that are free of non-soil materials and rock fragments larger than 3 inches in any one dimension. Based on visual examination, the near-surface strata of fine-grained slightly silty sands (SP/SM) should be suitable for use as structural fill/backfill, and the fine-grained clayey sands (SC) may or may not be suitable depending on the fines and moisture contents of excavated soils falling under this classification. Prior to construction, bulk samples of proposed fill materials should be laboratory-tested to confirm their suitability.

All materials to be used for backfill or compacted fill construction should be evaluated and, if necessary, tested by an independent testing lab prior to placement to determine if they are suitable for their intended use. Any off-site materials used as fill should be approved by an independent testing lab prior to acquisition. Organic and/or debris-laden material is not suitable for re-use as structural fill.

C. SOIL COMPACTION: Fill should be placed in thin, horizontal loose lifts (maximum 12-inch depth) and compacted to a minimum soil density of at least 95 percent of the Modified Proctor maximum dry density (ASTM D-1557), and subsequent footing excavations should be compacted to at least 98 percent. In confined areas, such as utility trenches, portable compaction equipment and thinner fill lifts (3 to 4 inches) may be necessary.

   Fill materials used in structural areas should have a target maximum dry density of at least 100 pounds per cubic foot (pcf). If lighter-weight fill materials are used, a geotechnical engineer should be consulted to assess the impact on design recommendations.

   Soil moisture content should be maintained within 2 percent of the optimum. We recommend that the grading contractor have equipment on-site during earthwork to dry and wet-fill soils. Moisture control may be difficult during rainy weather.

   Filling operations should be observed by an independent soil technician, who can confirm the suitability of the material used and the uniformity and appropriateness of compaction efforts. He/she can also document compliance with the specifications by performing field density tests using thin-walled tube, nuclear, or sand cone testing methods. (ASTM D-2937, D-6938, or D-1556, respectively)

   One test per 2,500 square feet within the proposed structure footprint should be performed in each lift of fill, with test locations well distributed throughout the fill mass. When filling in small areas, at least one test per day per area should be performed. One (1) test at conventional spread foundations, one (1) test per lift at each planned column footing area, and one (1) test per 75 linear feet at continuous strip foundations are also recommended.

D. GROUNDWATER CONTROL: Groundwater is not expected to adversely impact the planned development of this property, although the potential exists for shallow perched/laterally flowing water/stormwater conditions to be present during construction, particularly if the site is not properly graded during construction to prevent the accumulation of stormwater runoff during and shortly following significant rain events from perching on the underlying low permeability silty to clayey sand soils.

   Maintaining proper grades (i.e., positive drainage paths) during the construction phase of this project will be critical to avoid the development of “bird baths” within the proposed building footprint, which would degrade the underlying clayey soils and require undercutting to more firm underlying soils. Should perched groundwater conditions be encountered during the earthwork phase of this development, most likely localized dewatering efforts (e.g., construction ditches, temporary sumps, etc.) will suffice to allow for earthwork operations to be performed in the dry. Permanent dewatering measures are not anticipated as being necessary for this development.

E. FOUNDATION RECOMMENDATIONS: The planned development will include the construction of a two-story addition to the existing building. The structure will be a CMU block supported by a shallow foundation system. We have assumed that isolated interior column and continuous load-bearing wall loads will not exceed 40 kips per column and 3 kips per linear foot, respectively, for the planned structure.

Foundation excavations shall be evaluated by an independent testing lab prior to reinforcing steel placement to observe foundation subgrade preparation and confirm bearing pressure capacity. Foundation excavations should be level and free of debris, ponded water, mud, and loose, frozen, or water-softened soils. Concrete should be placed as soon as is practical after the foundation is excavated, and the subgrade evaluated.

Foundation concrete should not be placed on frozen or saturated soil. If a foundation excavation remains open overnight, or if rain or snow is imminent, a 3 to 4-inch thick "mud mat" of lean concrete should be placed in the bottom of the excavation to protect the bearing soils until reinforcing steel and concrete can be placed.

The conditions exposed at subgrade levels will vary across the site and may include structural fill or densified in-situ soils. The slab-on-grade may be adequately supported on these subgrade conditions subject to the recommendations in this report. The slab-on-grade should be jointed around columns and along walls to reduce cracking due to differential movement. An impermeable vapor barrier is recommended beneath finished spaces to reduce dampness. Once grading is completed, the subgrade can be exposed to adverse construction activities and weather conditions during the period of sub-slab utility installations. The subgrade should be well drained to prevent the accumulation of water. If the exposed subgrade becomes unstable, excessively wet or exhibits excessive rutting or pumping, the geotechnical engineer should be consulted.

Foundation excavations should be level and free of debris, ponded water, mud, and loose, frozen, or water-softened soils. An independent testing lab should evaluate all foundation excavations before reinforcing steel placement to observe foundation subgrade preparation and assess bearing pressure capacity. Due to variable site subsurface and construction conditions, some adjustments in isolated foundation bearing pressures, foundation depth, undercutting, and replacement with controlled structural fill may be necessary.

Once site grading is completed, the subgrade may be exposed to adverse construction activities and weather conditions. The subgrade should be well-drained to prevent the accumulation of water. If the exposed subgrade becomes saturated or frozen, an independent testing lab an independent testing lab should be consulted.

See Civil Drawings included as part of the construction documents for all required site development including grading, site utilities, sidewalks, and new vehicular parking.

2A-21. ROCK EXCAVATION:

The price bid shall be based on earth excavation; extra compensation will be allowed if rock is encountered. Shale or rotten or stratified rock that can be loosened with a pick shall not be construed as rock.

When rock is encountered it shall be stripped of earth and the Architect notified and given proper time to measure same before blasting. All rock removed which has not been previously measured by the Architect will not be estimated as rock excavation.

Measurement for rock excavation will be omitted to six inches on either side of the outside of the footings, and no extra will be allowed for bank slope. Only rock requiring blasting and boulders ½ cubic yard or more will be estimated as rock excavation.

All blasting, the use, transportation, and storage of explosives shall be in accordance with national and

local codes for transportation, storage, and use of explosives. The contractor shall be responsible for damage or injury to persons or property resulting from the blasting.

2A-22. SHORING AND PROTECTION:

A. Shore excavations where required to maintain them and/or adjoining structures in good order and safe working conditions.

Keep excavations free from accumulating mud and water, by pumping or draining until backfilling is authorized by the Architect.

B. The following shall be required where trench excavation or footing pit depth excavation exceeds 5 FT depth.

1. Comply with OSHA Standard 29 CFR, Section 1926.650 Subpart P.
2. The Contractor shall provide written assurance of compliance with this law.
3. A separate cost item identifying the cost of compliance.
4. A trench safety system shall be designed by the Contractor.

2A-23. EROSION AND SILTATION CONTROL:

A. During construction, the Contractor shall be responsible for providing control measures for erosion and siltation in compliance with the Local and/or County requirements and shall provide, if required, an Erosion and Siltation Plan.

B. Soil stockpiles shall be protected from erosion. Dust from soil stockpiles shall be controlled.

C. Storm drainage inlets shall be protected by hay bales, sod screens and/or any other measures to prevent siltation during construction and to prevent any construction debris from preventing proper flow of water to inlets.

D. Sediment basins, sediment traps, perimeter berms, filter fabric fences, hay bales and other measures shall be installed as a first step in site preparation.

2A-24. FINISH GRADING:

Upon completion of all exterior work, apply a minimum of 6" of topsoil over rough grades left bare by building construction and excavation. Before topsoil is placed the areas shall be cleared of debris, building material, broken brick and block, and other materials that interfere with proper growth of vegetation. Topsoil shall be placed in all areas disturbed by construction under this contract including all areas not covered by paving. Topsoil shall be installed around building area to bring finish grade to 8" below finish floor at building, and
sloped to existing grade.

Stockpiled topsoil shall be used and any additional amount of topsoil that will be required to bring grades up to levels shown or to provide proper drainage and slope away from the building, and toward drainage structures shall be furnished by the contractor.

Finish grading around building shall be as shown on the drawings and sloped away to existing grades at a minimum to prevent washing. The contractor shall be responsible for installing swales around the

building area to direct surface water away from new construction, or adjacent existing buildings.

END OF SECTION

SECTION 3A

CONCRETE AND CEMENT FINISH WORK

3A-01. GENERAL CONDITIONS:

The General and Special Conditions, Division II, Sections E and F of these specifications shall apply to and form a part of this Section as if written in full herein.

3A-02. SCOPE:

Work includes entire concrete operation consisting generally of footings, walls, grade beams, floor slabs, tie beams as shown on drawings, together with metal reinforcement rods and wire fabric, wood form, expansion joints and other required items to completely furnish all materials and labor for all concrete work. All reinforced concrete shall comply with the latest editions of ACI 301, Specifications for Structural Concrete for Buildings, and ACI 318-14, Requirements for Reinforced Concrete.

3A-03. MATERIALS:

A. All materials specified in this Section shall conform to ASTM Designation specified, latest revision.

B. Cement shall be an approved branch of Portland, meeting requirements of ASTM Standard Specification C-150. Type 1 cement shall be used.

C. Fine Aggregate shall consist of natural sand; sand shall be clean, hard, strong, durable, uncoated, and free from loam, clay, organic matter, or other deleterious substances in excess quantities, shall meet the requirements of ASTM Designation C-33.

D. Coarse Aggregate shall consist of crushed stone or gravel, conforming to ASTM Specification C-33, having hard, strong, durable and uncoated particles, well graded from fine to a maximum size not larger than 3/4".

E. Water used in mixing concrete shall be clean and free from any deleterious substances. Water used in mixing concrete shall be potable.

F. Anchorage Items: Slots, inserts, clips and other devices for anchoring masonry, wood, steel, and mechanical items to concrete of standard manufacture of approved types as required to engage and anchor work specified under other Sections.

Embedded items of structural steel as specified under Section of Structural Steel.

G. Forms: All contact forms for concrete exposed to view shall be new 5/8” thick, oil impregnated plywood, attached to the supports.

H. Form Oil: Approved colorless non-staining mineral oil, free of kerosene.

I. Form Ties: Approved design, fixed or adjustable length, free of devices that leave holes or depressions larger than 7/8” diameter in concrete surface or metal with 1" of finished surface.

J. Reinforcing Bars: Shall be new billet steel conforming to ASTM A-615, Grade 60, deformed and shall be free of kinks and non-shop bends in accordance with Section 26.6.3.1.b ACI 318-14 and should also be free of mud, oil, corrosion or anything that will impair proper bonding with concrete in accordance to 26.6.1.2.d ACI 318-14.

K. Reinforcing Mesh: Welded wire fabric shall conform to ASTM A-1064 and **unless otherwise noted**, shall be sized as follows:

For 4" Slabs 6 x 6 - W 1.4 x W 1.4
For 5" Slabs 6 x 6 - W 2.9 x W 2.9 (U.N.O.)
For 6" Slabs 6 x 6 - W 4.0 x W 4.0

L. Metal Accessories: Metal accessories to support and space reinforcing bars shall be furnished in wire sizes and quantities in accordance with CRSI Code of Standard Practice.

M. Expansion Joint Material: Shall be 1/2" thick, premolded expansion filler strips conforming to Federal Specification No. HHF 334, Type 1, Class "B".

N. Sheet Vapor Retarder: ASTM E 1745, Class B (10 mils thick). Include manufacturer's recommended adhesive or pressure-sensitive tape.

3A-04. STORAGE OF MATERIALS:

A. Cement and Aggregate: Shall be stored to prevent deterioration or intrusion of foreign matter. Material deteriorated or damaged shall not be used for concrete.

B. Reinforcing Bars: Must be kept in racks off ground until used.

3A-05. DESIGN OF CONCRETE MIX AND PROPORTIONS:

A. The concrete mixes shall be designed as per ACI-301 using Portland Cement conforming to ASTM C-150 or C-595, aggregate conforming to ASTM C-33 and add mixtures conforming to ASTM 494, C-1017, C-618, C-989, and C-260. Concrete shall be ready mixed according to C-94.

B. Except for sidewalks, all concrete shall be of such quality as to develop a minimum compressive strength of 3000 psi at 28 days for building slab-on-grade, foundations, and footings and 4000 psi for all beams, columns, and elevated slabs. The maximum permissible slump shall be 4" plus or minus 1" at the time of placing concrete. Concrete for sidewalks may have minimum compressive strength of 2500 psi at 28 days.

C. All concrete shall be a controlled mix concrete, and tests made to determine the exact amount of cement and proper proportion and grading of aggregate together with quantity of water required for strength of concrete shown above.

D. The concrete mix for 3000 psi and 4000 psi concrete shall be designed by an independent testing laboratory. The mixture design shall be submitted to the Architect for approval prior to any concrete work being done.

After approval, the mixture design shall be furnished to the mixing plant and shall be adhered to strictly. Cost for design mix shall be paid for by the General Contractor.

E. The exact proportions of all materials entering the concrete shall be as determined by the design mixture. The proportions will be changed whenever, in the opinion of the Architect, such change becomes necessary to obtain the specified strength, and the desired density, uniformity, and workability. The contractor shall not be compensated because of such change.

A minimum mix of 5.3 bags of cement per yard shall be used. The use of fly ash is allowable up to 20% of the design mix.

Unless approved otherwise by the Architect, aggregate used in all concrete mixes shall be no larger than No. 89 aggregate for concrete placed via a mechanical pump. All other concrete mix shall use No. 57 aggregate.

Concrete used for exterior concrete walks may contain fly ash as part of the mixture but not more than 10% of the total cement weight.

3A-06. SAMPLING AND TESTING:

A. Cement: Will be accepted based on manufacturer's mill certificate of compliance to ASTM Designation C-150.

B. Reinforcement: Mill tests reports for the material used shall be furnished to Architect and shall be furnished either before or at the time of submittal of reinforcing shop drawings.

C. Tests on Concrete:

1. (a) Four (4) 4" x 8" long test cylinders shall be made during each day's pour, or approximately each 50 yards or 1 per every 5 trucks by an independent testing laboratory. Selection of testing laboratory will require approval of the Architect.

(b) The cylinders shall be given identification marks and recorded for reference. Specimens shall be made and cured in accordance with current compression and flexural test specimens in the field.

(c) Cylinders shall be shipped to an approved testing laboratory for testing. During the first 24-hour after molding the cylinders, the contractor shall provide suitable means for maintaining the temperature immediately adjacent to the specimens within the range of 60 °F to 80 °F and prevent loss of moisture from the specimens. After the initial curing period the test specimens shall be transported in a damp condition to the testing laboratory in a manner to prevent damage to the specimens. Strict adherence to this requirement is necessary in achieving accurate cylinder test results. Acceptance of concrete cylinder tests shall be as per ACI 318 Chapter 26, Section 12 (ACI 318 26.12).

(d) One cylinder shall be broken at seven days, and three cylinders shall be broken at 28 days. The results of the cylinders broken at 28 days shall be the average results and the results of the test sent to the Architect in triplicate and shall equal or exceed the ultimate concrete strength f'c and no individual strength test or average of any two strength tests shall be less than f'c by more than 500 psi. Laboratory testing of cured specimens (concrete cylinders) shall be in accordance with ACI 318 26.12.3,

26.12.4 and 26.12.5 laboratory testing of cured specimens (concrete cylinders).

(e) Payment for cylinder tests shall be by the General Contractor. Invoices for concrete testing shall be sent directly to the General Contractor.

2. Slump tests shall be made on each batch (truck load) and tests shall be in accordance with current ASTM Designation C-143. Slump shall not exceed 4" plus or minus 1". Each slump test shall be made by an independent testing laboratory approved by the Architect. Making of slump tests by other than a designated technician from an approved testing lab will not be allowed. Payment for slump tests shall be by the General Contractor.

3. In addition, where there are questions as to the quality of the concrete in the structure, the Architect may require tests in accordance with the "Standard Methods of Securing, Preparing and Testing Specimens of Hardened Concrete for Compressive and Flexural Strengths; (ASTM Designation C-42)" or on order load test for that portion of structure where the questionable concrete has been placed.

4. Both cylinder and slump test reports shall be sent to the Architect. 7 and 28 day test reports shall be sealed and signed by a Florida Registered Professional Engineer as soon as the tests have been performed. Test results shall be sent as soon as the lab results are recorded.

3A-07. READY-MIXED CONCRETE:

A. All ready-mixed concrete shall conform to ASTM C-94.

B. Certificate shall be furnished by the mixing plant certifying that methods, materials and proportions used by the plant for concrete to be used on this project meet the requirements of the specification, if requested by the Architect.

3A-08. CONVEYING, PLACING AND VIBRATION:

A. Conveying: Concrete shall be transported from the mixer to forms as rapidly as practicable by methods which shall prevent separation, loss of ingredients, or the displacement of reinforcement and forms. Concrete shall be placed in the forms immediately after mixing, and under no circumstances shall concrete that has partially hardened be deposited in the work. Deposit as nearly as practical in its final position to avoid re-handling.

Ready mix or transit-mix equipment may be used provided that each batch of concrete shall be mixed, when using a truck mixer load to its maximum capacity, not less than 70 or more than 100 revolutions at stated mixing speed and remainder of mixing shall be at stated agitating speed. When a truck mixer or truck agitator is used to transport concrete that has been completely mixed in a stationary mixer, mixing shall be at the speed designated by the manufacturer of the equipment as agitating speed. Mixing and/or agitation of the concrete shall not continue for more than 16 minutes after the cement has been intermingled with the aggregate.

When air temperature is between 85 and 90 degrees F mixing and delivery time shall be no more than 75 minutes. When air temperature is above 90 degrees F,

mixing and delivery time shall be no more than 60 minutes.

B. Placing: Concrete shall have a temperature of not more than 90 degrees F, nor less than 50 degrees F, when placed in the forms. Concrete placement shall not be permitted when in the opinion of the Architect conditions prevent proper placement and consolidation.

Upon commencement of placement operation, operation shall be continuous until the placing of a panel or section as determined by its boundaries has been completed in accordance to Section 26.5.2.1.j ACI 318-14.

Concrete shall not be placed when the atmospheric temperature is below 40 degrees F, or it is likely to fall below 40 degrees F, during the 24-hour period after placing, except when approved in writing by the Architect. Salt or other chemicals for the prevention of freezing shall not be used, and when necessary, the concrete materials shall be heated before mixing. No frozen materials shall be used in the concrete. The contractor shall assume all risk for unsatisfactory concrete and such concrete shall be rejected when and as directed by the Architect. Permission to place concrete will in no way relieve the contractor of the responsibility for satisfactory results; the contractor shall break out, remove, and replace rejected concrete at no cost to Owner.

Concrete shall be deposited over firm, clean, damp surfaces free from frost, ice, standing or running water, and never upon soft mud, dry porous earth, or upon fills that have not been subjected to approved rolling and tamping so that the ultimate settlement has been obtained.

Concrete shall be deposited in layers not to exceed 18" in thickness, unless directed otherwise by the Architect. The placing of concrete shall generally be done by such means that the concrete deposited in one spot may be efficiently vibrated into a layer not exceeding 18" in thickness with the minimum amount of lateral movement. Concrete shall be deposited in forms as near its final location as practicable. Pre-handling and flowing of the concrete shall be as directed by the Architect only. As far as practicable, the contractor shall avoid splashing concrete on the form face and shall remove such coatings as have set before the concrete is placed there.

Concrete that has been splashed and dried on reinforcing prior to embedment shall be cleaned off by rubbing and brushing.

Concrete shall be placed to avoid segregation of materials in accordance to Section 26.5.2.1.f.3 ACI 318-14.

The use of contaminated or retempered concrete is prohibited in accordance to Sections 26.5.2.1.g and 26.5.2.1.h ACI 318-14.

Concrete placement operation shall ensure that concrete is always plastic in accordance to Section 5.10.2 ACI 318-14.

No concrete shall be placed until the Architect has inspected the area of placement and approved the reinforcement.

C. Vibration: Concrete shall be compacted with the aid of mechanical vibrating equipment. Internal vibrators shall be used in all sections sufficiently large to accommodate them. The vibration shall be of such intensity to cause the concrete to settle readily into place.

A sufficient number of vibrators shall be used so that efficient vibration throughout the entire volume of each layer of concrete is obtained. Extra vibrators shall be kept

available in the placement area so that there will be no interruptions in the consolidation of the concrete.

The vibration shall be of sufficient duration to accomplish thorough compaction of the concrete, and when necessary, shall be supplemented by forking and spading by hand adjacent to the forms in areas that cannot be effectively vibrated. The concrete shall be compacted and worked in an approved manner into all corners and angles of the forms and around reinforcement and embedded fixtures. No vibrator shall be immersed in one location long enough to draw a pool of grout from the surrounding concrete. Systematic spacing of points of vibration should be established to ensure that no portions of the concrete are missed. Care must be exercised that concrete is not over-vibrated and that vibrators are not used as a transportation facility. Care shall be taken to avoid hitting the forms of any embedded objects with sufficient force to cause damage.

3A-09. FINISHES OF CONCRETE OTHER THAN FLOORS & SLABS:

A. General: Directly after removal of forms, remove the wires in surface to be left exposed and cut ties flush with all finished surfaces. Patch slight honeycomb and minor imperfect areas in exposed areas with 1:2 mortar that will cure out same color as concrete and give one of the finishes indicated or specified. Remove fins and rough edges.

B. Rubbed Finish: Carefully remove fins, other projections, level offsets, repair damaged places, then rub with Carborundum stones and water, leaving surface uniformly smooth and clean. Use no mortar or grout in rubbing. This finish is to be applied to all exposed stair surfaces.

C. Smooth Finish: Immediately after removing forms, smooth off joint marks, remove blemishes, thoroughly dampen surface, brush coat with fine sand grout, filling all air bubbles and holes, rub with wood or corn float. Permit grout to partially set then remove excess with sponge rubber float without pulling grout from holes. Rub floated finish with burlap and keep damp by fog spraying. This finish is to be applied to all concrete surfaces to be left exposed.

D. Rough Finish: Remove fins and rough edges. Patch honeycombs. This finish is required of surfaces to be concealed by earth, etc.

3A-10. FLOOR FINISH:

Concrete floor slabs shall have a monolithic finish.

Monolithic Finish: Tamp with suitable tools to force coarse aggregate below surface, screed with straight edge, float to required finish level or grade showing no variations greater than 1/8” in ten (10) feet. While surface is still green, but will bear man's weight without appreciable imprint, trowel surface smooth and leave free from tool marks. Troweling shall be minimum amount to gain a smooth dense surface and shall not be done until the concrete has gained a smooth dense surface and shall not be done until the concrete has hardened sufficiently to prevent excess fine material from being worked to the surface. Dusting with sand cement or cement to facilitate troweling is prohibited.

3A-11. SIDEWALKS:

A. Construction: Sidewalks unless otherwise shown shall be 4” thick, reinforced with 6 x 6

W 1.4 x W 1.4 reinforcing mesh and the edges shall be turned down an additional 4" x 4". Construction joints shall be placed no more than 30 ft. on center and shall be tooled. Control joints shall be placed no more than 5 ft. on center and shall be tooled.

B. Finish: Concrete finish on sidewalks shall be a light broom finish. Concrete for sidewalks shall be tamped with proper tools to force coarse aggregate below the surface, then screeded with a straight edge, and while surface is still green the surface shall be steel troweled. After steel troweling, the surface shall be broomed lightly perpendicular to the edge of the walk. Sample section shall of at least 5'-0" x 5'-0" be finished for approval by the Architect prior to any sidewalk concrete being poured. Concrete walks shall be poured and finished by bonafide and experienced concrete subcontractors

C. Construction Joints: Construction Joints shall be placed no more than 30FT on center and shall be tooled. Control joints shall be placed no more than 5FT on center and shall be tooled.

D. Expansion Joints: Sidewalk expansion joints shall not exceed 120' in accordance to FDOT specifications.

3A-12. PATCHING:

Surface defects that require repair and holes from form ties shall be promptly attended to by the contractor. Repairs of defective concrete shall be completed before the adjacent concrete is four (4) days old where possible. Ridges and bulges shall be removed by careful chipping or tooling followed by rubbing with a grinding stone. Honeycomb and other defective concrete shall be chipped out in such a manner as to key the filling in place. All holes shall be moist prior to filling. The smaller holes shall be patched with 1.2 volume sand-cement dry mortar. The mortar shall be well compacted into the hole, and the surface shall be given a texture to match that of adjoining concrete. For major repairs, the filling shall be not less than 3" thick and shall also be doweled to the old concrete. As far as practicable, all patches shall be kept wet during the curing period of the surrounding concrete, and in no case less than seven days. Patching shall be done at the contractor's expense. A non-shrinking grout admixture shall be used for patching at such locations as shown by the Architect.

3A-13. CURING:

A. All concrete shall be protected from loss of moisture due to the sun or artificial heat. Fresh concrete shall be protected from rains, running water and mechanical injury. Tarpaulin sufficiently to cover fresh concrete sections shall always be available for prompt use. Wood forms left in place to assist curing shall be kept wet.

B. All concrete floor slabs shall be sealed as soon as possible with concrete curing and sealing compound equal to Sure Seal 25 for exterior use and VOCOMP-25 for interior use as manufactured by W.R. Meadows which is clear UV resistant solvent based (exterior use) and water-based (interior use), respectively, ready to use formula which seals and hardens freshly placed concrete. Curing compound shall be applied in strict accordance to manufacturer's recommendations.

C. Whenever the temperature of the surrounding air is below 40 degrees F, all freshly poured concrete shall be maintained at a temperature of not less than 50 degrees F, for at least 72 hours for normal concrete. No dependence shall be placed on salt or other chemicals for the prevention of freezing.

D. Floor slabs shall be protected throughout the entire construction period from damages.

3A-14. FORMS:

A. Construct forms to shape, form line and grade required and maintain sufficiently rigid to prevent deformation under load. Unless otherwise specified, construct forms and casework in conformity with A.C.I. 318-14, with leak-proof joints, arranged vertically and horizontally to design pattern. Make removable without injury to concrete.

B. Coating: Coat forms for exposed concrete surfaces with oil before placing reinforcement, remove surplus oil on form surfaces and any oil on reinforcing steel.

Forms for unexposed surfaces only may be thoroughly wetted immediately before placing concrete in lieu of oiling, except that in freezing weather oiling is mandatory.

C. Removal: When permission of the Architect has been obtained remove forms without damage to concrete. Leave load-supporting forms and shoring in place at least until seven-day tests indicate strength adequate to safely support superimposed load.

D. If any forms bulge or show deflection, which in the opinion of the Architect is excessive, concrete shall be removed, and work rebuilt.

E. Footing Forms: If local conditions are favorable, the Architect will permit use of earth forms for grade beams. These shall be inspected and approved by the Architect before pouring.

3A-15. REINFORCING STEEL:

A. Shop Drawings: To include placing drawings as well as detail of all bars as to size, shape and/or dimensions, and shall be submitted to Architect for approval. All detailing and fabrication shall be in accordance with ACI 318-14. Fabrication shall not begin until drawings are approved.

B. Reinforcing shall be placed accurately and secured in position in accordance with CRSI 59 of the C.R.S.I. by use of chairs, bolsters, spacers and/or tie wires.

C. Footing reinforcing shall be supported by plastic chairs equal to Grade Chair with Base manufactured by Rebar Support Products. Pieces of wood block or other material subject to decay shall not be used for support of bars. Brick bats or concrete brick or block will not be acceptable as support for reinforcing bars.

D. Reinforcing in all concrete tie beams and footings shall be continuous around corners with additional bars (size and number to match reinforcing), bend 2'-0" each way around corners. Where wall footings step, reinforcing shall be continuous in step. Reinforcing steel shall be free of kinks and non-shop bends. Field bend only as permitted by Architect. Do not field bend any bars set in hardened concrete. Reinforced concrete masonry units shall be reinforced at each side of all openings with one No. 5 bar from bottom steel of footing to top steel of tie beam as per Paragraph 4A-14 of these specifications.

E. In no case shall the clear distance between bars be less than one bar diameter, 1" nor less than 1-1/3 times the maximum size of the coarse aggregate. Where reinforcement in beams or girders is placed in two or more layers, the clear distance between layers shall be not less than 2", and the bars in the upper layers shall be placed directly above

those in the bottom layer.

F. Unless otherwise noted on the drawings, do all splicing in accordance with the recommendations of the C.R.S.I. Splices shall not be made at points of maximum stress unless specifically shown on the drawings. All reinforcing bar lap splices at footings shall be lapped a minimum of 36 bar diameters, except laps in reinforced masonry units shall be a minimum of 48 bar diameters. All other lap splices shall be spliced per drawing schedule. The Architect shall approve character and location of all splices.

G. Protective concrete cover for reinforcing shall be as noted on the drawings. ACI 318-14 shall govern where not specifically shown or noted on the drawings.

H. Adjacent sheets of welded wire mesh shall be lapped at least 6" and securely tied together. Mesh shall be placed at 1/3 times depth of the slab from the top of slab by placing the mesh on chairs prior to concrete pouring. All slabs on grade not otherwise noted on the drawings are to be reinforced with welded wire mesh of the size stated previously.

I. Reinforcing shall not under any circumstances be covered with concrete until placement has been inspected and approved by the Architect's representative. The Architect shall be notified a minimum of 24 hours in advance and sufficient time allowed for inspection before pouring of concrete. Reinforcing steel shall be free of mud, oil, corrosion, or other coatings that would impair proper bond with concrete.

3A-16. EMBEDDED ITEMS:

A. All embedded items shall be firmly and securely fastened in place as indicated. They shall be thoroughly clean and free from coatings or foreign matter. The embedment of wood shall be avoided.

B. Anchor bolts, pipe sleeves, and other embedded items shall be accurately set and rigidly held to prevent displacement. Threads and sleeves of anchor bolts shall be oiled or greased. All embedded items shall be checked by the Architect for location and security prior to pouring concrete.

C. Upon removal of forms, care shall be taken not to harm projecting items, such steps as required to assure continued protection during remaining construction operations shall also be taken.

3A-17. VAPOR-RETARDER INSTALLATION:

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches and seal with manufacturer's recommended tape.

3A-18. EXPANSION JOINTS:

Expansion joints shall be equal to Fiber expansion joint material as manufactured by W.R. Meadows, composed of cellular fibers bonded together and uniformly distributed with asphalt to ensure longevity.

3A-19. CONSTRUCTION JOINTS:

A. The use and location of monolithic construction joints shall be subject to prior approval of the Architect. Where construction joints are necessary in self-supporting slabs and beams they shall be placed at the center of the clear span of the member with key-ways provided at the bulkhead. Construction joints shall not be placed in beams supporting concentrated loads.

B. The surface of the concrete shall be roughened, except where key-ways are required, thoroughly cleaned, and all latence removed. Joints shall be thoroughly wetted and slushed with a coat of neat cement grout immediately before placing of new concrete.

C. At least two (2) hours must elapse after depositing concrete in columns or walks before depositing in beams, girders or slabs supported thereon. Beams, girders, brackets, column capitals, and haunches shall be considered as part of the floor system and shall be placed monolithically unless otherwise specifically indicated on drawings.

3A-20. SAW CUT JOINTS (Control Joints / Contraction Joints):

Saw cut joints (control / contraction joints) if indicated on the drawings shall be made between 4 and 12 hours after the concrete hardens or final finish. Saw cuts shall not be made after 12 hours from concrete finishing. Depth of the joint shall be 1/3 the depth of the slab, the depth shall be consistent, and the joint shall be straight. The maximum spacing of contraction joints shall be 12’ for 4” thick slabs.

The alternate wires of the welded wire reinforcement must be pre-cut at the slab control/contraction joint to create a weakened plane. Without cutting the alternate wires to create a weakened plane, the strength of the wire will prevent the slab from separating (cracking) at the joint and the slab may crack elsewhere.

3A-21. CONCRETE FLOOR SEALER:

A. Where noted on the Finish Schedule for concrete floors to be sealed, the floors shall be chemically treated for sealing, hardening, and dustproofing. Material shall be REZ-SEAL, Acrylic Copolymer as manufactured by the Euclid Chemical Co., Cleveland, Ohio

B. Application: Application shall be immediately after finishing operation has been completed. Application shall be by short nap roller and coverage shall be no more than 300 SF per gallon.

Do not apply when temperature is below 50°F.

Follow all manufacturer's directions in applying product.

3A-22. PAINTED CONCRETE FLOORS:

See Room Finish Schedule on drawing for concrete floors to be painted. Painting of these floor areas will be as specified in the painting section of these specifications.

END OF SECTION.

SECTION 4A

MASONRY WORK AND BLOCK

4A-01. GENERAL CONDITIONS:

The General and Special Conditions, Division II, Sections E and F of these specifications shall apply to and form a part of this Section as if written in full herein.

4A-02. SCOPE:

A. Furnish all labor, materials, equipment, and services and perform all operations necessary to complete all masonry work as shown on the drawings and as specified.

B. All reinforced masonry construction shall comply with ACI 530-13 and the Florida Building Code 2017.

4A-03. MATERIALS:

A. Face Brick: All face bricks shall be standard-size bricks (2 ¼" x 3 ½" x 7 ½ ") and types shall be as follows: **(submit samples for each type of brick called for)** for approval.

1. Brick shall be as selected by the Owner and the Construction Manager shall include an allowance of $350.00 per 1000 bricks for the purchase price as a basis for submittal and selection.

B. Concrete Masonry Units: Sizes and shapes as shown and detailed shall be even in color, weight, texture, and composition. They shall be approved normal weight block units to meet ASTM Specifications ASTM C-90, Grade N. Net area compressive strength for concrete masonry units shall be a minimum of 2,800 PSI.

C. Face Block Units: Shall be 8" x 8" x 16" and 8" x 8" x 16" one side vertical scored concrete masonry units (CMU).

D. Concrete Brick: N.A.

E. Special Rated Concrete Masonry Units: Shall be 8" x 8" x 16" concrete block with extra wall thickness and rated for two (2) hour fire rating. Where used, block to go from floor slab to underside of roof deck.

F. Wall Reinforcement: Shall be hot dipped galvanized DUR-O-WAL Ladder Type Reinforcement in 4", 6", 8", 12" and 16" widths as required and shown. Where both face brick and veneer CMU are indicated as composite wall construction, width of ladder type reinforcing shall be required to anchor brick to CMU masonry block wall. DUR-O-WAL shall be standard type No. 9 (W1.7) side rods and No. 9 (W1.7) cross rods. Rods shall be deformed and welded at points of connection. **Furnish L and T sections for corners and wall intersections.**

G. Submittals:

b. Submit brick sample panel for approval. Submit material information for brick ties

and wall reinforcement for review and approval.

c. For concrete masonry units submit the following items for review and approval:
   i. Product data for each type of product.
   ii. Shop drawings for reinforcing steel detailing bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.
   iii. Material Certificates for each type and size of product. Include data on material properties and material test reports substantiating compliance with requirements.
   iv. Mix designs for each type of mortar and grout. Include description of type and proportions of ingredients.

   Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement

H. Mortar: Mortar materials for all masonry work shall be measured by volume, separately, and be thoroughly mixed dry in a clean mortar box or mixer, before adding water.

Water shall be added only as needed, using only enough to bring the mixture to a smooth, even consistency. **No retempered mortar shall be used.**

It shall be the contractor's responsibility to see that mortar for the whole project is of one brand, and all shipped from the same batch. It will also be the contractor's responsibility to see that all mortar is mixed on the job to the same consistency to prevent varying joint colors within one wall area.

1. Mortar Mix: (all concrete masonry and face brick)

   a. Materials:
      1. Mortar shall be Type S complying with ASTM C270 for block masonry and type N for Brick.
      2. Water shall be clean and free and fit for drinking.
      3. Sand shall comply to ASTM C-144.

   b. Proportioning: Mortar shall be proportioned with one part by volume of Portland Cement; 3 to 2 part by volume of hydrated lime; and not less than 2-3 nor more than 3 times the sum of volumes of cement and lime used for the volume of sand.

   c. Physical Requirements: Compressive strength of mortar shall be not less than 1800 psi at 28 days for Type S mortar and not less than 750 psi at 28 days for Type N mortar.

2. Pre-Mixed Mortar: All block and brick work shall be equal to Magnolia Mortar Mix, Type S, or Type N color to match existing. Premixed mortars of the same color as manufactured by Lehigh Portland Cement Company or Coosa Mortar are acceptable.

I. Masonry Cavity Insulation: Provide and install at all cavities in between face brick veneer and concrete block masonry unit's high-performance rigid insulation equal to R-Techx as manufactured by insulfoam (a Carisle Company)

Rigid insulation shall be closed cell, lightweight, resilient expanded polystyrene with advanced polymeric laminate facing.

Rigid insulation shall be 1 ½" thick x 4'0" x 8'0" and shall be provided with an insul snap feature allowing clean break of sheet into (3) 16" x 8'0" long sheets. Product shall provide an effective and stable R-value of 9.9 at 40 ° F.

Product shall meet or exceed compressive strength, flexural strength, dimensional stability and water absorption requirements as set forth in ASTM C578, type x standard specification for rigid, cellular, polystyrene thermal insulation.

4A-04. MOCKUP PANEL: N.A.

4A-05. LAYING BLOCK:

A. Concrete Block:

1. Erect concrete block walls, partitions, chases where indicated. Bed each course solidly in mortar, with vertical joints in line. Bond each course at corners or intersections. Where block cannot be keyed into or bonded into adjacent and abutting walls, anchors as described above shall be used, unless noted otherwise. Block walls shall be laid in running bond except at exposed mechanical yard screen walls, block shall be laid in stack bond with tooled concave joints. **Note: It is important that the cavity remain clean and free from all excess mortar, therefore, the masons will be required to exercise caution when laying exterior walls.**

2. Where concrete block walls noted to be fire rated, masonry block is to be carried up to underside of deck, unless noted otherwise, and fire safing applied to seal top of block and underside of deck.

B. Wall Reinforcement: On stacked block walls, install every course (**8" o.c. vertically**). On running bond, install in first and second bed joints and in every other bed joint (**16" o.c. vertically**) throughout remainder of structure or as directed by Architect.

At wall corners and wall intersections L's and T's sections shall be used.

On stacked concrete block and brick walls, 7" wide wire reinforcing may be used at 16" o.c. vertically alternating with 11" wide reinforcing in every other course. Where block extends above ceilings, block may be set in running bond.

Reinforcing to be run in first and second block courses above and below all openings and carried two (2) feet past opening on each side.

C. Brick Ties: (**Other than in block and brick construction**) Shall be spaced 16" o.c. horizontally and no less than every sixth course (16") vertically.

4A-06. LAYING MASONRY IN FREEZING WEATHER:

When temperature is below 50°F, or likely to freeze within 24 hours from time masonry is laid, no masonry work shall be done unless approved by Architect and provision is made to prevent mortar from freezing before it has set.

4A-07. MASONRY FILL INSULATION:

A. Install masonry fill insulation in all exterior concrete block cells and in other block walls that are indicated for masonry fill insulation on the drawings.

B. Acceptable Materials:

1. Zonolite Masonry fill insulation of light weight granular vermiculite.

2. Core fill 500 foam plastic masonry wall insulation as manufactured by Tailored Foam of Florida

3. Thermco foam insulation as manufactured by Thermal Corporation of America

C. Installation:

1. Vermiculite insulation shall be poured from the bag into concrete block cells with the use of a hopper placed on top of the walls. Height of pours shall not exceed 20 feet.

2. Foamed in place insulation shall be installed as per the manufacturer's instructions and pumping shall be in heights of no more than ten (10) feet.

3. All cells, except pilaster block shall be full from floor slab elevation to bottom of concrete tie beam or roof lintel beam. All exterior walls shall have cells filled with masonry fill insulation.

D. Submit sample and literature for type of masonry fill insulation to be used, for review and approval.

4A-08. PROTECTION:

Masonry shall be well protected when not being worked upon as well as during hot weather, frost, and rain, by substantial waterproof covering securely held in place. Other parts of the work such as sill, pavement, etc., shall be protected against falling mortar, etc., by protecting with suitable substantial covering. **All block and brick shall be delivered to the site on wood pallets and shall be covered with visqueen until ready for use. Block with excessive chipped corners shall be returned to manufacturer.**

4A-09. CONTROL JOINTS:

Where noted on the drawings and at all exterior walls abutting existing construction, and at all wall expansion joints, equal to Dur-O-Wal Rapid Control Joint, No. 8, wide flange joint for 8" walls and No. 12 for 12" block and brick walls.

4A-10. FLASHING:

Where called for on the drawings, approved flashing equal to Phoenix Type A, "Cop-R-Flash", 3 oz., or Nervastral 56 shall be installed as the work progresses. Where laps occur in flashing, a lock joint shall be formed to insure water tightness. At heads and sills of windows, extend flashing

12" beyond jamb line and turn up with folded corner to lead all moisture to exterior.

4A-11. BUILDING IN ANCHORS, ETC.:

Build in all anchors, beams, lintels, frames, pipes, sleeves, hangers, inserts, plugs, and any other accessories indicated or necessary for installation of connections of adjoining work. Nailing plugs shall be crimped galvanized, spaced not less than 16" o.c.
Any wood blocks or nailers set in masonry shall be treated with approved wood preserver.

Build in all metal flashing and fabric flashing as indicated on drawings or specified.

Fill in all spaces between the masonry and door bucks with mortar. Exterior door frames shall be 3” reveal between frame and brick to permit caulking. Interior frames shall have right, full joints unless otherwise detailed.

Consult all other trades in advance and make provisions for installation of their work to avoid cutting and patching. Any cutting and patching required to accommodate the work of others shall be done by the mason.

4A-12. CUTTING AND PATCHING:

Consult all other trades in advance and make provisions for their work to avoid cutting and patching. Any cutting and patching required to accommodate work of others shall be done by the mason.

4A-13. POINTING UP:

The contractor shall be responsible for pointing up, grouting, etc., around all piping that passes through the walls, especially those pipes that pass-through chase walls are to be pointed up around so that there is no space between the masonry units and the pipe for the full thickness of the wall.

4A-14. REINFORCED MASONRY UNITS:

Reinforced masonry shall be grouted and reinforced as shown on the structural plans with reinforcing steel from bottom (hooked) of footing to top steel (hooked) of tie beam. In addition, one cell reinforced masonry unit shall be located at jambs of all interior windows and door openings and a minimum of two cells reinforced at jambs of all exterior windows and door openings. **Reinforcing shall be lapped per the structural plans**.

Reinforced masonry units shall comply with ACI 530-13 and FBC 2017.

Concrete for filling shall be 3,000 psi, 8” - 10" slump plus or minus 1”. **Lifts shall not be over 4 FT in height.**

Reinforcement Requirements:

A. Uncoated-Steel Reinforcing Bars: ASTM A 615/A 615M, Grade 60.

B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

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. Dur-O-Wal; a Hohmann & Barnard company.
b. Heckmann Building Products, Inc.
c. Hohmann & Barnard, Inc.
d. Wire-Bond.

4A-15 FIELD QUALITY CONTROL:

A. Testing and Inspecting: Engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

B. Inspections: Special inspections according to Level B in TMS 402/ACI 530/ASCE 5.

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Testing Prior to Construction: One set of tests.

D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.

E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.

F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.

G. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

4A-16. CLEANING:

At completion of masonry work, all brick surfaces shall be cleaned with a stiff fiber brush using a product equal to Vanatrol as manufactured by Prosoco, Inc., Kansas City, Kansas. Use of pressure treating equipment shall **not** be permitted. Job site mixed muriatic acid and water shall not be used in the brick cleaning process.

END OF SECTION

SECTION 5A
STRUCTURAL STEEL FRAMING

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. Structural steel.
2. Grout.

B. Related Requirements:

1. Section 051213 "Architecturally Exposed Structural Steel Framing" for additional requirements for architecturally exposed structural steel.
2. Section 055000 "Metal Fabrications" for steel lintels and shelf angles not attached to structural-steel frame miscellaneous steel fabrications and other steel items not defined as structural steel.
3. Section 133419 "Metal Building Systems" for structural steel.

1.3 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment Drawings.

3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.

C. Delegated-Design Submittal: For structural-steel connections indicated to comply with design loads, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. For shop drawings which depict engineering not shown on the structural drawings, the delegated Registered P.E. who issued the shop drawings shall sign, date and seal all such shop drawings in accordance with Section 471.025(1) Florida Statue.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, fabricator, professional engineer, and testing agency.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

D. Mill test reports for structural steel, including chemical and physical properties.

E. Product Test Reports: For the following:

1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
2. Direct-tension indicators.
3. Tension-control, high-strength, bolt-nut-washer assemblies.
4. Shop primers.
5. Nonshrink grout.

F. Survey of existing conditions.

G. Source quality-control reports.

H. Field quality-control and special inspection reports.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD, or is accredited by the IAS Fabricator Inspection Program for Structural Steel (AC 172).

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

C. Comply with applicable provisions of the following specifications and documents:

1. AISC 303.

2. AISC 360.
3. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
2. Clean and relubricate bolts and nuts that become dry or rusty before use.
3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator, including comprehensive engineering analysis by a qualified professional engineer, to withstand loads indicated and comply with other information and restrictions indicated.

1. Select and complete connections using schematic details indicated and AISC 360.
2. Use Load and Resistance Factor Design; data are given at factored-load level.

B. Moment Connections: Type FR, fully restrained.

C. Construction: Combined system of moment frame, braced frame, and shear walls.

2.2 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A 992/A 992M.

B. Channels, Angles-Shapes: ASTM A 36/A 36M.

C. Plate and Bar: ASTM A 36/A 36M.

D. Cold-Formed Hollow Structural Sections: ASTM A 500/A 500M, Grade B, structural tubing.

E. Steel Pipe: ASTM A 53/A 53M, Type E or Type S, Grade B.

1. Weight Class: Standard.
2. Finish: Black.

F. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers; all with plain finish.

1. Direct-Tension Indicators: ASTM F 959, Type 325, compressible-washer type with plain finish.

B. Zinc-Coated High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade DH heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers.

1. Finish: Hot-dip or mechanically deposited zinc coating.
2. Direct-Tension Indicators: ASTM F 959, Type 325, compressible-washer type with mechanically deposited zinc coating, baked epoxy-coated finish.

C. Headed Anchor Rods: ASTM F 1554, Grade 36, straight.

1. Nuts: ASTM A 563 heavy-hex carbon steel.
2. Plate Washers: ASTM A 36/A 36M carbon steel.
3. Washers: ASTM F 436, Type 1, hardened carbon steel.
4. Finish: Plain.

D. Structural Slide Bearings: Low-friction assemblies, of configuration indicated, that provide vertical transfer of loads and allow horizontal movement perpendicular to plane of expansion joint while resisting movement within plane of expansion joint.

1. Mating Surfaces: PTFE and PTFE.
2. Coefficient of Friction: Not more than 0.05.
3. Design Load: Not less than 2,000 psi.
4. Total Movement Capability: 2 inches.

2.4 PRIMER

A. Primer: SSPC-Paint 25, Type II, zinc oxide, alkyd, linseed oil primer.

2.5 GROUT

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

2.6 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.

1. Camber structural-steel members where indicated.
2. Fabricate beams with rolling camber up.
3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
4. Mark and match-mark materials for field assembly.
5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill, or punch standard bolt holes' perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 2, "Hand Tool Cleaning."

F. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.

1. Cut, drill, or punch holes' perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.7 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened or Slip critical as indicated.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

2.8 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
2. Surfaces to be field welded.
3. Surfaces of high-strength bolted, slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
5. Galvanized surfaces.
6. Surfaces enclosed in interior construction.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 2, "Hand Tool Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

2.9 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform shop tests and inspections.

1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

B. Bolted Connections: Inspect and test shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: Visually inspect shop-welded connections according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

1. Liquid Penetrant Inspection: ASTM E 165.
2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
3. Ultrasonic Inspection: ASTM E 164.
4. Radiographic Inspection: ASTM E 94.

D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedment for compliance with requirements.

1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedment showing dimensions, locations, angles, and elevations.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Baseplates Bearing Plates and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of baseplate.
3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

C. Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection.

G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

H. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened or Slip critical as indicated.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," for mill material.

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Engage a qualified special inspector to perform the following special inspections:

1. Verify structural-steel materials and inspect steel frame joint details.
2. Verify weld materials and inspect welds.
3. Verify connection materials and inspect high-strength bolted connections.

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. Bolted Connections: Inspect and test bolted connections according to RCSC’s "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Welded Connections: Visually inspect field welds according to AWS D1.1/D1.1M.

1. In addition to visual inspection, test and inspect field welds according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

    a. Liquid Penetrant Inspection: ASTM E 165.
    b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
    c. Ultrasonic Inspection: ASTM E 164.
    d. Radiographic Inspection: ASTM E 94.

3.6 REPAIRS AND PROTECTION

A. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

    1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

END OF SECTION

SECTION 5B

STEEL JOIST FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. K-series steel joists.
2. KCS-type K-series steel joists.
3. K-series steel joist substitutes.
4. Steel joist accessories.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for installing bearing plates in concrete.
2. Section 042000 "Unit Masonry" for installing bearing plates in unit masonry.
3. Section 051200 "Structural Steel Framing" for field-welded shear connectors.

1.2 DEFINITIONS

A. SJI's "Specifications": Steel Joist Institute's "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders."

B. Special Joists: Steel joists or joist girders requiring modification by manufacturer to support nonuniform, unequal, or special loading conditions that invalidate load tables in SJI's "Specifications."

1.3 ACTION SUBMITTALS

A. Product Data: For each type of joist, accessory, and product.

B. Sustainable Design Submittals:

1. Third-Party Certifications: for each product
2. Third-Party Certified Life Cycle Assessment: for each product.

C. Shop Drawings:

1. Include layout, designation, number, type, location, and spacing of joists.
2. Include joining and anchorage details; bracing, bridging, and joist accessories; splice and connection locations and details; and attachments to other construction.
3. Indicate locations and details of bearing plates to be embedded in other construction.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer.

B. Welding certificates.

C. Manufacturer certificates.

D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

E. Mill Certificates: For each type of bolt.

F. Comprehensive engineering analysis of special joists signed and sealed by the qualified professional engineer responsible for its preparation.

G. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standard specifications and load tables in SJI's "Specifications."

1. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.

B. Welding Qualifications: Qualify field-welding procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle joists as recommended in SJI's "Specifications."

B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

1.7 SEQUENCING

A. Deliver steel bearing plates to be built into cast-in-place concrete and masonry construction.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide special joists and connections capable of withstanding design loads indicated on Drawings.

1. Use ASD; data are given at service-load level.
2. Design special joists to withstand design loads with live-load deflections no greater than the following:

a. Floor Joists: Vertical deflection of 1/360 of the span.
b. Roof Joists: Vertical deflection of 1/240 of the span.

B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

2.2 STEEL JOISTS

A. K-Series Steel Joist: Manufactured steel joists of type indicated according to "Standard Specification for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, and parallel top chord.

1. Joist Type: **K-series steel joists**
2. K-Series Steel Joist Substitutes: Manufacture according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle or -channel members.
3. Provide holes in chord members for connecting and securing other construction to joists.
4. Top-Chord Extensions: Extend top chords of joists with SJI's Type S top-chord extensions where indicated on Drawings, complying with SJI's "Specifications."
5. Extended Ends: Extend bearing ends of joists with SJI's Type R extended ends where indicated on Drawings, complying with SJI's "Specifications."
6. Do not camber joists.
7. Camber joists according to SJI's "Specifications."
8. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds **1/4 inch per 12 inches**.

B. Long-Span Steel Joist: N.A.

2.3 STEEL JOIST GIRDERS N.A.

2.4 PRIMERS

A. Primer:

1. SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.
2. Provide shop primer that complies with Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

2.5 STEEL JOIST ACCESSORIES

A. Bridging:

1. Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.
2. Schematically indicated. Detail and fabricate according to SJI's "Specifications." Furnish additional erection bridging if required for stability.
3. Fabricate as indicated on Drawings and according to SJI's "Specifications." Furnish additional erection bridging if required for stability.

B. Fabricate steel bearing plates from ASTM A36/A36M steel with integral anchorages of sizes and thicknesses indicated on Drawings. Shop prime paint

C. Steel bearing plates with integral anchorages are specified in Section 055000 "Metal Fabrications."

D. Furnish ceiling extensions, either extended bottom-chord elements or a separate extension unit of enough strength to support ceiling construction.

1. Extend ends to within **1/2 inch** of finished wall surface unless otherwise indicated on Drawings.
2. Finish: Hot-dip zinc coating, ASTM A153/A153M, Class C.

E. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, **Grade A325**, Type 1, heavy-hex steel structural bolts; **ASTM A563, Grade DH,** heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.

1. Finish: Hot-dip zinc coating, ASTM A153/A153M, Class C.

F. Welding Electrodes: Comply with AWS standards.

G. Galvanizing Repair Paint: MPI#18, MPI#19, or SSPC-Paint 20.

H. Furnish miscellaneous accessories including splice plates and bolts required by joist manufacturer to complete joist assembly.

2.6 CLEANING AND SHOP PAINTING

A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories by hand-tool cleaning, SSPC-SP 2 or power-tool cleaning, SSPC-SP 3.

B. Do not prime paint joists and accessories to receive sprayed fire-resistive materials.

C. Apply one coat of shop primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than **1 mil** thick.

D. Shop priming of joists and joist accessories is specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates, embedded bearing plates, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Do not install joists until supporting construction is in place and secured.

B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting

construction according to SJI's "Specifications," joist manufacturer's written instructions, and requirements in this Section.

1. Before installation, splice joists delivered to Project site in more than one piece.
2. Space, adjust, and align joists accurately in location before permanently fastening.
3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
4. Delay rigidly connecting bottom-chord extensions to columns or supports until dead loads are applied.

C. Field weld joists to supporting steel bearing plates. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

D. Bolt joists to supporting steel framework using carbon-steel bolts.

E. Bolt joists to supporting steel framework using high-strength structural bolts. Comply with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for high-strength structural bolt installation and tightening requirements.

F. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

3.3 REPAIRS

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.

B. Touchup Painting:

1. Immediately after installation, clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists, bearing plates, and accessories.

    a. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
    b. Apply a compatible primer of same type as primer used on adjacent surfaces.

2. Cleaning and touchup painting are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Visually inspect field welds according to AWS D1.1/D1.1M.

C. Visually inspect bolted connections.

D. Prepare test and inspection reports.

END OF SECTION 5B

SECTION 05C
STEEL DECKING

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. Roof deck.
2. Composite floor deck.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

B. Shop Drawings:

1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

1.4 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Product Certificates: For each type of steel deck.

C. Product Test Reports: For tests performed by a qualified testing agency, indicating that each of the following complies with requirements:

1. Power-actuated mechanical fasteners.

D. Evaluation Reports: For steel deck, from ICC-ES.

E. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

B. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 ROOF DECK **(All Areas framed with Cold-Formed Trusses)**

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. Canam Steel Corporation; Canam Group, Inc.
2. New Millennium Building Systems, LLC.
3. Nucor Corp.

B. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:

1. Galvanized-Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33, G60 zinc coating.
2. Deck Profile: Type WR, wide rib.
3. Profile Depth: 1-1/2 inches.
4. Design Uncoated-Steel Thickness: 0.0295 inch.
5. Side Laps: Overlapped or interlocking seam at Contractor's option.

2.3 COMPOSITE FLOOR DECK

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. Canam Steel Corporation; Canam Group, Inc.

2. New Millennium Building Systems, LLC.
3. Nucor Corp.

B. Composite Floor Deck: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with SDI C, with the minimum section properties indicated, and with the following:

1. Prime-Painted Steel Sheet: ASTM A1008/A1008M, Structural Steel (SS), Grade 33 minimum, with top surface phosphatized and unpainted and underside surface shop primed with manufacturers' standard gray or white baked-on, rust-inhibitive primer.
2. Profile Depth: 1-1/2 inches.
3. Design Uncoated-Steel Thickness: 0.0295 inch.
4. Span Condition: Triple span or more.

2.4 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.

C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.

D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.

E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

F. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck. For drains, cut holes in the field.

G. Galvanizing Repair Paint: ASTM A 780/A 780M.

H. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.

B. Install temporary shoring before placing deck panels if required to meet deflection limitations.

C. Locate deck bundles to prevent overloading of supporting members.

D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.

G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.

H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

I. Mechanical fasteners may be used in lieu of welding to fasten deck for connection of deck to cold-formed steel framing members. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.3 ROOF-DECK INSTALLATION

A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as follows:

1. Weld Diameter: 5/8-inch, nominal.
2. Weld Spacing: as indicated.

B. Fasten roof-deck panels to cold-formed steel truss supporting members as follows:

1. Mechanically fasten with self-drilling, No. 12 diameter or larger, carbon steel screws.
2. Fastener Spacing: as indicated.

C. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of one-half of the span or 18 inches, and as follows:

1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.

D. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:

1. End Joints: Lapped 2 inches minimum or butted at Contractor's option.

E. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and mechanically fasten flanges to top of deck. Space mechanical fasteners not more than 12 inches apart with at least one fastener at each corner.

1. Install reinforcing channels or zees in ribs to span between supports and mechanically fasten.

F. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. mechanically fasten to substrate to provide a complete deck installation.

1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.

3.4 INSTALLATION OF FLOOR DECK

A. Fasten floor-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated and as follows:

1. Weld Diameter: 5/8 inch, nominal.
2. Weld Spacing:

a. Weld edge ribs of panels at each support. Space additional welds an average of 16 inches apart, but not more than 18 inches apart.

3. Weld Washers: Install weld washers at each weld location.

B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of one-half of the span or 36 inches, and as follows:

1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.
2. Mechanically clinch or button punch.
3. Fasten with a minimum of 1-1/2-inch-long welds.

C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:

1. End Joints: Lapped.

D. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure in accordance with SDI recommendations unless otherwise indicated.

E. Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, in accordance with SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Field welds will be subject to inspection.

C. Prepare test and inspection reports.

3.6 PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780/A 780M and manufacturer's written instructions.

B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.

1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.

END OF SECTION

SECTION 6A

CARPENTRY, MILLWORK, AND INSULATION

6A-01. GENERAL CONDITIONS:

The General and Special Conditions, Division II, Sections E and F of these specifications shall apply to and form a part of this Section as if written in full herein.

6A-02. SCOPE:

The contractor shall furnish all labor and materials for carpentry, millwork and case work as indicated on drawings or specified, or reasonably required to finish the work. Work under this heading shall be properly coordinated with all other trades. The carpenter shall do all cutting and fitting for carpentry and millwork, and render all such other assistance required for other branches of the work, making good after other mechanics.

6A-03. LUMBER, IN GENERAL:

All lumber shall be thoroughly seasoned and dried to a moisture content of not over 10% for framing lumber and not over 12% for millwork, and when delivered shall be stored and protected to keep same dry.

All lumber for any purpose shall be dressed four (4) sides, unless otherwise noted and be free from holes, large loose knots, bark and large pitch streaks, regardless of grade.

Grading shall be according to grading rules of the Southern Pine Inspection Bureau under which it is manufactured and each piece of bundle, if bundled stock, shall bear an Inspection Bureau's mark, indicating the grade.

Doors, trim, and millwork in general shall not be stored in the building while the building is damp or in any damp storage location.

6A-04. LUMBER GRADES:

All trim shall be No. 1 Fir. All blocking “cant” strips, grounds or nailers shall be pressure treated No. 2 grade, Yellow Pine; wood studs and wood joists shall be Fir or Yellow Pine structural grade.

6A-05. TREATED LUMBER:

A. Structural Lumber: Give all nailers, blocking and wood grounds in contact with exterior masonry, concrete, roof slabs or steel, pressure preventative treatment in closed retort as per FS TT-W-571; minimum net preservatives as specified herein. Any of the following preservatives will be acceptable:

Preservative	Lbs. Per Cu. Ft.
Pentachlorophenol (5% solution in oil)	Solution 6.0
Zinc Chloride	Dry Salt 1.0
Zinc Metal Arsenite (ZMA)	Dry Salt .03
Wolman Salts (Tanalith)	Dry Salt 0.3
Chromated Zinc Chloride	Dry Salt 0.75

After using the salt treatment, reduce lumber moisture content to not over 10%. Brush coat surfaces of lumber sawed, bored or cut, after treatment with same preservative used at plant. Accompany lumber with certificates from lumber treatment company, certifying treatment amount, moisture percentage after kiln drying. Architect reserves the right to apply method for determining penetrating as per manual issued by the American Wood Preserver's Association. Treatment shall be arsenic free.

6A-06. METAL GLASS STOPS:

All wood doors shown or noted with glass lights shall have metal stops. Stops shall be Type FGS75 for single glazing and shall be as manufactured by Anemostat Door Products. **Install stops with stainless steel through bolts.**

6A-07. MILLWORK:

Millwork shall be of material and manufacturer hereinafter specified and as indicated on the drawings and shown on details. In all cases millwork shall be of good standard construction. All joints shall be made in approved manner perfectly fitted. Secure with finishing nails with heads set for putty, and with screws and glue where required. All surfaces sanded smooth.

All trim and moldings shall be mitered at joints and corners and in full lengths within the limits of the material.

No sheet plywood shall be less than ¼" thick, exposed surfaces, Grade A. Frames shall be primed on all sides at the mill with clear primer.

6A-08. TRIM:

Trim shall be as indicated on drawings or if not noted shall match specie of doors, siding, and paneling used. All other trim shall be as specified above, No. 1 Fir. All cuts in trim shall be painted with clear Rez during erection. All trim work including bonding on cabinets and cabinet work shall have mitered corners.

6A-09. PLASTIC LAMINATE:

Surfaces where detailed shall be standard grade plastic laminate, 1/16" thickness, furniture finish, color as selected. Edges are to be covered with laminate. Counter top sheet shall overlap counter edge and corners ground to a 45-degree angle. Laminate shall be Formica, Micarta, Wilson Art, or equal. Colors shall be of solid colors as selected. **Other than manufactured casework items, all millwork, window sills, and other surfaces shown with plastic laminate, plastic laminate shall be field applied.**

6A-10. ROUGH HARDWARE:

The contractor shall furnish all nails, screws, bolts and fittings required to fabricate and install his work in place of the character required and best suited to the conditions of the work.

6A-11. APPLICATION OF FINISH HARDWARE:

Finish hardware is specified under another Section. Fit and apply all finish hardware to wood doors and leave same in operating order. All mortises, sinkages and cuts shall be accurately made to fit or be covered by hardware. Screws shall be counter sunk or counter bored and plugged as specified. All screws shall be screwed in place and not hammered. (After the finish hardware has been fitted, remove same until the painter has applied the last coat of paint on every surface, then reset in place.) See Carpet Section and Finish Hardware Section for aluminum saddles at doors between corridors and rooms.

6A-12. DOOR LOUVERS:

All door louvers to be furnished by others and installed by this Contractor.

6A-13. CAULKING:

Where backsplashes and/or counter tops finish against plastic walls, the joint shall be caulked with a Thiokol caulking compound before painting.

6A-14. PLYWOOD:

All plywood shall have markings stamped on sheets for grades and thicknesses called for. Where used for exterior applications, plywood is to be exterior grade with exterior glue.

6A-15. ROOF ASSEMBLY INSULATION:

Insulation shall be of thickness as indicated on plans, glass fiber reinforced closed cell polyisocyanurate foam core board with impermeable facers. Insulation shall be equal to NRG E'NERG"Y 2 as manufactured by NRG Barriers, Inc., Saco, Maine. Insulation shall have LTTR ratings (Long Term Resistance Values).

Insulation fasteners shall be as required and approved by the membrane manufacturer for mechanically fastened single-ply systems. Screw and plate fasteners in lengths as required to penetrate the new wood deck. (See Specifications, Section 5-C) Pattern and number of fasteners as required by the roof panel and membrane manufacturer.

Installation of insulation shall strictly follow the insulation manufacturer's recommendations and standard installation procedures, including types of fasteners, fastening pattern, installation pattern, edge treatment, and joint treatment.

Installation of roof insulation shall be by the roofing subcontractor, and the fastening system shall in no way diminish the ability of the roof system to comply with specified wind speeds. See Section 6 and Section 7 of these specifications.

6A-16. EXTERIOR WALL INSULATION: As indicated on architectural drawings.

6A-17. INTERIOR WALL SOUND BATTS:

Install interior wall sound batts at interior metal stud framed wall construction as shown in drawings equal to un-faced sound attenuation batts fiber glass as manufactured by Owens Corning with the following characteristics:

Thickness:3 ½" Width:16" Length:96"

Surface Burning Characteristics / Rating:	Flame Spread Rating	10
	Smoke Developed Rating	10
Acoustical Performances:	N.R.C. (Noise Reduction Coefficient)	1
Thermal Performance:	R-Value	11

6A-18. INTERIOR CEILING SOUND BATTS: N.A.

6A-19. CLEAN-UP:

The Contractor shall remove all debris, scrap, etc., from the site upon completion of his work. Tile shall be free of fingerprints, smudges, and present a uniform color, clean and level. Any tile found to contain smudges, chips, etc., shall be removed and replaced with new tile.

6A-20. GUARANTEE:

This contractor shall guarantee in writing the materials and workmanship for a period of two (2) years after final acceptance of the building.

END OF SECTION.

SECTION 7A

METAL ROOFING PANELS

7A-01. GENERAL CONDITIONS:

The General and Special Conditions, Division II, Sections E and F of these specifications shall apply to the form part of this Section as if written in full herein.

7A-02. SCOPE OF WORK

A. Furnish all labor, material, equipment, and incidentals necessary for installing all new roofing including required trim, flashing, framing and supports for new metal roofing and other related items as indicated on the drawings and as specified, and/or as required to complete the work.

Generally, the roofing system will consist of installing a concealed fastener type 24-gauge metal panel roofing system over a peel and stick roof underlayment over a solid plywood roof deck over pre-engineered wood roof trusses.

as shown on the drawings for each of the three buildings.

7A-03. INCIDENTAL WORK:

All work which is incidental to the installation of the roof and fascia shall be done by this Contractor. This includes flashing, trim, gutter and downspouts and any other items related to the above roofing areas, fastening and any support work required to complete the installation.

7A-04. METAL ROOF SYSTEM:

A. Manufacturers: Metal roofing shall be as per these specifications. Panels from other manufacturers will be acceptable providing they conform to the same shape, size, gauge, method of fastening and type of finish**. Contractors proposing to use roof panels other than as specified shall submit sample panel showing fastening system and panel specifications prior to receipt of bids for approval.** (See Section B, paragraph B-5, Substitutions, these Specifications)

All roof panels as listed below, shall be flat panels and shall be 16" wide and have a 2" high standing seam and of 24-gauge galvanized steel. All roofing materials shall be labeled Class “A” per ASTM 108 and shall be certified by a nationally recognized independent testing laboratory. All roofing systems shall be installed within the limitations of the test procedure for surfaces, deck cross slope and combustibility.

All newly installed materials shall be protected from moisture and sealed for moisture protection at the end of each day. The contractor shall provide the Architect / Engineer of record a final statement of compliance for the Board.

B. Roof Panels:

1. Roof panels shall be equal to MBCI Craftsman Series HB 16 ½, 24-gauge, non-embossed steel,

cold formed flat panel, standing seam panels, 16 ½" wide, 2" deep male and female rib. **All panels shall be full lengths, end splices will not be acceptable on any of the areas to be roofed.**

2. Fastening of roof panels to support framing shall be by a concealed fastener system so no screws penetrate the face of the roofing panel nor are any screws visible. Where rigid insulation is called for, Thermal spacers shall be installed between the insulation and bottom face of the panel to provide a positive thermal break between the roof panels and supporting members.

   a. Concealed Z clip shall be a minimum 2" long, height as required of not less than 24-gauge aluminized steel (minimum yield 48,000 psi).

   b. Where required thermal break spacer shall be maximum 6" wide x 1" thick, expanded polystyrene in 48" lengths with a minimum density of 2 pcf.

3. Sealant tape shall be an extruded non-skinning, resilient preformed butyl compound type.

4. Finish: Exterior finish on all roof and fascia panels and trim pieces will be fluoropolymer Kynar 500 coating, minimum of 1 mil nominal thickness. Color selected will be by the Architect and color selection will be from the Kynar 500 finish in the standard colors for the respective manufacturer.

C. Roof Panel Penetrations:

1. Plumbing vents and stacks shall be extended through new metal roofing panels at the flat pan portion of the panel and flashed with new EPDM flashing to make for watertight installation. No roof panel penetrations for vent/stack shall occur at or impact the vertical standing seam of the roof panel.

2. Flashing for exhaust fan curbs and for any penetrations shall be as per manufacturer's details for flashing.

D. Sealants:

1. Closer Strips: The corrugations of the roof and wall panels shall be filled with solid or closed cell, preformed, rubber or neoprene closures along with eave ridge and rake when required for weather-tightness.

2. Sealer: All roof panels side laps and end laps shall be sealed with 3/16" diameter mastic. The sealer shall be a gray elastic compound of synthetic base and fibrous filler and shall have good adhesion to metal. The material shall be non-staining, non-corrosive, non-shrinking, non-oxidizing, non-toxic and non-volatile. The service temperature will be from -30° F to -200° F and the flash point must be above 400° F. The material shall meet or surpass the requirements of Specification Mil-C-18969B, Type II, Class B, and shall be equal to that manufactured by Presstite Division of Interchemical Corporation.

3. Gutter Sealer: All gutter joints shall be sealed with aluminum pigmented 3M Gutter Seal or equal.

7A-05. FINISHES:

A. Roof and Fascia Panels: Finish with corrosion - resistant metallic coating, Kynar 500, 1 mil (.001") thick, factory applied prior to fabrication. Color to be selected by the Architect.

B. Samples of roof and wall panel colors to be submitted for color selection.

7A-06. FASTENINGS:

All fastenings shall be of the type, length and spacing that will secure the framing and support members directly into the existing and/or new structural system and as recommended by the metal building panel manufacturer. **Fastenings shall be of stainless steel.**

The contractor shall submit to the Architect prior to starting any work, a complete list of the fastenings he proposes to use for each framing system, showing by size, type, and spacing, etc. joist structural system. Metal roof panels applied over this system shall have fasteners penetrating either the steel joist or through the heavy- duty steel decking. See roof deck systems section, these specifications, for deck system.

7A-07. MISCELLANEOUS:

A. Ridge Vent: Where shown, furnish and install continuous gravity type ridge vent as detailed. Sheet metal parts shall be of 22 gauge. Finish and color to be same as roof panels.

B. Drip and Trim Pieces: To be in shapes, sizes and gauges as shown on the drawings. All metal for trim pieces to be minimum 24 gauge, in same finish and color as roof panels where panels are called for with color finish. Where galvalume finish is called for, drip and trim gutter and downspout to be painted color as selected by Architect.
Drip shall be installed as detailed with continuous cleat and joints shall be butted and 4" wide joint covers installed overusing same material, gauge, finish, etc.

C. Curbs: This contractor is to furnish and install all roof curbs that are required for Mechanical roof mounted exhaust fans air intake hoods, and gravity vents that penetrate this metal roof. Fan and air intake hood dimensions will be provided by the mechanical contractor. Gravity vents will be furnished by the general contractor.

7A-08. GUTTERS AND DOWNSPOUTS:

A. Where shown on the drawings, furnish and install gutters and downspouts. Gutters and downspouts will be constructed in shapes and sizes as detailed and of 24-gauge steel. Finish shall be Kynar 500 finish in color selection from PEMB System manufacturer’s standard colors.

B. Downspouts terminate will terminate into a downspout elbow diverter as required to divert roof water away from building.

C. All workmanship shall be first class. Gutters and downspouts shall be straight and true, and all components shall be properly anchored.

D. Anchorage for downspouts to building wall shall be as shown and detailed on the drawings.

7A-09. UNDERLAYMENT:

Roofing Underlayment shall be a 40-mil thick, peel and stick, SBS (Styrene butidyene styrene) modified,

rubberized asphalt sheet waterproofing underlayment equal to Grace Ice and Watershield or Loadmaster Duraclad underlayment as manufactured by Grace Construction Products. With an internally reinforced non-woven polyester fabric. Roofing Underlayment shall have a white reflective topping for added foot safety as well as heat reduction on the deck and protection against short term. Ultraviolet damage. A removable release film shall be on the membrane under side for ease of application.

7A-10. METAL CORRUGATED SIDING PANELS: N.A.

7A-11. DESIGN REQUIREMENTS:

Design for the metal roofing system, metal soffit system and corrugated metal siding panels shall be for an ultimate wind speed of 125 mph as per ASCE 7-22 and the State of Florida Building Code 2024.

Shop drawings shall be signed, dated, and sealed by a Florida Registered Engineer, and it shall be stated by the Engineer that the system will comply with the uplift requirements as state herein.

Metal roofing and fascia system shall contain product approval numbers and information showing product complies with the Florida Building Code 2024, Section 17. See Supplementary and Special Conditions, Paragraph 15-6

7A-12. GUARANTEES AND ONE YEAR INSPECTION:

A. The following guarantees shall be furnished to the Owner at completion of project, dated the Date of Acceptance, for each Metal Roof System.

1. Manufacturer's Warranty: Warranting the finish of the panels against blistering, peeling, cracking, or chipping and against significant color change, for a period of Twenty (20-Yrs.) Years.
2. Manufacturer's Twenty (20 Yr.) Year Warranty: For weather tightness of the total metal roofing system, both classroom building and pavilion.

If not implied or stated on this Warranty, the Roofing Contractor shall furnish separate Guarantee in writing, to the Owner, his Workmanship and Materials Guarantee, guaranteeing the weather tightness of his work for a period of three (3) years, from Date of Acceptance.

B. Manufacturer’s One Year Inspection: The roof shall be inspected by the manufacturer’s representative within one year of the project’s completion and acceptance of the Board.

END OF SECTION

SECTION 7B

MEMBRANE ROOFING SYSTEM

7B-01. GENERAL CONDITIONS:

The General and Special Conditions, Division II, Sections D and E of these specifications shall apply to and form part of this Section as if written in full herein.

7B-02. LOCATIONS:

See Drawings for the location of the building to be re-roofed.

7B-03. SCOPE:

Furnish all labor, materials, equipment, and incidentals necessary for the installation of the new roofing system as noted and shown. This work includes the installation of membrane, flashing, required trim and all other related items as indicated on the drawings and/or as specified to complete the work and achieve the end product implied. This roofer will be responsible for installing all flashing that is required for curb flashing at existing roof top air intake units, bent stacks, fans, and all other flashing as may be required for a complete job and as noted in the General Roofing Provisions. Also, included is the removal of the existing and replacement of a new gutter and leader system as further stated in this section and shown on the drawings. As per Section One, and as part of this project is the removal of the screening and support system around the roof top A/C units.

7B-04. INCIDENTAL WORK:

All work which is incidental to roofing shall be done by respective Contractors licensed for that trade.

7B-05. REMOVAL OF EXISTING MATERIALS:

As described in Section 1 of these Specifications.

7B-06. DAMAGED MATERIALS:

As described in Section 1 of these Specifications.

7B-07. SYSTEM MEMBRANE:

Specifications have been written around FiberTite mechanically attached FiberTite E.I.P. Single-Ply Roofing System, as manufactured by Seaman Corporation, Wooster, Ohio.
Equal systems acceptable for membrane roofing are Sarnafil Membrane mechanically attached Disc System manufactured by Sarnafil, Inc.; or Duro-Last Membrane System as manufactured by Duro-Last, Inc.

Equal thermoplastic polyester reinforced single-ply heat welded systems with membranes of similar construction and of the same properties, thicknesses and similar installation methods and guarantees will be considered **with prior written approval.**

7B-08. MATERIALS:

All materials shall meet the latest published specifications of FiberTite Single-Ply System as manufactured and supplied by Seaman Corporation, Building Systems Division, 2170 Whitfield Avenue, Sarasota, Florida 34243-3397; 1-813/756-8463.

A. Deck: See construction plans for the new roof deck assembly description.

B. Membrane: Roofing membrane shall be an ethylene interpolymer (EIP) alloy, reinforced with knitted polyester fabric, minimum of .036" thick, Class “A” as manufactured by Seaman Corporation, Building Systems Division under the trade name FiberTite. Physical properties shall be as stated in latest FiberTite publication for membrane specifications.

C. Separation Layer: Shall be 2.70 LBS./100 SF, (3 oz), non-woven polyester fabric; P-3B RUFON.

D. Laminated Metal (where shown): Shall be Fiberclad 24 gauge hot dipped G-90 laminated with polymeric coating (Fiberclad) as supplied by Seaman Corporation.

E. Fastening Devices: FiberTite membrane attachment shall utilize barbed round, hot dipped, galvanized stress plate (Part No. 300). Membrane fastener shall be as listed within FiberTite Approved Fastener List. Length shall be as required to penetrate metal deck and achieve the deign requirements stated in this section.

F. Sealants, Mastics and Solvents: As supplied or approved by FiberTite. All sealants, mastics and solvents shall be listed on the FiberTite Material Submittal Form. A short description of its use shall also be included.

G. Wood Nailers: Wood shall be No. 2 or better southern yellow pine, kiln dried, wolmanized, as furnished by Koppers Company, Inc., or approved equal conforming to Federal Specification TT-550, TT-W-517 and American Wood Preservers Institute Standard LP-2.

NOTE: CREOSOTE OR ASPHALTIC TYPE PRESERVATIVES ARE NOT ACCEPTABLE.

H. Expansion Joints: Expansion joints shall be flashed with FiberTite membrane or prefabricated from neoprene, factory bonded to 26 gauge hot dipped G-90 galvanized or 20 oz. copper metal flashing.

I. Termination Bar: Termination Bar shall be the following: 1/8" x 1" type aluminum rectangular bar having smooth, rounded edges as approved by FiberTite. (Flat stock cut on a shear is not acceptable). Termination bar shall be pre-punched with 9/32" holes or slots 8" o.c. NOTE: Termination bars must be installed with a minimum space of ¼" between bars. Fasteners for termination bars shall be approved by membrane

manufacturer.

J. Traffic Pads: N.A.

K. Insulation: Shall be 1 ½" (1/5) thick closed cell polyisocyanurate insulation equal to Atlas Roofing Corporation AC Foam Supreme with an R-value of 11.2. the last four feet at the edge of the roof shall be ¼" per foot tapered insulation as shown on the drawings and of the same product. Fastening shall be as required by the manufacturer to obtain the specified wind up lift requirements for the reroofing operation.

7B-09. COORDINATION:

A. Plan and coordinate the installation of the roofing system with other trades in such a manner to avoid membrane damage, keeping the complete installation weather tight and in accordance with all approved details and warranty requirements.

7B-10. INSTALLATION:

A. Deck shall be completely cleaned of all debris. Low spots or ridges or uneven areas that may pond water or damage membrane shall be corrected prior to installation of membrane. **Installation of roofing system shall comply with manufacturer's printed recommendation.**

See Section One for the existing single ply membrane and roof deck system

B. Separator Sheets: Separator sheet shall be of the type specified and to be compatible with the type of deck and membrane used. Fastening shall be as per the manufacturer's recommendations to comply with the mechanically fastened single-ply membrane. **A separation sheet will be required at between the new membrane and substrate or foam insulation board regardless of type of membrane.**

C. Membrane Installation:

1. Quality Control:

a) It will be the responsibility of the roofing contractor to initiate a Q C program to govern all aspects of the installation of the new FiberTite roofing system.

b) The job foreman and/or supervisor, will be responsible for the daily execution of the Q C program which will include, but is not limited to, the inspection and probing of all heat welding incorporated within the FiberTite System.

c) If inconsistencies in the quality of the welds are found, all work shall cease until corrective actions are taken to insure the continuity of all field and detail welding.

2. Paneled Rolls:

a) 10 FT, 15 FT, and 20 FT wide rolls shall be installed snug, but not taut,

utilizing chalk lines, and maintaining (good lay flat) characteristics.

b) Adjoining rolls shall overlap the fastened edge a minimum of 4-½ " maintaining proper roll staggering as to avoid back water seams.

c) Stagger the factory welds so that each weld falls equal distance between the factory welds on adjacent rolls. (SEE FTR-D1 FOR STANDARD ROLL LAYOUT AND FASTENER PLACEMENT).

3. Non-Paneled Rolls (53 IN. x 100 FT.):

a) When job conditions necessitate the utilization of roll roofing application procedures, follow all standard FiberTite Installation Specifications, in addition to the following:

1) Install rolls so that rolls overlap 5" to the back line of the underlying, adjacent roll.

2) Stagger the rolls so that the tails, or roll ends do not line up. (SEE FTR-D28 FOR ROLL OUT AND INSTALLATION OPTIONS)

4. Perimeter Sheets (29 IN. x 100 FT.):

a) To comply with FM I-90 Design Requirements, effective July 1, 1993, two (2) perimeter sheets shall be installed. Install parallel to all exterior roof perimeters, including parapet walls, expansion joints and other changes in the plane of the deck.

b) Install perimeter sheets square to chalk lines with proper staggering to avoid back water seams.

c) Adjoining rolls shall overlap the fastened edge a minimum of 4-½" maintaining proper staggering to avoid back water seams.

5. Attachment: **Pull out tests shall be performed by the contractor and submitted to the membrane manufacturer for determination of fastener type, lengths, and pattern.**

6. Non-Paneled Roll Attachment:

a) The following are minimum FM I-90 requirements, effective July 1, 1993, for the attachment of the 53" x 100 FT rolls. Alternative spacing requirements may be required to achieve FM equivalency ratings due to deck type, building height, fastener resistance values, and special geographic zone considerations.

(1) Side Laps:
Install fasteners and FTR barbed stress plates in a STRAIGHT LINE ON THE CENTER LINE 18 IN. O.C.

(2) Roll Ends:
Install fasteners and FTR barbed stress plates in a STRAIGHT LINE 18 IN. O.C.

7. Perimeter Sheets:

a) All perimeter sheets are to be installed by terminating the exterior edge of previously installed wood nailers by nailing with galvanized angular ring shank nails 6" o.c.

8. Fastener Placement:

a) All stress plates must set completely on the membrane allowing a minimum of ½" from the edge of the underlying membrane.

b) Allow a minimum of 2" from the edge of the stress plate to the edge of the overlapping membrane to allow sufficient room to apply the automatic welded field seam.

9. Welding:

a) All field seams exceeding 10 FT in length shall be welded with an approved automatic welder.

b) All field seams must be clean and dry prior to initiating any field welding.

c) Remove foreign materials from the seams (dirt, oils, etc.) with Acetone, MEK, or approved alternative. Use CLEAN cotton cloths and allow approximately five minutes for solvents to dissipate before initiating the automatic welder.

d) All welding shall be performed only by qualified personnel to ensure the continuity of the weld.

e) All finished seams shall exhibit a homogeneous bond a minimum of 1-1/2" in width.

D. Walkway Installation: **N.A.**

7B-11. FLASHING:

See General Roofing Provisions for re-flashing of existing items.

A. Clean all vents, pipes, conduits, tubes, walls, and stacks to bare metal. All protrusions must be properly secured to the roof deck with approved fasteners. Remove and discard all lead, pipe and drain flashings. Flash all penetrations according to approved details.

B Remove all cant strips and loose wall flashings.

C Flash all curbs, parapets and interior walls in strict accordance with approved FiberTite Details.

D. All flashing shall be totally adhered to approved substrate with FTR #201 mastic applied in sufficient quantity to insure total adhesion.

E. The base flange of all membrane flashing shall extend out on to the plane of the deck, beyond the wood nailer to a maximum width of 8".

F. Vertical flashing shall be terminated no less than 8" above the plane of the deck with approved termination bar or metal cap flashing.

G. Vertical wall flashings terminations shall not exceed 30" without additional, parallel horizontal rows of termination bar between the deck and the termination point of the flashing. Spacing between horizontal rows shall not exceed 24".

H. Complete all inside and outside corner details with FiberTite unreinforced membrane.

I. PROBE ALL SEAMS WITH A DULL, POINTED PROBE TO INSURE THE WELD HAS CREATED A HOMOGENEOUS BOND.

7B-12. CORNERS:

All inside/outside corners shall be installed in strict accordance with FiberTite Details for a complete watertight installation. Non-reinforced FiberTite membrane, either field fabrication sheets or pre-sized inside/outside corners shall be used.

7B-13. PENETRATION ACCESSORIES:

Install penetration accessories in strict accordance with approved details. Insure penetration accessories have not impeded in any way the working specification of the penetration. (Refer to the related trade for the technical specification).

7B-14. FLASHING (METAL):

A. All perimeter edge details are to be fabricated from Fiberclad Metal or an approved two piece locking system. Width shall be as required to overlap existing perimeter fascia. Existing metal fascia is to remain and it will be the roofers responsibility to protect the existing fascia from damage.

B. Insure all fascias are 4" lower than the bottom of the wood nailers.

C. Fasten all metal flashing to wood nailers or approved substrates with approved fasteners 8" o.c.

D. Break and install Fiberclad metal in strict accordance with approved details, insuring proper attachment, maintaining ½" expansion joints.

E. Install joint covers, 6" wide of same gauge fiber clad metal as drip.

F. Color of new overlapping fascia shall be dark bronze to match existing.

7B-15. EXPANSION JOINTS:

Flash all expansion joints in strict accordance with approved details. Fasten all expansion joint

material according to FiberTite specifications. Insure the expansion material has sufficient material to expand to the widest point in expansion without causing undue stress on the expansion joint material.

7B-16. SEALANT:

Apply approved sealant to all surface mounted reglets and where called for in approved details. Apply a bead of sealant large enough to fill the void entirely. Tool the sealant to shed water, following manufacturer's instructions and installation guides. Use primer when recommended by the manufacturer.

7B-17. GUTTERS AND DOWNSPOUTS:

Existing gutters and downspouts are to remain and if damage occurs during the course of construction, damage sections shall be repaired with materials matching existing.

7B-18. TEMPORARY SEALS:

At the end of each working day, or at the sign of rain, install temporary watertight seal where the exposed edge of the completed new roofing terminates at the uncovered deck or existing roof surface. If the old roof surface is covered with slag, spud back an area 6" from where the membrane will be sealed to the deck. Use a sufficient size strip of FiberTite membrane or Fiberseal tape to bridge the new membrane and the roof deck. If using FiberTite membrane, the strip must be welded to the new roofing membrane and cemented to the cleaned roof deck.

7B-20. DESIGN REQUIREMENTS:

A. General: 2024 Florida Building Code, Building (FBC-B) 7th Edition

B. Design Lateral Live Loads
   1. Wind Loads per ASCE 7-22 (3 sec gust)
   2. Ultimate Wind Speed – 125 mph
   3. Risk Category – II (2)
   4. Exposure – B
   5. Internal Pressure Coefficient – GCpi=+/-0.18

C. See components and cladding wind load diagrams and pressures on drawings, Structural Sheet S-1.0.

7B-21. INSPECTIONS:

A. Manufacturer’s technical representative shall inspect the work at the following stages:

   1. Prior to installation of the separator sheet being applied, after the insulation board has been installed and prepared to receive the separator sheet.

   2. During installation of the membrane.

3. Upon Completion of the work.

4. After each site visit, a report shall be forwarded to the General Contractor with copies to roofing contractor and Architect, verifying the time and date of inspection, work inspected and any deficiencies or corrections which were cited to be made.

5. The roofing membrane shall be inspected by the manufacturers technical representative within one year of acceptance of the building by the Owner, and shall issue a report of his findings to the Architect.

7B-22. SUBMITTAL:

Prior to beginning the work, the contractor shall submit to the Architect for approval, manufacturer's specifications for the membrane including technical data, installation instructions, etc., layout of installation stating type, number and location of fasteners, and type of fasteners for both insulation and membrane based on pull out test information for each site. Drawings are to comply with wind requirements as per 2007 Florida Building Code and **shall be signed and sealed by a Florida Registered Engineer.**

7B-23. WARRANTIES:

A. MANUFACTURER'S WARRANTY: The manufacturer shall furnish the Owner with a **Fifteen (15) Year No Dollar Limit System Warranty** against defective materials and for roofing system as specified herein including, flashing and membrane. Date of warranty to be same as date of Owner's acceptance of the work.

B. ROOFING CONTRACTOR'S WARRANTY: In addition to the manufacturer's warranty, the roofing contractor shall supply the Owner with a minimum Three (3) Year Workmanship Warranty. In the event any work related to the roofing, flashing, or metal work is found to be defective or otherwise not in accordance with the contract documents within two years of substantial completion, the roofing contractor shall remove and replace the defective materials at no cost to the Owner. The contractor's warranty obligation shall run directly to the Owner, with a copy of the warranty sent to Sarnafil.

The roofing contractor shall submit along with the guarantee a "final statement of compliance" which states that the finished roofing membrane system complies with the approved contractual documents.

END OF SECTION

SECTION 7C

WATERPROOFING, DAMPPROOFING, AND CAULKING

7C-01. GENERAL CONDITIONS:

The General and Special Conditions, Division II, Sections E and F of these specifications shall apply to and form a part of this section as if written in full herein.

7C-02. SCOPE:

The contractor shall furnish all labor and materials for waterproofing, dampproofing and caulking indicated on the drawings, as specified, and here reasonably required to make work watertight.

7C-03. WORK BY OTHERS:

All admix or liquid waterproofing of masonry and all sheet metal, water or dampproofing will be done by the respective sub-contractors.

7C-04. WALL FLASHING:

Exterior masonry walls shall be dampproofed with fabric flashing installed at mortar “cant,” over top of foundation walls, over window heads, glazed panels, and openings, as indicated on drawings or required to provide such protection. "Fabric Flashing" in the above locations shall be Type A-3 oz. flashing as manufactured by AFCO Products, Inc., or Nervastral 56 as manufactured by Nervastral Waterproofing Products.

The flashing shall be in long lengths lapped 4" at all joints and sealed watertight. At heads and sills, **extend 8" beyond jamb line** and turn up with folded corner to lead all moisture to the exterior.

All metal flashing and counter flashing shall be as indicated on drawings and as specified under "Roofing and Sheet Metal Work".

7C-05. EXTERIOR WALL WATERPROOFING:

Where shown on the drawings and/or on outside face of all concrete block walls, between brick and block and between block and fascia panels, apply one (1) coat of Sonneborn Hydrocide 600 Black Mastic Waterproofing or equal product. Application shall be by brush and coverage shall be complete from footing to top of lintel block or tie beam. Application shall be in accordance with manufacturer's recommendations. **Water proofing not to be applied on block where EIF system is called for.**

7C-06. FLOOR SLAB WATERPROOFING: (vapor barrier)

Under all interior floor slabs, install one layer of .010 "Natural Visqueen" or equal over carefully prepared porous fill, by a suitable method to prevent damage or rupturing of film. Lap all joints

8" with the top lap in the direction of the spreading of the concrete. Cut carefully around all pipe, conduit, etc., and apply pressure sensitive tape to all joints to ensure maximum barrier effectiveness as recommended by the manufacturer. Turn up at exterior walls to insure enveloping and trim after concrete pour. Inspect all surfaces after mesh is laid and repair all damage.

7C-07. METAL ROOF UNDERLAYMENT: See Section 7A-09

7C-08. CAULKING:

A. Scope: Caulk all joints between masonry and the perimeter of exterior door and window frames and similar locations in exterior walls of building wherever **indicated or specified or necessary to make weather tight.**

B. Materials: Caulking compound shall be Dow Corning 785 Silicone Building Sealant, or G.E. Construction 1200 Sealant. Substitutes other than these are acceptable with approval by the Architect prior to being shipped to the work.

C. Caulking: Joints and spaces shall be thoroughly clean and dry.

Caulking around frames of exterior openings and as may be required in masonry shall be not less than ½" deep and joints shall be raked clean and prepared to receive the compound and shall be filled. Finish joints smoothly and slightly concave.

Caulking around windows in areas where special concrete coating is to be applied shall be done prior to concrete coating. Caulking shall be left slightly recessed.

Joints having depth more than ¾" shall be packed with oakum to within ½" of the surface and carefully and filled with compound and thoroughly worked in. Material shall finish neatly against adjoining surfaces, smooth and of uniform width.

The method of application will be by means of a pressure caulking gun; in locations where a caulking gun cannot be used, the compound shall be applied with hand caulking tools.

The color of caulking shall be as selected by Architect.
Metal Thresholds: Unless otherwise specifically indicated on drawings, shall be set in full beds of caulking compound.

7C-09. THRESHOLDS AND WEATHER STRIPPING:

Covered in Finish Hardware Section, these specifications.

END OF SECTION

SECTION 8A

GLASS, GLAZING, AND WINDOWS

8A-01. GENERAL CONDITIONS:

The General and Special Conditions, Division II, Sections E and F of these specifications shall apply to and form a part of this Section as if written in full herein.

8A-02. SCOPE:

Furnish all labor, materials, and equipment and perform all operations necessary for the complete installation of all glass, glazing, windows, and store front as noted in these specifications and as shown on the drawings.

8A-03. GLAZING:

All glazing shall be done by experienced glaziers. Only high grade glazing compound shall be used. G.E. Silglaze 2400 Silicone Sealant. All surfaces to be glazed shall be clean and dry and no glazing shall be done in freezing weather. Face putty shall be smooth and of uniform width, without ripples and all corners shall be cut clean and sharp.

Rebates of glazed panels and doors shall be primed before installing glass and all glass shall be back puttied and bedded on all sides except as noted for plate glass. Heat absorbing glass shall be set as to allow free expansion and contraction of the material.

Each piece of glass shall bear the manufacturer's label of quality and the labels shall remain in place until after inspection and approval of Architect. After inspection and approval, the labels shall be removed and glass cleaned and polished, both sides.

8A-04. SAFETY STANDARDS:

All glazing shall comply with Safety Standards for Architectural Glazing 16CFR as issued by the Consumer Safety Commission. **All windows shall meet requirements for 125 mph ultimate wind speed as per the 2024 Florida Building Code and ASCE 7-10.**

8A-05. NON-SECURITY LEVEL GLASS: (STOREFRONT ONLY, See metal Clad Windows, Section 8A-06, for metal clad windows.)

PART 1 -GENERAL

1.1 SECTION INCLUDES

A. Glass and glazing units for the following products and applications, and glazing requirements referenced by other sections:
   1. Windows.

2. Doors.
3. Interior borrowed lites.
4. Glazed entrances.
5. Storefront framing.
6. Glazed curtain walls.
7. Skylights.

B. Glazing accessories.

1.2 RELATED SECTIONS

A. Division 08 Section 'Decorative Glass Glazing.'

B. Division 08 Section 'Mirrors.'

C. Division 08 Section 'Plastic Glazing.'

D. Division 08 Section 'Security Glazing.'

1.3 REFERENCES

A. American Architectural Manufacturers Association:
1. AAMA 800 - Voluntary Specifications and Test Methods for Sealants.

B. ASTM International (ASTM):
1. **ASTM C 509 -** Specification for Elastomeric Cellular Preformed Gasket and Sealing Material.
2. **ASTM C 864** - Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
3. **ASTM C 920** - Specification for Elastomeric Joint Sealants.
4. **ASTM C 1036 -** Specification for Flat Glass.
5. **ASTM C 1048 -** Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.
6. **ASTM C 1087 -** Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems.
7. **ASTM C 1115 -** Specification for Dense Elastomeric Silicone Rubber Gaskets and Accessories.
8. **ASTM C 1172 -** Specification for Laminated Architectural Flat Glass.
9. **ASTM C 1281 -** Specification for Preformed Tape Sealants for Glazing Applications.
10. **ASTM C 1330 -** Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
11. **ASTM C 1376 -** Specification for Pyrolytic and Vacuum Deposition Coatings on Glass.
12. **ASTM E 774 -** Specification for the Classification of the Durability of Sealed Insulating Glass Units.
13. **ASTM E 1300 -** Practice for Determining Load Resistance of Glass in Buildings.
14. **ASTM E** 2190 **-** Standard Specification for Insulating Glass Unit Performance and Evaluation.

C. Code of Federal Regulations:
1. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.

D. Glass Association of North America (GANA):
1. Glazing Manual.
2. Laminated Glass Design Guide.
3. Engineering Standards Manual.

E. The Insulating Glass Manufacturers Alliance (IGMA):
1. IGMA TB-3001 - Sloped Glazing Guidelines.
2. IGMA TM-3000 - Glazing Guidelines for Sealed Insulating Glass Units.

F. Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; Building Technologies Department; Windows & Daylighting Group, windows.lbl.gov/software:
1. **"LBNL Window 5.0 (or higher) - A PC Program for Analyzing Window Thermal and Optical Performance.**

G. National Fenestration Rating Council (NFRC):
1. NFRC 100 - Procedure for Determining Fenestration Product Thermal Properties.
2. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficients at Normal Incidence.
3. NFRC 300 - Procedures for Determining Solar Optical Properties of Simple Fenestration Products.

H. National Fire Protection Association (NFPA):
1. NFPA 80 - Fire Doors and Windows.
2. NFPA 252 - Fire Tests of Door Assemblies.
3. NFPA 257 - Fire Test for Window and Glass Block Assemblies.

1.4 DEFINITIONS

A. Manufacturers of Primary Glass: Firms that produce primary glass, as defined in referenced industry publications.

B. Manufacturers/Fabricators of Glass Products: Firms that utilize primary glass in the production of glass products that may include coated glass, laminated glass, and insulating glass.

C. Sealed Insulating Glass Unit Surfaces:
1. Surface 1: Exterior surface of outer lite.
2. Surface 2: Interspace-facing surface of outer lite.
3. Surface 3: Interspace-facing surface of inner lite.
4. Surface 4: Interior surface of inner lite.

1.5 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems that will withstand indicated loads and normal thermal movement without failure, including loss or glass breakage resulting from defective manufacture, fabrication, or installation; failure of glazing systems to remain watertight and airtight; or deterioration of glazing materials.

B. Glass Design: Glass thicknesses indicated are minimums. Select actual glass lite thicknesses by analyzing loads and conditions. Provide glass lites in the thicknesses and in strengths required to meet or exceed the following criteria:
1. Glass Thicknesses: Comply with ASTM E 1300, as follows:
a. Specified Design Wind Loads: As indicated.
b. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set within 15 degrees of vertical and under wind load for a load duration of **[**3**]** seconds.
c. Probability of Breakage for Sloped Glazing: 1 lite per 1000 for lites set more than 15 degrees off vertical and under wind and snow loads for a duration of **[**30**]** days.

d. Thickness of Tinted Glass: Provide the same thickness for each tint color for all applications.

C. Thermal Movements: Allow for thermal movements of glazing components and glass framing members resulting from a temperature change range of 120 deg F ambient and 180 deg F material surfaces.

D. Thermal and Optical Performance Properties: Provide glass meeting specified performance properties, based on manufacturer's published test data for units of thickness indicated, and the following:

1. Center-of-Glass Values: Per LBNL Window 5.0 (or higher) analysis, as follows:
   a. U-Factors: NFRC 100 expressed as Btu/sq. ft. x h x deg F.
   b. Solar Heat Gain Coefficient: NFRC 200.
   c. Solar Optical Properties: NFRC 300.

1.6 SUBMITTALS

A. Product Data: Manufacturer’s data sheets for each glass product and glazing material.

B. Samples: 12-inch-square, for each type of glass product, other than monolithic clear float glass **[**or clear float glass only set in insulated glass units**]**.

C. Glazing Schedule: Prepare schedule using designations used on Drawings.

D. Product Certificates: Signed by manufacturers/fabricators of glass products certifying that products furnished comply with project requirements.

E. Preconstruction Adhesion and Compatibility Test Report: From glazing sealant manufacturer, based on submitted samples or acceptable data from previous testing of current formulations with similar products.

F. Qualification Information: For Installer firm and Installer’s manufacturer/fabricator-trained field supervisor.

G. Warranties: Submit sample meeting warranties requirements of this Section.

1.7 QUALITY ASSURANCE

A. Manufacturer/Source: Obtain each type of glass product from a single primary glass manufacturer and a single manufacturer/fabricator for each glass product type.

1. For glass sputter-coated with solar-control low-e coatings, obtain glass products in fabricated units from a manufacturer/fabricator certified by the primary glass manufacturer.

B. Installer Qualifications: Experienced Installer with minimum of 5 successful completed projects of similar materials and scope, approved by glass product manufacturer/fabricator.

C. Preconstruction Adhesion and Compatibility Testing: Submit glass units, glazing materials, and glass-framing members with applicable finish to elastomeric glazing sealant manufacturer for determination of sealant compatibility, priming, and preparation requirements for optimum adhesion and performance.

D. Glazing for Fire-Rated Door and Window Assemblies: Glazing tested per NFPA 252 and NFPA 257, as applicable, for assemblies complying with NFPA 80 and listed and labeled per requirements of authorities having jurisdiction.

E. Safety Glazing Products: Comply with size, glazing type, location, and testing requirements of 16 CFR 1201 for Category I and II glazing products, and requirements of authorities having jurisdiction.

F. Glazing Industry Publications: Comply with glass product manufacturers' recommendations and the following:
   1. GANA Publications: GANA Laminated Division's 'Laminated Glass Design Guide' and GANA's 'Glazing Manual.'
   2. IGMA Publication for Insulating Glass: IGMA TM-3000, 'Glazing Guidelines for Sealed Insulating Glass Units.'

G. Insulating-Glass Certification Program: Indicate compliance with requirements of Insulating Glass Certification Council on applicable glazing products.

H. Mockups: Prior to installing glazing, build mockups to demonstrate materials and workmanship. Coordinate with mockup requirements of related sections.

I. Preinstallation Conference: Conduct conference at Project site in compliance with Division 01 requirements.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials during shipping, handling, and storage to prevent breakage, scratching, damage to seals, or other visible damage. Deliver, unload, store, and erect glazing materials without exposing panels to damage from construction operations.
   1. Comply with manufacturer's venting and sealing recommendations for shipping and handling of insulating glass units exposed to substantial altitude change.

1.9 WARRANTY

A. Warranty for Coated-Glass Products: Manufacturer's standard form, signed by coated-glass product primary manufacturer or manufacturer/fabricator, as applicable, agreeing to replace coated-glass units that display peeling, cracking, and other deterioration in metallic coating under normal use, within **[**10**]** years of date of Substantial Completion.

B. Warranty for Laminated Glass: Manufacturer's standard form, signed by laminated-glass product manufacturer/fabricator, agreeing to replace laminated-glass units that display edge separation, delamination, and blemishes exceeding those allowed by ASTM C 1172, within **[**five**]** years of date of Substantial Completion.

C. Warranty for Insulating Glass: Manufacturer's standard form, signed by insulating-glass product manufacturer/fabricator, agreeing to replace insulating-glass units that exhibit failure of hermetic seal under normal use evidenced by the obstruction of vision by dust, moisture, or film on interior surfaces of glass, within **[**10**]** years of date of Substantial Completion.

D. Installer's Warranty: Form acceptable to Owner, signed by glass product Installer, agreeing to replace glass products that deteriorate, or that exhibit damage or deterioration of glass or glazing products due to faulty installation, within **[**2**]** years of date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Glass product selections are based upon the primary glass manufacturer below. Provide basis of design product **[**, or comparable product of a listed manufacturer approved by the Architect prior to bid**]**:
   1. Vitro Architectural Glass, Cheswick, PA, (888) 774-4332, Email: ideascapes@ppg.com, http://www.vitroglazings.com.

2.2 GLASS PRODUCTS

A. Annealed Float Glass, General: ASTM C 1036, Type I, Quality-Q3, class indicated.

B. Annealed Ultra-Clear (Low Iron) Float Glass: Class I (clear).
   1. Basis of Design Product: Vitro Architectural Glass, Starphire.
   2. [Specifier: insert manufacturer of comparable product if required**]**

C. Heat-Treated Float Glass, Heat-Strengthened: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; Kind HS, of class and condition indicated: where indicated, where needed to resist thermal stresses and where required to comply with performance requirements.

D. Heat-Treated Float Glass, Fully Tempered: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; Kind FT, of class and condition indicated: where safety glass is indicated. Safety glazing must comply with ANSI Z97.1 and CPSC 16CFR-1201

E. Pyrolytic-Coated Float Glass: ASTM C 1376, float glass with metallic-oxide coating applied by pyrolytic deposition process during primary glass product manufacture.

F. Sputter-Coated Float Glass: ASTM C 1376, float glass with metallic-oxide or -nitride coating deposited by vacuum deposition process following primary glass product manufacture.

G. Ceramic-Coated Vision Glass: Float glass with silk-screened ceramic enamel application, per ASTM C 1048, Condition B, Type I, Quality-Q3, and Specification No. 95-1-31 in GANA 'Engineering Standards Manual.'

H. Ceramic-Coated Spandrel Glass: ASTM C 1048, Condition B, Type I, Quality-Q3 and GANA 'Engineering Standards Manual' 66-9-20 Specification for Heat-Strengthened or Fully Tempered Ceramic Enameled Spandrel Glass for Use in Building Window/Curtain Walls and Other Architectural Applications.

I. Coated Spandrel Float Glass: Float glass complying with ASTM C 1048, GANA 'Engineering Standards Manual' 89-1-6 Specification for Environmental Durability of Fully Tempered or Heat-Strengthened Spandrel Glass with Applied Opacifier and other requirements specified, with manufacturer’s standard opacifier material on coated second surface of lites.

J. Laminated Glass: ASTM C 1172, with manufacturer’s standard polyvinyl butyral or cured resin interlayer.

K. Insulating-Glass Units: Factory-assembled units consisting of dual-sealed lites of glass separated by a dehydrated interspace, with manufacturer’s standard spacer material and construction, per ASTM E 2190.

2.3 GLAZING ACCESSORIES

A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

B. Glazing Tape: Butyl-based elastomeric tape with integral resilient tube spacer, 10 to 15 Shore A durometer hardness, black color, coiled on release paper; widths required for specified installation, complying with ASTM C 1281 and AAMA 800 for application.

C. Glazing Tape: Closed cell polyvinyl chloride foam, maximum water absorption by volume 2 percent, designed for 25 percent compression percent for air barrier and vapor retarder seal, black color, coiled on release paper over adhesive on two sides; widths required for specified installation, and complying with AAMA 800.

D. Glazing Gaskets:
   1. Dense Compression Gaskets: ASTM C 864, neoprene or EPDM, or ASTM C 1115, silicone, or thermoplastic polyolefin rubber, as recommended by glazing product manufacturer for application, molded or extruded shape to fit glazing channel retaining slot; black color.
   2. Soft Compression Gaskets: ASTM C 509, Type II, black, molded, or extruded, neoprene, EPDM, silicone, or thermoplastic polyolefin rubber, of profile and hardness required to maintain watertight seal.

E. Setting Blocks: ASTM C 864, neoprene, 80 to 90 Shore A durometer hardness; length 4 inches, width of glazing rabbet space less 1/16-inch, height required for glazing method, pane weight, and pane area.

F. Spacer Shims: ASTM C 864, neoprene, 50 to 60 Shore A durometer hardness; length 3 inches, one half height of glazing stop, thickness required for application, one face self-adhesive.

G. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

H. Glazing Sealants: ASTM C 920, type recommended by glazing product manufacturer for application indicated, complying with requirements of Division 07 Section 'Joint Sealants,' color as selected by Architect.

I. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

J. Smoke Removal Unit Targets: Adhesive targets for application to glass, identifying glass units designed for removal for smoke control.

2.4 FABRICATION OF GLAZING UNITS, GENERAL

A. Fabricate glazing units in dimensions required, with edge and face clearances, edge and surface conditions, and bite in accordance with glazing product manufacturer/fabricator’s instructions and referenced glazing publications.

2.5 INSULATING-GLASS UNIT(S)

A. Double Glazed Tinted Solar Control Insulating Glass Unit [Solarban® 60 on Solargray® 6mm (2) | Air 1/2" (12.7mm) | Clear 6mm]
   1. Conformance: ASTM E 2190
   2. Outdoor Lite: Solargray® Tinted Float Glass as manufactured by Vitro Architectural Glass

a. Conformance: ASTM C 1036, Type 1, Class 2, Quality q3.
b. Glass Thickness: 6mm (1/4")
c. Magnetic Sputter Vacuum Deposition Coating (MSVD): ASTM C 1376.
d. Coating: Solarban® 60 on Surface # 2
e. Heat-Treatment: Heat-strengthened, ASTM C 1048, Kind HS

3. Interspace Content: Air 1/2" (12.7mm)
4. Indoor Lite: Clear float glass as manufactured by Vitro Architectural Glass
   a. Conformance: ASTM C 1036, Type 1, Class 1, Quality q3.
   b. Heat-Treatment: Heat-strengthened, ASTM C 1048, Kind HS
   c. Glass Thickness: 6mm (1/4")
5. Performance Requirements:
   a. Visible Light Transmittance: 35 percent minimum.
   b. Winter Nighttime U-Factor: 1.55 ($W/m^2*°C$) maximum.
   c. Summer daytime U-Factor: 1.55 ($W/m^2*°C$) maximum.
   d. Shading Coefficient: 0.29 maximum.
   e. Solar Heat Gain Coefficient: 0.25 maximum.
   f. Outdoor Visible Light Reflectance: 6 percent maximum.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that glazing channels are clean and ready to accept glazing installation, and that weeps are unobstructed. Confirm that minimum required face and edge clearances will be maintained. Do not proceed with glazing until unsatisfactory conditions have been corrected.

B. Examine glazing units prior to setting. Reject units that display edge or face damage that may impede performance of unit or that will be visible when installed.

3.2 PREPARATION

A. Clean glazing channels with recommended solvent and wipe dry. Apply primers to joint surfaces to ensure adhesion of sealants, unless preconstruction sealant-substrate testing indicates no primer is required.

3.3 GLAZING INSTALLATION

A. General: Install glass and glazing materials in accordance with instructions of manufacturers and requirements of GANA Glazing Manual.
   1. Install setting blocks of size and in location required by glass manufacturer. Set blocks in bed of approved sealant.
   2. Provide spacers for glass lites as recommended, based upon size of glass unit.
   3. Comply with glass manufacturer’s limits on edge pressures.
   4. Ensure that glazing units are set with proper and consistent orientation of glass units toward interior and exterior.
   5. Provide edge blocking where recommended.
   6. Install sealants in accordance with requirements of Division 07 Section 'Joint Sealants.'

B. Tape Glazing: Place tapes on fixed stops positioned to be flush or protrude slightly when compressed by glass. Install tapes continuously. Form butt joints at corners and where required, and seal tape joints with approved sealant.
   1. Apply heel bead of glazing sealant along intersection of permanent stop and frame for continuity of air and vapor seal.

2. Set glass lites centered in openings on setting blocks.
3. Install removable stops, and insert dense compression gaskets at corners, working toward centers of lites, compressing glass against tape on fixed stops.
4. Apply cap bead of elastomeric sealant over exposed edge of tape or gasket on exterior of glass unit.

C. Sealant Glazing: Install continuous spacers between glass lites and glazing stops. Install cylindrical sealant backing where recommended, in width and depth recommended to provide proper depth and width of sealant bead. Ensure sealant cannot block weep system.
1. Install sealant under pressure to completely fill glazing channel without voids, with full bond to glass and channel surfaces.
2. Tool sealant bead to proper profile providing wash away from glass.

D. Sealant Glazing for Butt Glazing:
1. Brace glass in position for duration of glazing process
2. Mask edges of glass at adjoining glass edges and between glass edges and framing members.
3. Secure small diameter non-adhering foamed rod on back side of joint.
4. Apply sealant to open side of joint in continuous operation; completely fill joint without displacing foam rod; tool sealant surface smooth to concave profile.
5. Allow sealant to cure, then remove foam backer rod.
6. Apply sealant to opposite side; tool sealant smooth to concave profile.
7. Remove masking tape.

E. Gasket Glazing: Fabricate gaskets to fit openings exactly. Allow for stretching of gaskets during installation.
1. Set soft compression gasket against fixed stop or frame, secure, with bonded miter cut joints at corners.
2. Set glass lites centered in openings on setting blocks.
3. Install removable stops, and insert dense compression gaskets at corners, working toward centers of lites, compressing glass against soft compression gaskets and to produce a weathertight seal. Seal joints in gaskets. Allow gaskets to protrude past face of glazing stops.

3.4 CLEANING AND PROTECTION

A Protect installed glass from damage. Attach streamers or warning tape to framing members, away from contact with glass. Remove nonpermanent labels.

B Protect glass from contact with contaminating substances during construction. Immediately clean glass exposed to contamination using methods recommended by glass manufacturer.

C Within 5 working days prior to inspection for Substantial Completion, clean all exposed glass surfaces using methods recommended by manufacturer. Remove glazing compounds from framing surfaces.

D Remove and replace broken or damaged glass.

8A-06. METAL-CLAD WOOD WINDOWS:

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Wood-framed, aluminum-clad windows of the following types: **single-hung and sash-set fixed**.

1.2 REFERENCES

A. General: Standards listed by reference form a part of this specification section. Standards listed are identified by issuing authority, abbreviation, designation number, title or other designation. Standards subsequently referenced in this Section are referred to by issuing authority abbreviation and standard designation.

B. American Architectural Manufacturers Association (AAMA):

1. AAMA 450 - Voluntary Performance Rating Method for Mulled Fenestration Assemblies.
2. AAMA 502 - Voluntary Specification for Field Testing of Newly Installed Fenestration Products.
3. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
4. AAMA 902 - Voluntary Specification for Sash Balances.
5. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
6. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
7. NAFS - North American Fenestration Standard/Specification for windows, doors and skylights.

C. Andersen E-Series Product Installation Guides.

D. ASTM International (ASTM):

1. ASTM C1036 - Standard Specification for Flat Glass.
2. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.
3. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
4. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.
5. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.
6. ASTM F2090 - Standard Specification for Window Fall Prevention Devices with Emergency Escape (Egress) Release Mechanisms.

E. Insulating Glass Certification Council (IGCC): Insulating Glass Unit Certification.

F. Insulating Glass Manufacturers Alliance of Canada (IGMAC) and Canadian General Standards Board (CGSB): Insulating Glass Units Standard CAN/CGSB 12.8-97.

G. International Standards Organization (ISO): ISO 14021 - Environmental Labels and Declarations -- Self-Declared Environmental Claims (Type II Environmental Labeling).

H. National Fenestration Rating Council (NFRC):

1. NFRC 100 - Procedure for Determining Fenestration Product U-Factors.
2. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.

I. U.S. Environmental Protection Agency (EPA): ENERGY STAR.

J. Window and Door Manufacturers Association (WDMA):

1. WDMA Hallmark Certification Program for Manufacturers.
2. WDMA I.S. 4 - Industry Specification for Preservative Treatment for Millwork.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance Requirements:

1. Comply with requirements of NAFS.
2. See structural drawings for wind speed and components and cladding pressures.

1.4 SUBMITTALS

A. Product Data: For each type of product required.

B. Shop Drawings: Showing methods of installation, plans, sections, elevations and details of walls, specified loads, flashings, vents, sealants, and interfaces with all materials not supplied by the window manufacturer, and identification of proposed component parts and finishes.

C. Samples: Selection and verification samples for finishes, colors and textures. Submit two complete sample sets of each type of material required.

D. Certificates: Signed by manufacturer certifying materials comply with specified performance characteristics, criteria and physical requirements.

E. Test and Evaluation Reports: Showing compliance with specified performance characteristics and physical properties.

F. Manufacturer Instructions: Manufacturer installation, storage, and other instructions.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Member in good standing of the Insulating Glass Certification Council (IGCC).
2. Hallmark Certified Manufacturer and member in good standing of the Window and Door Manufacturers Association (WDMA).
3. Member in good standing of the U.S. Green Building Council.
4. U.S. EPA ENERGY STAR Partner.
5. Capable of demonstrating an extended history of window and door design, production and innovation.

1.6 DELIVERY, STORAGE AND HANDLING

A. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

B. Deliver materials to Project in manufacturer's original unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials and accessories protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by manufacturer off ground, under cover and not exposed to weather and construction activities.

1.7 WARRANTY

A. Special Warranty: Manufacturer's transferrable, non-prorated limited warranty.

1. Warranty Period, Glass: 20 years.
2. Warranty Period, Non-Glass Parts: 10 years.

B. Special Warranty: Installer's standard form in which installer agrees to repair or replace windows that fail due to poor workmanship or faulty installation within the specified warranty period.

1. Warranty Period: 2 years from date of Substantial Completion.

PART 2 PRODUCT

2.1 METAL-CLAD WOOD WINDOWS

A. General: Provide windows complying with the performance requirements indicated and tested according to NAFS.

B. Basis-of-Design Product: Subject to compliance with requirements provide Andersen Corporation: Andersen E-Series windows.

C. Substitution Limitations: **All other manufacturers: Submit substitution request in accordance with Section 01 25 00 - "Substitution Procedures"**.

2.2 MATERIALS

A. Construction:

1. Cladding: Extruded aluminum, minimum thickness 0.050 inch (1.27 mm).
2. Frame: Preservative treated laminated veneer lumber.
3. Interior Exposed Frame: Preservative treated solid lumber, kiln dried and suitable for stain or painted finish.
4. Sash: Preservative treated solid lumber, kiln dried and suitable for stain or painted finish.

B. Wood Species: Pine

C. Interior Finish:
1. Unfinished.

D. Exterior Finish:
1. Painted Frame: Factory-applied baked-on silicone polyester enamel, in compliance with [**AAMA 2605**] [**color as selected from manufacturer's standard colors of no less than 50 options**] .
2. Painted Sash: Factory-applied baked-on silicone polyester enamel, in compliance with [**AAMA 2605**] [**color as selected from manufacturer's standard colors of no less than 50 options**].
3. Anodized Frame: Architectural quality, in compliance with AAMA 611 Class I.

2.3 WINDOW .

A. Window Type and Performance Requirements: **Single-Hung and Specialty Fixed Window as indicated in window schedule**.

B. Air Infiltration Requirements:

1. Air Infiltration Rate: **< 0.2 cfm/sf²**.

B. Environmental Certifications:

1. ENERGY STAR performance requirements.

2. Indoor air quality performance.

C. Weatherstrip:

D. Installation Flange Type: **Extruded aluminum**.

E. Hardware:
1. Sash Lock/Tilt Mechanism Type and Material: Self-latching, die-cast zinc.
2. Sash Lift Type and Material: Surface mounted, die-cast zinc.
3. Sash Lock and Sash Lift Finish: [**Bronze**] [**Gold**] [**White**] [**Black**] [**Polished Brass**] [**Antique Brass**] [**Pewter**] [**Oil-Rubbed Bronze**] [**Satin Chrome**] [**Bright Chrome**].
4. Balancer Type and Material: **Spring-loaded block and tackle** galvanized steel.
5. Jamb Liner:
    a. Type and Material: Concealed, rigid vinyl.
    b. Color: **White**.
    c. Interior Inserts: **Wood-veneered vinyl, species to match window**.
    d. Exterior Inserts: **Aluminum, color to match window**.
6. Window Opening Control Device: Provide device to restrict operable sash to less than four inches maximum clear opening and releasable, in compliance with ASTM F2090, **White**.

F. Divided Lights:
1. Full Divided Light: Permanent exterior and interior attachment, spacer between glass panes.

    a. Exterior Style: **Chamfer**.
    b. Interior Style: [**Ovolo**] [**Contemporary**]
    c. Width: [**7/8 inch (22mm)**.
    d. Pattern: **As shown in Drawings**
    e. Spacer Color: [**Match insulated glass spacer color**].
    f. Exterior Color: [**Match window**] .
    g. Interior Finish: [**Match window**]

G. Insect Screens:
1. Type: Conventional.

2. Type: Conventional **half**.

    a. Frame Material: Aluminum.
    b. Painted Finish and Color: **Color as selected by Architect from manufacturer's available exterior colors**.
    c. Insect Screen Material: **Aluminum mesh**.

H. Exterior Trim and Accessories: As required for installation conditions.

1. Type: [**2 inch Brick Mould**] [**3-1/2 inch Brick Mould**] [**2 inch Adjustable Brick Mould**] [**2 inch Ovolo Brick Mould**] [**Expandable Brick Mould with Flange**] [**Expandable Brick Mould without Flange**].
2. Type: [**3-1/2 inch Flat Casing**] [**5-1/2 inch Flat Casing**] [**3-1/2 inch Backband and Bead Casing**] [**Expandable Flat Casing**].
3. Type: [**1-1/2 inch Sill Nose**] [**1-1/2 inch Extended Sill Nose**] [**1 inch Narrow Sill Nose**].
4. Type: [**As indicated**] <**Insert requirements**>.
5. Material: Factory-applied extruded aluminum with corner keys.
6. Finish and Color: **Match windows**.

2.4 NON-IMPACT-RESISTANT GLAZING Single Hung and Fixed Sashi.

A: Thermal Transmission (U-Factor), NFRC 100

B. Solar Heat Gain Coefficient (SHGC), NFRC 200:

C. Visible Light Transmittance (VLT), NFRC 200:
1. Direct-Set Fixed: [**0.62 without grilles**] [**0.55 with grilles**] <**Insert VLT value**>.

D. Sound Transmission Class (STC)/Outdoor Indoor Transmission Classification (OITC), ASTM E90:

E. Glass Units: Provide insulating glass units certified through [**Insulating Glass Certification Council as conforming to the requirements of IGCC and ASTM E2190**].

1. Manufacturer Designation: Andersen Low-E4 Glass.
2. Glazing Configuration: **Dual-pane**.
3. Tint: **None**.
4. Seal and Spacer Type: Dual sealed insulating glass units with polyisobutylene primary seal, silicone secondary seal and stainless steel spacers.
5. Glass Spacer Color: **Black**
6. Glass Type: **Fully tempered glass, ASTM C1048**.
7. Opacity: **None**.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that all substrate conditions are suitable for installation in compliance with manufacturer's recommendations.

B. Do not begin installation until substrates have been properly prepared and any conditions not in compliance with manufacturer's recommendations have been corrected.

3.2 INSTALLATION

A. General: Comply with manufacturer's product recommendations, including but not limited to the Andersen Unit Installation Guide, installation information in product literature and on product packaging. Comply with Drawings [**and Shop Drawings**] for installing windows, hardware, accessories, and other components.

B. Install windows plumb, level and square. Anchor windows securely to structure in correct orientation to flashing and adjacent construction as indicated. Comply with product installation instructions for proper flashing integration into wall system. Install windows so as to drain water penetration to the exterior.

C. Adjust sashes, insect screens, ventilators, hardware and accessories as applicable for correct fit. Adjust weatherstrip for smooth operation and weather- tight closure.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: If requested by Owner, provide manufacturer's field service consisting of product use recommendations and periodic site visits for observation of product installation in accordance with manufacturer's recommendations.

1. Site Visits: At window installation completion.

3.4 CLEANING

A. Refer to manufacturer for guidance on timing for when best to remove protective films and non-permanent labels after installation.

B. Remove excess sealant, soiling, dirt and other substances. Clean window frame and glass surfaces. Avoid damaging coatings and finishes.

C. Touch-up, repair or replace glass or other window components broken, scratched or damaged during construction prior to Substantial Completion.

D. Remove and lawfully dispose of construction debris from Project site.

3.5 PROTECTION

A. Protect installed windows and finish surfaces from damage during construction until completion of Project and acceptance by Owner.

8A-07. ALUMINUM STOREFRONT AND SASH:

A General: All aluminum tubing shown for fixed glass windows and windows shall be equal to Kawneer TriFab II 451 UT Series, 2" x 4 ½" or Vista Wall Series 3000 2" x 4 ½". Finish shall be Class 1 – clear anodized. Aluminum storefront shall be for Thermopane glazing.

B Materials: All framing members shall be extruded aluminum of 6063-T6 alloy and temper. Exterior glazing gasket shall be E.P.D.M. and interior glazing seal shall be closed cell PVC. foam sealant tape. All mullions and horizontals for 1" glazing (except butt glazed) shall be thermally isolated from the pressure plate by a rigid vinyl separator.

C Installation: All openings shall be prepared plumb and square by others and shall be of sufficient size to provide clearance at jambs, head and sill as shown on the Architectural drawings. Experienced technicians shall perform installation, glass and glazing according to the manufacturer's recommended procedures. All units shall be securely anchored with all joints fully caulked to issue a water tight seal. Sills shall be laid in full bed of caulking and jambs and heads shall be caulked as shown on the drawings and specified elsewhere in these specifications. Installation shall be by skilled, well trained mechanics. Fastenings shall be Phillips Head Machine Screws counter sunk and of stainless steel.

D Finish: All exposed surfaces shall be free of unsightly scratches and blemishes. The exposed surfaces shall receive a caustic etch followed by an architectural class I clear anodized coating conforming to AA-M12C22A44 Vistawall 740-EC.

E Cleaning: Upon completion of construction, the General Contractor shall be responsible for cleaning all aluminum, employing methods recommended by the manufacturer as follows Anodized aluminum shall be cleaned with plain water containing a mild detergent, or a petroleum product such as white gasoline, kerosene, or distillate. No abrasive agent shall be used.

F Florida Product Approval Number: **See paragraph C above**

G Warranty: Provide standard limited two-year warranty from the date of substantial completion.

H See drawings for locations for store front and fixed glass windows.

8A-08. ALUMINUM FRAME ENTRANCE DOORS: N.A.

8A-09. ALUMINUM WINDOWS N.A.

8A-10. SKYLIGHTS: N.A.

8A-11. SHOP DRAWINGS:

Glass and glazing contractor shall furnish complete shop drawings for all items this Section for approval prior to fabrication showing all details, sizes, shapes, dimensions, etc.

Shop Drawings shall show calculations, signed and sealed by an engineer registered in the State of Florida, that all exterior glazing, windows and store front comply with 130 mph ultimate wind speed as per the 2014 Florida Building Code and ASCE 7-10.

Shop Drawings shall also include product approval number and additional test data that is required to comply with the 2014 Florida Building Code. See Supplementary and Special Conditions, Paragraph 15-6.

8A-12. CLEANING:

After Final Inspection, all remaining glazing compound and smears shall be cleaned from the glass, the sash and frames, and the glass washed clean. Broken glass shall be removed and replaced at no expense to the Owner.

8A-13 GLAZED ALUMINUM CURTAIN WALLS: N.A.

END OF SECTION.

SECTION 8B
EXTERIOR AND INTERIOR DOORS

8B-01. GENERAL CONDITIONS:

The General and Special Conditions, Division II, Sections E and F of these specifications shall apply to and form a part of this Section as if written in full herein.

8B-02. SCOPE:

Furnish all labor, materials, and equipment and perform all operations necessary for the complete installation of all glass, glazing, windows, and storefront as noted in these specifications and as shown in the drawings.

8B-03. CHAIN OPERATED SERVICE DOOR: **N.A.**

8B-04. HOLLOW METAL DOORS: See Section 8C of these specifications.

8B-05 WOOD DOORS:

All wood doors shall be sized as scheduled on the drawings and shall be equal to the following specifications for door types.

A. Hollow Core Doors: Shall be Graham seven-ply hollow core doors, 1-3/4" thick conforming to US Commercial Standard CS 171-58, including all amendments. Type I waterproof glue for exterior doors and Type II water resistant for interior doors. Hollow core doors shall be flush panel, Birch Veneer. Furnish one-year industry guarantee.

B. Solid Core Doors: Shall be Graham exterior or interior solid lumber staved core doors, 1- ¾ " thick, of sizes as noted on drawings. Doors noted for 20-minute rating shall be DGS-20 staved core. Doors shall conform to U.S.

Commercial Standard CS 171-58 including all amendments. Face veneer shall be Birch premium grade. Exterior doors shall be guaranteed for two (2) years after installation, interior doors for life of installation. Top and bottom edges to be at least 2 _" minimum hardwood, side edges to be 1¾" minimum Beech.

C. Fire Doors: Where noted on the drawings, rated or label wood doors shall be equal to Weyerhaeuser staved core DFM-60 fire door for a one-hour fire rating, conforming to industry standards I.S. 1-73. Door shall carry appropriate UL Label. Finish shall be Birch premium grade.

D. Acceptable manufacturers are US Plywood, Roddis, or Eggers Hardwood Company; supplier to furnish submittal data showing all specifications of doors to be furnished for approval by Architect.

8B-06. METAL GLASS STOPS:

All wood doors shown or noted with glass lights shall have metal stops. Stops shall be Type FGS75 for

single glazing and shall be as manufactured by Anemostat Door Products. **Install stops with stainless steel through bolts.**

8B- 07. ALUMINUM FRAME ENTRANCE DOORS: N.A.

8B-08. BULLET RESISTANT WOOD DOORS: N.A.

8B-09. PUSH UP COUNTER DOOR:

A. Furnish and install at location shown push up counter fire door equal to Series FD10-1, face of wall mounted, as manufactured by the Cookson Co., Phoenix, Arizona. Materials shall include curtains, bottom bars, guides, brackets, hood, operating mechanism, and all necessary items for a complete installation.

B. Door shall be constructed in accordance with testing agency requirements and bear a 1 ½ hour rating label.

C. Curtain shall be stainless steel slats, 22 gauge No. 10 (1 ¼" x _") slats. The bottom bar shall be tubular stainless steel 2" high x 1 ¼" deep. Guides shall be box sections of stainless steel. Brackets shall be 11 gauge steel plate. Barrel shall be steel tubing not less than 4" diameter and oil tempered torsion springs shall be capable of counter balancing the weight of the curtain. The hood shall be 24 gauge stainless steel.

D. Counter doors shall have an automatic closing device and govern to control the downward speed of the door which shall become operational upon the fusing of a 160 degree fusible link. The door shall have an average closing speed of not less than six (6) inches per second and not more than twenty four (24) inches per second as indicated in NFPA Bulletin 80. The door shall be able to be reset by one person on one side of the door only. Push up operated doors shall open and close with a maximum of 30 pounds of effort utilizing finger lifts in th bottom bar.

E. The push up door shall be secured by means of a concealed sliding bolt dead lock in the bottom bar operated by a thumb turn.

F. Furnish shop drawings for review and approval.

8B-10. PRODUCT APPROVAL NUMBERS: (METAL DOORS AND FRAMES)

Submittals for exterior hollow metal doors, metal door frames, exterior roll up doors, and exterior hollow metal window frames to have Florida Product Approval Numbers and information showing product complies with the Florida Building Code 2014. See Supplementary and Special Conditions, Paragraph 15-6 for this requirement.

Approval numbers shall be for the entire assembly (frames, doors. and hardware) including gauges of materials, set backs of hardware anchorage and installation of all components.

END OF SECTION

SECTION 8C
HOLLOW METAL DOORS AND FRAMES

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 and custom hollow metal doors and frames.
2. Steel sidelight, borrowed lite and transom frames.
3. Louvers installed in hollow metal doors.
4. Light frames and glazing installed in hollow metal doors.

B. Related Sections:

1. Division 01 Section "General Conditions".
2. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
3. Division 08 Section “Flush Wood Doors”.
4. Division 08 Section "Glazing" for glass view panels in hollow metal doors.
5. Division 08 Section "Door Hardware".
6. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc- Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic- Coated by the Hot-Dip Process.

9. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
10. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
11. ASTM E 413 - Classification for Rating Sound Insulation.
12. ASTM E1332 - Standard Classification for Determination of Outdoor-Indoor Transmission Class.
13. ASTM E1886 - Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Shutters Impacted by Missiles and Exposed to Cyclic Pressure Differentials.
14. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Windborne Debris in Hurricanes.
15. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
16. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
17. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
18. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
19. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
20. NFRC 400 – Procedure for Determining Fenestration Product Air Leakage.
21. TAS-201-94 - Impact Test Procedures.
22. TAS-203-94 - Criteria for Testing Products Subject to Cyclic Wind Pressure Loading.
23. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
24. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.

B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.

C. Shop Drawings: Include the following:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of anchorages, joints, field splices, and connections.
6. Details of accessories.
7. Details of moldings, removable stops, and glazing.
8. Details of conduit and preparations for power, signal, and control systems.

D. Samples for Verification:

1. Samples are only required by request of the architect and for manufacturers that are not current members of the Steel Door Institute.

E. Informational Submittals:

1. Hurricane Resistant Openings (State of Florida): Within the State of Florida, provide copy of current State of Florida Product Approval or Metro-Dade County Notice of Acceptance (NOA) as proof of compliance that doors, frames and hardware for exterior opening assemblies have been tested and approved for use at the wind load and design pressure level requirements specified for the Project.

a. Hurricane Resistant Components (State of Florida): Within the State of Florida, provide copy of independent, third party certified listing conforming to ANSI A250.13.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.

B. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".

C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL10C (neutral pressure at 40” above sill) or UL 10C.

1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
3. Smoke Control Door Assemblies: Comply with NFPA 105.

a. Smoke "S" Label: Doors to bear “S” label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.

D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.

E. Hurricane Resistant Exterior Openings (State of Florida including High Velocity Hurricane Zone (HVHZ): Provide exterior hollow metal doors and frames as complete and tested assemblies, or component assemblies, including approved hardware specified under Section 087100 "Door Hardware", to meet the wind loads, design pressures, debris impact resistance, and glass and glazing requirements as detailed in the current State of Florida building code sections applicable to the Project.

1. Each unit to bear third party permanent label in accordance with Florida Building Code requirements.

F. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.

1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

B. Building Information Modeling (BIM) Support: Utilize designated BIM software tools and obtain training needed to successfully participate in the Project BIM processes. All technical disciplines are responsible for the product data integration and data reliability of their Work into the coordinated BIM applications.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide steel doors and frames from a SDI Certified manufacturer:

1. CECO Door Products (C).
2. Curries Company (CU).
3. Pioneer Industries (PI).
4. Steelcraft (S).

2. MATERIALS
2

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

2. HOLLOW METAL DOORS
3

A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8 and ANSI/NAAMM HMMA 867.

B. Exterior Doors: Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Design: Flush panel.
2. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16 gauge (0.053-inch - 1.3-mm) thick steel, Model 2.
3. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
4. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
5. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

C. Interior Doors (Energy Efficient): Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A366 or 620. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Design: Flush panel.

1. Core Construction: Steel stiffened laminated core with fiberglass filler with no stiffener face welds, in compliance with HMMA 867 “Laminated Core”.

    a. Provide 22 gauge steel-stiffeners at 6 inches on-center internally welded at 5" on- center to integral core assembly, No stiffener face welding is permitted.
    b. Acoustical sound transmission rating shall be no less than STC 38 complying with ASTM E 90 and must be visible on factory applied labels.

2. Level/Model: Level 2 and Physical Performance Level A (Heavy Duty), Minimum 18 gauge (0.042 inch - 1.1-mm) thick steel, Model 2.
3. Vertical Edges: Vertical edges to be mechanically interlocked with hairline seam. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).
4. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
5. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9".
6. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

D. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Design: Flush panel.

    a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.

2. Level/Model: Level 2 and Physical Performance Level B (Heavy Duty), Minimum 18 gauge (0.042-inch - 1.0-mm) thick steel, Model 2.
3. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.
4. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
5. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

E. Manufacturers Basis of Design:

1. Curries Company (CU) - Polystyrene Core - 707 Series.

2.4 HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Thermal Break Frames: Subject to the same compliance standards and requirements as standard hollow metal frames. Tested for thermal performance in accordance with NFRC 102, and resistance to air infiltration in accordance with NFRC 400. Where indicated provide thermally broken frame profiles available for use in both masonry and drywall construction. Fabricate with 1/16" positive thermal break and integral vinyl weatherstripping.

C. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.

1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
2. Frames: Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.
3. Manufacturers Basis of Design:

    a. Curries Company (CU) – M Series.

D. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.

1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
2. Frames: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
3. Manufacturers Basis of Design:

    a. Curries Company (CU) - CM Series.
    b. Curries Company (CU) - M Series.

E. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

F. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.5 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.
3. Compression Type for Drywall Slip-on (Knock-Down) Frames: Adjustable compression anchors.
4. Windstorm Opening Anchors: Types as tested and required for indicated wall types to meet specified wind load design criteria.

B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.

C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.6 LOUVERS

A. Metal Louvers: Unless otherwise indicated provide louvers to meet the following requirements.

1. Blade Type: Vision proof inverted V or inverted Y.
2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

B. Louvers for Fire Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire protection rating of 1-1/2 hours and less.

1. Manufacturers: Subject to compliance with requirements, provide louvers to meet rating indicated.
2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

2.7 LIGHT OPENINGS AND GLAZING

A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator’s shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.

B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.

C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames.

D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.

2.8 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.9 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate,

frames for large openings are to be fabricated in sections for splicing or splining in the field by others.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.

C. Hollow Metal Doors:

1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.
2. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.
3. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
4. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".

D. Hollow Metal Frames:

1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.

    a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.

3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
8. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
9. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

        1) Two anchors per jamb up to 60 inches high.

2) Three anchors per jamb from 60 to 90 inches high.
3) Four anchors per jamb from 90 to 120 inches high.
4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.

b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

1) Three anchors per jamb up to 60 inches high.
2) Four anchors per jamb from 60 to 90 inches high.
3) Five anchors per jamb from 90 to 96 inches high.
4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.

10. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".
11. Bituminous Coating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water based bituminous or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.

E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.10 STEEL FINISHES

A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

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. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.

C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.

1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Standard Steel Doors:

a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.

c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

3.5 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.

END OF SECTION

SECTION 8D
DOOR HARDWARE

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.
2. Sliding doors.
3. Other doors to the extent indicated.

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 06 Section “Rough Carpentry”.
2. Division 06 Section “Finish Carpentry”.
3. Division 08 Section “Operations and Maintenance”.
4. Division 08 Section “Door Schedule”.
5. Division 08 Section “Hollow Metal Doors and Frames”.
6. Division 08 Section “Flush Wood Doors”.
7. Division 08 Section “Aluminum-Framed Entrances and Storefronts”.

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. ANSI/SDI A250.13 - Testing and Rating of Severe Windstorm Resistant Components for Swing Door Assemblies.
3. ASTM E1886 - Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Shutters Impacted by Missiles and Exposed to Cyclic Pressure Differentials.
4. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure difference.
5. ASTM E1996 - Standard specification for performance of exterior windows, curtain walls, doors and storm shutters impacted by Windborne Debris in Hurricanes.
6. ICC/IBC - International Building Code.
7. NFPA 70 - National Electrical Code.
8. NFPA 80 - Fire Doors and Windows.
9. NFPA 101 - Life Safety Code.
10. NFPA 105 - Installation of Smoke Door Assemblies.
11. TAS-201-94 - Impact Test Procedures.

12. TAS-202-94 - Criteria for Testing Impact and Non-Impact Resistant Building Envelope Components using Uniform Static Air Pressure.
13. TAS-203-94 - Criteria for Testing Products Subject to Cyclic Wind Pressure Loading.
14. 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. Proof of Qualification: Provide copy of manufacturer(s) Factory Trained Installer documentation indicating proof of status as a qualified installer of Windstorm assemblies.

D. 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.

E. Informational Submittals:

1. Hurricane Resistant Openings (State of Florida): Within the State of Florida, provide copy of current State of Florida Product Approval or Metro-Dade County Notice of Acceptance (NOA) as proof of compliance that doors, frames and hardware for exterior opening assemblies have been tested and approved for use at the wind load and design pressure level requirements specified for the Project.

    a. Hurricane Resistant Components (State of Florida): Within the State of Florida, provide copy of independent, third party certified listing to ANSI A250.13.

2. 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.

F. 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. Hurricane Resistant Exterior Openings (State of Florida including the High Velocity Hurricane Zone (HVHZ)): Provide exterior door hardware as complete and tested assemblies, or component assemblies, including approved doors and frames specified under Section 081113 "Hollow Metal Doors and Frames",

to meet the wind loads, design pressures, debris impact resistance, and glass and glazing requirements as detailed in the current State of Florida building code sections applicable to the Project.

1. Each unit to bear third party permanent label in accordance with the Florida Building Code requirements.

G. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

H. 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.

I. 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

J. 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. Ten years for mortise locks and latches.
2. 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).

B. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.

5. Manufacturers:

    a. Hiawatha, Inc. (HI).
    b. Rockwood (RO).
    c. Trimco (TC).

2.4 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:

1. Threaded mortise cylinders with rings and cams to suit hardware application.
2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
4. Tubular deadlocks and other auxiliary locks.
5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
6. Keyway: Match Facility Standard.

C. Keying System: Each type of lock and cylinders to be factory keyed.

1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. Existing System: Field verify and key cylinders to match Owner's existing system.

D. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).

E. Construction Keying: Provide construction master keyed cylinders.

F. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

2.5 MECHANICAL LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.

1. Manufacturers:

    a. Corbin Russwin Hardware (RU) - ML2000 Series.

B. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Operational Grade 1 Certified Products Directory (CPD) listed.

1. Vertical Impact: Exceed 100 vertical impacts (20 times ANSI/BHMA A156.2 requirements).

2. Furnish with solid cast levers, standard 2 3/4” backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt.

3. Locks are to be non-handed and fully field reversible.

4. Manufacturers:

    a. Corbin Russwin Hardware (RU) - CLX3300 Series.

2.6 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.

2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.7 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.

2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.

3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.

4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.

5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.

   a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
   b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

6. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.

7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.

8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.

9. Rail Sizing: Provide exit device rails factory sized for proper door width application.

10. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

11. Hurricane and Tornado Resistance Compliance: Conventional exit devices are to be U.L. listed for windstorm assemblies where applicable. Provide the appropriate hurricane or tornado resistant products that have been independent third party tested, certified, and labeled to meet state and local windstorm building codes applicable to project.

B. Security Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed rim panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be constructed of high grade, heat treated, corrosion resistant nickel steel alloy, and have a full 3/4" throw projection with slide action positive deadlocking.

1. Static Load Force Resistance: Minimum 3000 lbs certified independent tested.

2. Manufacturers:

    a. Corbin Russwin Hardware (RU) - ED4000S / ED5000S Series.
    b. Yale (YA) - 7050 Series.

2.8 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 (Large Body Cast Iron): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty 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 body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control.

1. Manufacturers:

    a. Corbin Russwin Hardware (RU) - DC8000 Series.
    b. Norton Rixson (NO) - 9500 Series.

2.9 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).

2.10 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).

C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

1. Manufacturers:

a. Norton Rixson (RF).
b. Rockwood (RO).
c. Sargent Manufacturing (SA).

2.11 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).

2.12 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.

2.13 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.

B. Manufacturer's Abbreviations:

1. MK - McKinney
2. RU - Corbin Russwin
3. RO - Rockwood
4. RF - Rixson
5. PE - Pemko

Hardware Sets

END OF SECTION

SECTION 8E

ALUMINUM LOUVERS AND BRICK VENTS

8E-01. ALUMINUM LOUVERS AND BRICK VENTS:

A. Manually operated louvers: Shall be in sizes and shapes as shown on the drawings equal to Construction Specialties, Inc., Aluminum Model 4830 M for manual operation. Louver blades to be storm proof type center pivoted with two reinforcing bosses. Furnish with aluminum insect screen on exterior side and an aluminum expanded metal screen on the interior side. Expanded metal shall be equal to ½", 081 standard expanded aluminum and set in a screened or heavy duty extruded aluminum frame.

Finish to be C/S Kynar 500 coating in color as selected by Architect.

B. Louvers (Fixed): Furnish and install at locations shown and in sizes and shapes shown, aluminum fixed louvers equal to Construction Specialties Model 4110 storm proof for louver widths or diameters up to 24" and Model 4130 storm proof for louver widths or diameters over 24".

All louvers to be furnished complete with C/S insect screen and an aluminum expanded metal screen on the interior side set in a screwed on heavy duty extruded frame. The expanded metal shall be equal to .081 standard expanded aluminum.

Frames and blades to be 6063-T52 alloy minimum .081" for 4110 louvers and .125" for 4130 louvers, with reinforcing bosses. Heads, jambs, and sills to be one piece structural members and to have integral caulking slot and retaining bead. All fastenings to be stainless steel.

Structural supports to be designed by C/S to carry a wind load of not less than 20 pounds p.s.f.

Finish to be C/S Kynar 500 coating in color as selected by Architect.

C. Brick Vents: Shall be in sizes as shown on the mechanical drawings and equal to Construction Specialties, Inc., Aluminum Brick Vent.

Model 22EX for 16 x 4-7/8 vents
Model 23EX for 16 x 7-3/4 vents

Vents shall include 7 x 7 mesh aluminum screen, continuous drip top and bottom, weep holes and minimum wall thickness of .125".

Coordinate with mechanical contractor for exact location and installation for proper connection to FIA duct.

Finish shall be Kynar 500 finish in color selected by Architect.

D. Motorized Louvers: N.A.

END OF SECTION

SECTION 9A

CERAMIC TILE

9A-01. GENERAL CONDITIONS:

The General and Special Conditions, Division II, Sections E and F of these specifications shall apply to and form a part of this Section as if written in full herein.

9A-02. SCOPE:

Furnish all labor, materials, equipment and services necessary and/or required to install all ceramic and quarry floor tile and base where scheduled on the drawings and as indicated. All tile patterns and colors shall be as approved and selected by the Architect. Tile work shall be performed in accordance with Standards of the Tile Council of American

9A-03. SAMPLES AND CERTIFICATES OF GRADE:

The Contractor shall submit to the Architect for approval three (3) samples of each type of tile he proposes to use. Package shall be branded with a shipping mark stating grade and shall be subject to the inspection of the Architect.

9A-04. CERAMIC FLOOR TILE:

A. Materials:

1. In Areas where noted and where shown on the Room Finish Schedule:

   a. Floor Tile: Shall be American Olean Unpolished terra pavers 12" x 12" (11 13/16" x 11 13/16") x 11/32" . In toilet rooms tile size shall be 8' x 8" (7 7/8" x 7 7/8" x 5/16"). Floor tile shall be Price Range One. Floor tile shall be non-slip

   b. Base: Shall be 6" high coved base

   c. Grout: Grout to be equal to Bonsal Epoxy Grout for tile and a sanded grout for wall tile.

   d. Tile and grout colors will be as selected by Architect.

   NOTE: In some areas two colors of tile may be used, Architect will provide the pattern to the successful bidder.

B. Installation:

1. Floor Tile: Shall be laid with a thin set grout over new and existing concrete floors and a 1/4" grout joint and installed in accordance with ATC F112-93.
Floor tile laid in rooms with floor drains to be installed so positive slope to floor drains are provided.

2. See Demolition Plan for the removal of all existing ceramic floor tile.

3. It will be the responsibility of the ceramic tile subcontractor to prepare the existing concrete floors by sanding, grouting, cleaning, etc. after the existing tile has been remove, to properly receive new floor tile.

9A-05 CERAMIC WALL TILE: N.A.

9A-06. QUARRY TILE: **N.A.**

9A-07. MARBLE THRESHOLDS:

The tile contractor shall furnish and install a marble threshold at every door opening or location where ceramic tile abut a different type of flooring and/or at any location noted on the drawings.

The marble threshold shall be 1 3/8" thick and width as required. The threshold shall be beveled and installed so the bottom of the bevel projects no more than ¼" above the surface of either adjoining flooring material.

9A-08. TOILET ACCESSORIES:

See Miscellaneous Metals and Specialities Section.

9A-09. SUBMITTAL:

Contractor to submit samples of each material specified in this section along with manufacturers catalog and specifications for each of the materials.

9A-10. CLEANING:

On completion of tile work the floor and wall tile shall be thoroughly cleaned and polished. Before any traffic is permitted on the floor the walls and floor shall be sealed in an approved two-coat application, and when sealer is dry, the entire floor area covered with 20# building paper which shall be maintained in good condition until removal just prior to the Final Inspection. Sealer shall be equal to "Clear Bond" by Guardian Chemical Company.

9A-11. GUARANTEE:

This Contractor shall furnish a guarantee of all ceramic tile materials and workmanship for a period of one (1) year from the date of final acceptance of the building.

END OF SECTION.

SECTION 9B

RESILIENT TILE AND RUBBER BASE

9B-01. GENERAL CONDITIONS:

The General and Special Conditions, Division II, Sections E and F, of these specifications shall apply to and form a part of this Section as if written in full herein.

9B-02. SCOPE:

Provide all labor, materials and equipment necessary to install new floor covering and base where shown and scheduled on the drawings and as specified.

9B-03. RESILIENT TILE FLOORING

1) GENERAL
    (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.

    (2) SUMMARY
        (a) Section Includes:
            (i) Solid vinyl floor tile.

    (3) ACTION SUBMITTALS
        (a) Product Data: For each type of product.
        (b) Sustainable Design Submittals:
            (i) Product Data: For adhesives, indicating VOC content.
            (ii) Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
            (iii) Laboratory Test Reports: For flooring products, indicating compliance with requirements for low-emitting materials.
        (c) Shop Drawings: For each type of floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
            (i) Show details of special patterns.

(d) Samples: Full-size units of each color and pattern of floor tile required.

(e) Product Schedule: For floor tile. [Use same designations indicated on Drawings.]

(4) INFORMATIONAL SUBMITTALS

(a) Qualification Data: For Installer.

(5) CLOSEOUT SUBMITTALS

(a) Maintenance Data: For each type of floor tile to include in maintenance manuals.

(6) MAINTENANCE MATERIAL SUBMITTALS

(a) Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

(i) Floor Tile: Furnish one box for every 100 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

(7) QUALITY ASSURANCE

(a) Installer Qualifications: A qualified installer with a minimum of 5 years commercial resilient flooring installation experience, and who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.

(i) Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

(b) Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

(i) Build mockups for floor tile including resilient base and accessories.

1. Size: Minimum 100 sq. ft. (9.3 sq. m) for each type, color, and pattern and locations as shown on drawings.

(ii) Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

(iii) Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

(8) DELIVERY, STORAGE, AND HANDLING

(a) Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C). Store floor tiles on flat surfaces.

(9) FIELD CONDITIONS

(a) HVAC system should be operational and running for a minimum of 7 days prior to resilient tile installation and remain running after resilient tile installation.

(b) Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F (18 deg C) or more than 85 deg F (29 deg C), in spaces to receive floor tile during the following time periods:

(i) 48 hours before installation.
(ii) During installation.
(iii) Permanently after installation.

(c) Close spaces to traffic during floor tile installation.

(d) Close spaces to traffic, all heavy rolling loads, and point loads for 48 to 72 hours after floor tile installation.

(e) Install floor tile after other finishing operations, including painting, have been completed.

(10) WARRANTY

(a) Special Warranty for Resilient Tile; Manufacturer agrees to repair or replace defective material within specified warranty period.

(i) Warranty does not include installer's workmanship.
(ii) Resilient tile must be installed and maintained according to manufacturer's recommendations.
(iii) Warranty Period:
1. Manufacturing Defects Warranty: 10 years.
2. Limited Commercial Wear Warranty: 10 years.
3. Under bed Warranty: 10 years. (Requires Shaw 4100 or S150 adhesive.)

2) PRODUCTS

(1) PERFORMANCE REQUIREMENTS

(a) Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

(i) Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

(b) Flooring products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

(2) SOLID VINYL FLOOR TILE

(a) Basis-of-Design Product: Subject to compliance with requirements, provide Patcraft Typeface I312V.

(b) Tile Standard: ASTM F 1700.

(i) Class: Class III, printed film vinyl tile.
(ii) Type: A Smooth.

(c) Overall Thickness: 0.098 inch (2.5 mm).

(d) Wear Layer: 20 mil (0.5 mm) ExoGuard™ Quatrz Enhanced Urethane.

(e) Wear Layer Thickness: 0.020 inch (0.5 mm).

(f) Size: 23-5/8 by 23-5/8 inches (600mm by 600 mm).

(g) Colors and Patterns: As selected by Architect from full range of manufacturer's designations.

(h) Test Data:

(i) Slip Resistance: ASTM D 2047, ADA Compliant.
(ii) Static Load, ASTM F 970: 2000 psi (lbs.sq.in) – 0.005 in.
(iii) Residual Indentation, ASTM 1914: Passes <8%
(iv) Flexibility, ASTM F 137: Passes.
(v) Dimensional Stability: Federal Standard #501A, Method 6211 >0.02”/ft.
(vi) Resistance to Heat, ASTM F 1514: Passes.
(vii) Resistance to Light, ASTM F 1515: Passes.
(viii) Resistance to Chemicals, ASTM 925: Passes.
(ix) Resistance to Fungi, ASTM G 21: Passes, Rate zero (Rate zero: Fungi Free).
(x) Antibacterial Activity, AATCC 147: Passes, resists the propagation of bacteria.
(xi) Radiant Flux, ASTM E 648: greater than 0.45 watts/cm, NFPA Class I.
(xii) Smoke Density, ASTM E 662: less than 450, Passes.

(3) INSTALLATION MATERIALS

(a) Trowel-able Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.

(b) Adhesives: Water-resistant adhesive such as the Shaw 4100 or Shaw S150 to suit floor tile and substrate conditions indicated.

(i) Adhesives shall have a VOC content of 50 g/L or less.
(ii) Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

(c) Floor Polish: Floor Finish is optional. If floor finish is desired, provide protective, neutral pH liquid floor-polish products recommended by floor tile manufacturer.

3) EXECUTION

(1) EXAMINATION

(a) Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

(i) Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

(b) Proceed with installation only after unsatisfactory conditions have been corrected.

(2) PREPARATION

(a) Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.

(b) Concrete Substrates: Prepare according to ASTM F 710.

(i) Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
(ii) Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
(iii) Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 10 pH.
(iv) Moisture Testing: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:

1. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates are below 90 percent relative humidity level.

(c) Fill cracks, holes, and depressions in substrates with trowel-able leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

(d) Do not install floor tiles until they are the same temperature as the space where they are to be installed.

(i) At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

(e) Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

(3) FLOOR TILE INSTALLATION

(a) Comply with manufacturer's written instructions for installing floor tile.

(b) Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

(i) Lay tiles square with room axis.

(c) Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

(i) Lay tiles in pattern of colors and sizes indicated.

(d) Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

(e) Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

(f) Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

(g) Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

(h) Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids,

raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

(4) CLEANING AND PROTECTION

(a) Comply with manufacturer's written instructions for cleaning and protecting floor tile.

(b) Perform the following operations immediately after completing floor tile installation:

(i) Remove adhesive and other blemishes from exposed surfaces.
(ii) Sweep and vacuum surfaces thoroughly.
(iii) Damp-mop surfaces to remove marks and soil.

(c) Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

(d) Optional Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.

(e) Cover floor tile until Substantial Completion.

9B-04. CARPET TILE N.A.

9B-05. RUBBER BASE:

Where noted, base shall be 4" high **rubber** base equal to Roppe or Johnsonite. **Internal and external corners shall be premolded**. Apply with full bed of mastic so base adheres uniformly to wall surface. Color to be selected by Architect.

9B-06. GUARANTEES:

This Contractor shall furnish a 2-Year Guarantee for workmanship and installation and defective materials for the installation of all the floor covering specified in this section, and in addition, shall furnish a 10-Year Warranty from the carpet manufacturer for delamination, edge ravel and excessive wear. Guarantees to be dated date of acceptance of building.

9B-07. RESILIENT ATHLETIC FLOORING: N.A.

END OF SECTION.

SECTION 9D

ACOUSTICAL TREATMENT

9D-01. GENERAL CONDITIONS:

The General and Special Conditions, Division II, Sections E and F of these specifications shall apply to and form a part of this Section as if written in full herein.

9D-02. SCOPE:

The work to be done under this heading includes the furnishing of all labor, equipment, services, and materials necessary for, or reasonably incidental to, making a complete installation of the suspended acoustical tile ceilings in strict accordance with these specifications and/or as indicated on the drawings. No deviation from these specifications shall be allowed unless approved by the Architect in writing prior to bid date. All acoustical materials and suspension systems shall be installed by a subcontractor thoroughly experienced in this type of work and approved by the manufacturer. **It shall be the responsibility of the acoustical contractor to provide adequate support for the light fixtures and it shall be this contractor's responsibility to coordinate his work with the electrical and mechanical contractors. This contractor is to arrange for adequate anchorage to the frame system.**

9D-03. NON-BEVELED EDGE SUSPENDED GRID LAY IN TILE CEILING SYSTEM: **N.A.**

A. Grid System: Shall be Prelude XL 15/16" suspended exposed tee grid as manufactured by Armstrong World Industries, Inc.

1. Components: All main beams and cross tees shall be commercial - quality hot dipped galvanized steel. Exposed surfaces chemically cleansed, capping prefinished in baked polyester pain. Main beams and cross tees are double-web steel construction with 15/16" type exposed flange design column strength and staked-on end detail allowing easy cross tee removal and remounting. Main beams shall be 1 ½" spaced not more than 4'0" o.c. Cross tees shall be 1 ½". Wall molding shall be #7800 with ½ " exposed flange. Hanger wire shall be 12-gauge galvanized carbon steel.

2. Finish: All steel roll-formed parts, including cap, shall be chemically cleansed. Capping shall be prefinished in a baked polyester paint finish. Color shall be WHITE and match the actual color of the selected ceiling tile, unless other specified. Off white not acceptable.

B. Ceiling Lay-in Tile Units:

1 Lay-in tile units shall be Armstrong Mineral Fiber Ceiling Tile Units, Georgian #764 Pattern with and exposed grid system, Humiguard Plus, 24" x 24" x ⅝". Tile units shall be Class "A". Have a light reflectance of LR-1 (over 75%), and N.R.C. range of .50-.60, and an STC range of 35-29.

9D-04. BEVELED EDGE SUSPENDED GRID LAY IN TILE CEILING SYSTEM: N.A.

9D-05. KITCHEN ZONE, SUSPENDED GRID LAY IN TILE CEILING SYSTEM:

A. Grid System: Shall be Prelude XL 15/16" suspended exposed tee grid as manufactured by Armstrong World Industries, Inc.

1. Components: All main beams and cross tees shall be commercial - quality hot dipped galvanized steel. Exposed surfaces chemically cleansed, capping prefinished in baked polyester pain. Main beams and cross tees are double-web steel construction with 15/16" type exposed flange design column strength and staked-on end detail allowing easy cross tee removal and remounting. Main beams shall be 1 ½" spaced not more than 4'0" o.c. Cross tees shall be 1 ½". Wall molding shall be #7800 with ⅞" exposed flange. Hanger wire shall be 12-gauge galvanized carbon steel.

2. Finish: All steel roll-formed parts, including cap, shall be chemically cleansed. Capping shall be prefinished in a baked polyester paint finish. Color shall be WHITE and match the actual color of the selected ceiling tile, unless other specified. Off white not acceptable.

B. Ceiling Lay-in Tile Units:

1 Lay-in tile units shall be Armstrong Kitchen Zone, Smooth Texture Square Lay-in Tile #673, 24" x 24" x _" with the following characteristics:

Acoustical Performance	CAC Rating 33
Fire Rating	Class A
Light Reflectance	0.89
Anti-Mold & Mildew	Bio-Block High Level of Performance
Sag Resistance	Humi Guard High level of Performance
VOC Emissions	Certified Low Level
Durability	Water Repel. Scratch Resistant, Soil Buildup Resistant, & Washable
Warranty	30 years

9D-06. ACOUSTICAL CEILING TILE TRIM: N.A.

9D-07. INSTALLATION AND COORDINATION:

Main "T" runners shall be of not more than 48" centers and supported by 12-gauge wire to joist or structural system members (no hanging from ducts, piping, etc.); use unistrut members where required. Each corner of light fixture shall also be supported by hanger wires. "T" spline intersecting moldings shall be locked in place. All runners and splines shall be straight or in alignment and flush at intersections. **Edge molding shall be mitered at all corners, internal and external.**

Exterior doors shall be hung, and all doors and windows glazed and all wet work completely dry before starting this work. Areas shall be broom clean before proceeding with this work.

The contractor shall extend complete coordination to and with the mechanical and electrical contractors in coordination of the work. Tile shall be centered one room and lighting fixtures, and ceiling grilles shall be centered in tiles. A reflected ceiling plan is included in the architectural drawings, and it is the responsibility of the ceiling sub- contractor to verify their

accuracy and to bring to the Architect's attention any areas that will create shifting of grid or mechanical or electrical items.

9D-08. EXTRA TILE: **N.A.**

9D-09. ACOUSTICAL WALL PANELS: N.A.

A. Furnish and install, in locations, and in sizes and arrangements as shown, acoustical wall panels equal to Armstrong Soundsoak wall panels. Panels shall comprise a fiberglass composition substrate, 1" thick with fabric facing and an “H” spline system for installation.

Fabric shall be Rhythms 85 in color as selected by Architect.

Panels shall have a flame spread rating of 25 or less and a composite smoke-developed rating of 200 or less in accordance to ASTM-E-84. Panels shall have a noise reduction co-efficient (NRC) of .80 in “A” mounting system.

B. All vertical joints between panels shall be flush with face of panels. Install “J” moldings around all outside edges of wall panels in color as selected by Architect.

C. Furnish submittal for approval and fabric samples for color selection.

9D-10. ACOUSTICAL BARREL DIFFUSERS N.A.

9D-11. CLEAN-UP:

The Contractor shall remove all debris, scrap, etc., from the site upon completion of his work. Tile shall be free of fingerprints, smudges, and present a uniform color, clean and level. Any tile found to contain smudges, chips, etc., shall be removed and replaced with new tile.

9D-12. GUARANTEE:

This contractor shall guarantee in writing the materials and workmanship for a period of two (2) years after final acceptance of the building.

9D-13 EGG CRATE CEILING:

Where called for in the drawings, egg crate ceilings shall be equal to white polystyrene egg crate louver, injection molded as ½” thick x ½” x ½” square cell ceiling diffuser as manufactured by 1800 Ceilings at 555 Oak Street Copiague, NY 11726, (516) 221-1484.

END OF SECTION.

SECTION 9E

PAINTING

9E-01. GENERAL CONDITIONS:

The General and Special Conditions, Division II, Sections E and F of these specifications shall apply to and form a part of this Section as if written in full herein.

9E-02. SCOPE:

Furnish all labor, materials, equipment and services necessary and/or incidental to do all painting and decorating under this Contract.

In general, but not limited to, this contractor will include:

A. Three (3) coats of paint on all new work exterior and interior, including plaster, stucco, sheetrock, block masonry walls, trim, and metal.

B. Finishing of all cabinet work and paneling except that which is covered by plastic laminate, or that which is finished at the mill.

C. Epoxy coating of all walls and ceilings where called for on the schedule.

D. Painting of concrete floors where called for on the drawings.

9E-03. GENERAL REQUIREMENTS:

Mix all paints at least seventy-two (72) hours before using, keeping the containers covered during this period. Mix well before using. All paint to come to the job in their original containers, and to be Sherwin- Williams, ICI Coatings, Pittsburgh, or Pratt and Lambert.

Painter to mix samples of stains and colors and have Architect's approval before applying. All surfaces to receive paint, varnish, etc., shall be clean, smooth, free from dust, scratches, and to be thoroughly dry before applying paint.

The edges including the top and bottom edges of all doors which paint at the job site shall be finished as called for, and shall be touched up after the carpenter has made the final adjustments.

No paint shall be applied to wet or damp surfaces, nor shall any paint be applied to any surface when the temperature is below 50 degrees F.

All painting and decorating to be done by experienced workmen, and the finished work shall be free from runs, sags, scratches, and brush marks, and shall be uniform in color.

Application of a paint by spray not allowed other than glaze or multicolor coats as called for. All wood and trim to be painted by brush only.

9E-04. APPLICATION:

A. No coat shall be applied until the preceding one is thoroughly dry, and no paint shall be applied when temperature is 50 degrees F., or below, or when surfaces are damp. All paint shall be evenly spread and well brushed or sprayed as noted, or so as to accomplish best results. All paints, stains, etc., shall be mixed and applied according to manufacturer's directions, and each coat shall be sanded as required before the succeeding coat is applied.

B. All raw spots of wood frames, interior millwork, to be primed at mill shall be touched up with similar material immediately after being placed. All knots, sap, and pitch streaks shall be brush coated with shellac before priming coat is applied. Prime all wood which is to be covered with metal unless same has been treated with wood preserver.

C. Concrete masonry walls where called for to be painted shall be first examined for excess mortar, pointing up of joints, etc.

D. All rust spots, scratches, blemishes, etc., on metal door frames and exposed metal work through the building, shall be worked to the base metal with steel wool, the spots primed, and when dry.

E. Natural finish wood doors surfaces to be sanded with #320 wet or dry paper and rubbed with 4/0 steel wool between each coat.

F. Epoxy Coating Finish: Where called for on the finish schedule, epoxy coating shall be as per Paragraph 16-11, this section.

9E-05. PUTTYING:

After the priming coat has been applied, all nail holes and voids of any kind are to be puttied flush with the surfaces. Excess putty shall be removed from the surfaces before succeeding coats of paint are applied.

9E-06. EXTERIOR PAINTING:

A. All exposed metal, trim, frames, doors, miscellaneous steel and iron, galvanized iron:

1. One Coat Primer: ICI Devoe Coatings DevGuard 4160 Multi-Purpose Tank and Structural Primer or one coat of Sherwin Williams Kerm Kromik Metal Primer and one coat of Sherwin Williams Galvite for Galvanized Irons.

2. Two Coats Finish: ICI Devoe Coatings DevGuard 4308 Alkyd Gloss Enamel. Or two coats of Sherwin Williams Industrial Enamel B-54.

B. All exposed wood and wood trim:

1. One Coat Primer: ICI Ultra-Hide Durus 2110 Exterior Alkyd Primecoat or one coat of Sherwin Williams A-100 Primer.

2. Two Coats Finish: ICI Dulux Professional 2402 Exterior 100% Acrylic Satin Finish or Sherwin Williams K33W100 Satin Latex House.

C. Exposed concrete block, concrete, and cement stucco:

1. One Coat Primer: (for concrete block only) ICI Ultra-Hide 3010-1200, Interior Exterior Vinyl Acrylic Block Filler or Sherwin Williams Heavy Duty Acrylic Block Filler B42W46.

2. Two Coats Finish: ICI Dulux Professional 2402 Exterior 100% Acrylic Satin Finish or Sherwin Williams A24W351 Satin Latex House Paint.

9E-07. INTERIOR PAINTING:

A. Exposed Iron and Steel Metals:

1. One Coat Primer: ICI Ultra-Hide 1120-1200 Oil / Alkyd Interior Enamel Undercoater or Sherwin Williams Kem Kromik Metal Primer.

2. Two Coats Finish: ICI Ultra-Hide 1416 Latex Semi-Gloss Interior Wall and Trim Enamel or two coats Sherwin Williams Promar 200 Latex Semi-Gloss Enamel.

B. Wood Trim (other than natural finish):

1. One Coat Primer: ICI Ultra-Hide 1120-1200 Oil / Alkyd Interior Enamel Undercoater or Sherwin Williams Classic Wall and Wood Primer B28-W101.

2. Two Coats Finish: ICI Ultra-Hide 1416 Latex Semi-Gloss Interior Wall and Trim Enamel or Sherwin Williams Promar B-31 200 Semi-Gloss.

C. Sheetrock Walls:

1. One Coat Primer: ICI Ultra-Hide 1030-1200 PVA Interior Primer Sealer or Sherwin Williams Promar 200 Series B-28.

2. Two Coats Finish: ICI Ultra-Hide 1412 Latex Eggshell Interior Wall and Trim or Sherwin Williams Promar 200 Latex Semi-Gloss Enamel B-31.

D. Exposed Masonry Block:

1. One Coat Primer: ICI Ultra-Hide 3010-1200 Interior / Exterior Vinyl Acrylic Blockfiller or Sherwin Williams Heavy Duty Acrylic Block Filler B42W46.

2. Two Coats Finish: ICI Ultra-Hide 1412 Latex Eggshell Interior Wall and Trim Enamel or Sherwin Williams Promar 200 Latex Semi-Gloss Enamel B-31.

E. Epoxy Coating Finish: Where called for on the finish schedule, epoxy coating shall be as per Paragraph 16-11, this section.

9E-08. NATURAL FINISH:

A. Where selected or called for on wood trim or doors or millwork items:

1. One coat of Lacquer Sealer and two coats of Gloss Lacquer or two coats of ICI Woodpride 1902 Interior Polyurethane High Gloss Varnish.

9E-09. STAINED FINISH:

A. Where selected or called for on wood trim or wood doors or millwork items:

1. One Coat: ICI Woodpride 1900 Interior Oil Wood Finishing Stain or one coat of Olympic Clear Interior Stain.

2. One Coat: Lacquer Sealer or Sanding Sealer Well Sanded.

3. Two Coats: ICI Woodpride 1902 Interior Polyurethane High Gloss Varnish or two coats of Gloss Lacquer.

9E-10. SEALED CONCRETE FLOORS:

A. Where called for on the drawings and finish schedule concrete floors shall be painted with H&C shield plus paint as manufactured by the Sherwin-Williams Company Cleveland, Ohio. (Technical Service Phone - 1-800/867-8246) or two coats of Anvil Concrete 1900 Siliconized Acrylic Concrete Stain.

B. Concrete floor areas to receive paint shall be at least 45 days old, shall be clean and completely free of all grease, oil, loose or chalking paint, chalking concrete, dirt, etc.

Floor areas to be first cleaned with detergent and degreaser and thoroughly rinsed.

C. Apply first coat of paint, let dry two (2) hours and apply 2nd coat. Paint maybe applied by brush, roller, or airless sprayer.

Do not apply in temperature below 50 degrees F or above 90 degrees F.

D. Color to be selected by Architect.

9E-11. EPOXY COATING FINISH: N.A.

9E-12. SANDING AND FINISHING:

It will be the responsibility of the painting contractor to hand sand all surfaces to be painted and otherwise prepare them to provide a smooth finish paint job. All corners to be "eased", nail holes filled and painted surfaces prepared and approved after prime coat is applied. The second coat of paint must be completed and approved before final coat is started in any area. Repainting of any area required because of poor coverage, sags, voids, poorly prepared surfaces, etc., will require the repainting of the entire wall area. No patch painting will be accepted.

9E-13. APPLICATION OF COATS:

Work shall be limited to specific areas of construction to facilitate inspection and progress, and no succeeding coat will be applied in any area until the prime coat or first coat has been inspected and approved for the entire area.

Prime coat will be white. Second coat tinted toward color, and final coat from can in color selected.

9E-14. SUBMITTAL:

Painting contractor to submit technical information for the various types of paint used along with color sample box for color selection.

9E-15. GUARANTEE:

Painting contractor shall guarantee in writing his material and application for a period of one year from date of acceptance of building.

END OF SECTION.

SECTION 9F

METAL STUD AND DRYWALL SYSTEM

9F-01. GENERAL CONDITIONS:

The General and Special Conditions, Division II, Sections E and F of these specifications shall apply to and form a part of this Section as if written in full herein.

9F-02. SCOPE:

Furnish all labor, materials and equipment and perform all operations necessary for the complete installation of all metal studs and drywall applications as noted in these Specifications and as shown on the Drawings.

9F-03. GENERAL:

Screw stud system shall be generally for single layer of ⅝" fireguard sheetrock, or ⅝" sheetrock in interior walls, ½" exterior plywood or exterior gypsum board for backing for E.I.F. system, or for thermoply and backing for face brick. Steel stud system shall be equal to 3 ⅝" and 6" screw stud system as manufactured by U.S. Gypsum Company. Note drawings for other special wall thicknesses. All studs shall be galvanized steel and spaced 16" o.c.

9F-04. MATERIALS:

1. Studs -3 ⅝", 6" or 8" where shown. 16 gauge at door jambs and head. 20 gauge where used for framing for interior walls or where drawings indicate. 18 gauge where framing at exterior walls. Walls above or below window and door openings and for any framing where connections are welded if not indicated heavier shall be 18 gauge.

2. Runners - Sized for studs 22 gauge.

3. Face Boards - ⅝" " fire guard where noted (see drawings for double layers), and ⅝" " regular for other partition walls. Where ceramic tile is called for on metal stud construction wall boards shall be ½" Durock Board as manufactured by U.S. Gypsum.

4. Fasteners - USG screws of required length.

5. Joint Treatment - tape regular and flex tape.

6. Z galvanized metal furring strips ¾" and 1".

7. ¾" E.P.S. insulation board.

8. Galvanized hat channels (see drawings for sizes).

9. Galvanized corner beads. Galvanized “J” molding at all face ends

10. Sheetrock equal to National Gypsum Co. Wallboards ⅝" " thick fire guard for all rated walls, ⅝" " thick for interior walls and for ceilings where called for.

11. See EIFS section for exterior EIFS sheathing.

9F-05. INSTALLATION:

A. Exterior Framing:

1. Studs and Runners:

a. Align runners accurately according to exterior wall layout and secure to base and head with power-driven fastener spaced 16" o.c.

b. Position studs vertically in runners at floor and ceiling to structural elements with suitable fasteners located 2" from each end and spaced 24" o.c., or to suspended ceilings with toggle bolts or hollow wall anchors spaced 16" o.c.

c. Exterior block wall furring strips to be installed 2'0" o.c. with ¾" E.P.S. Board positioned tightly between the furring strips. Furring strips to be secured to block walls with power driven fasteners spaced no further than 16" o.c.

B. Interior Walls:

1. Stud System Erection: Attached steel runners at floor and ceiling to structural elements with suitable fasteners located 2" from each end and spaced 24" o.c., or to suspended ceilings with toggle bolts or hollow wall anchors spaced 16" o.c.

Position studs vertically, with open side facing in same direction, engaging floor and ceiling runners, and spaced 16" o.c. When necessary, splice studs with 8" nested lap and two positive attachments per stud flange. Place studs in direct contact with all door frame jambs, abutting partitions, partitions corners and existing construction elements. here studs are installed directly against exterior walls, and a possibility of water penetration through walls exists, install asphalt felt strips between studs and wall surface.

Anchor all studs for shelf-walls and those adjacent to door and window frames, partition intersections, corners and free-standing furring to ceiling and floor runner flanges with USG Metal Lock Fastener tool or screws. Securely anchor studs to jamb and head anchor clips of door or borrowed-light frames by bold or screw attachment. Over metal door and borrowed-light frames, placed horizontally a cut-to length section of runner, with a web-flange bend at each end, and secure to strut-studs with two screws in each bent web. Position a cut-to-length stud (extending to ceiling runner) at vertical panel joints over door frame header.

2. Gypsum Panel Erection: Apply gypsum panels perpendicular to studs. Position all edges over studs for parallel application; all ends over studs for perpendicular application. Use maximum practical lengths to minimize end joints. Fit ends and

edges closely, but not forced together. Stagger joints on opposite sides of partition.

For one hour rated walls between units, screw size and spacing shall be in accordance to requirement for a one-hour rating.

For single-layer parallel application of gypsum panels, space screws 16" o.c. in field of panels and along vertical abutting edges. For perpendicular panel application, space screws 16" o.c. in field and along abutting end joints. For double-layer screw attachment, space screws 24" o.c. in base layer and 16" o.c. in face layer. Apply both layers of gypsum panels vertically with joints in face layer offset from base layer joints. For ½" and ⅝" " panels, use 1" screws for base layer and 1- ⅝" " screws for face layer.

For stud walls where ceramic tile is called for ½" Durock Board shall be installed in accordance with ATC. All joints shall be properly taped and the contractor shall inspect application of wall board for proper secureness to see that all joints of the wall board occur at wall anchored studs. All joints to be taped full length of cement board.

3. Chase Wall Erection: Align two parallel rows of floor and ceiling runners spaced apart as detailed. Attach to concrete slabs with concrete stud nails or power-driven anchors 24" o.c. to suspended ceilings with toggle bolts 16" o.c., or to wood framing with suitable fasteners 24" o.c.

   Position steel studs vertically in runners, 16" o.c. with flanges in the same direction, and with studs on opposite sides of chase directly across from each other. Anchor all studs to floor and ceiling runner flanges with USG Metal Lock Fastener tool or screws.

   Cut cross bracing to be placed between rows of studs from gypsum panels, 12" high by chase wall width. Space braces 48" o.c. vertically and attach to stud webs with six (6) 1" Type S Screws per brace. If larger braces are used, space screws 8" o.c. max. On each side.

   Bracing of 2- ½" steel studs may be used in place of gypsum panels. Anchor web at each end of steel brace to stud web with two (2) ⅝" pan head screws. When chase wall studs are not opposite, install steel stud cross braces 24" o.c. horizontally and securely anchor each end to a continuous horizontal 2- ½" runner screw-attached to chase wall studs within the cavity.

C. Finishing: Gypsum board shall be finished according to manufacturer's recommendations with a complete system of taping, joint compound, sanding, etc. Use pre-fabricated outside and inside corner metal reinforcement. Joints, nails or other imperfections that are visible will be cause for rejection. Use "J" molding at all sheetrock panel ends.

END OF SECTION.

SECTION 9G

EXTERIOR INSULATION FINISH SYSTEM (E.I.F.S.)

9G-01. GENERAL AND SPECIAL CONDITIONS:

The General and Special Conditions, Division II, Sections E and F of these specifications shall apply to and form a part of this Section as if written in full herein.

9G-02. SCOPE:

The Contractor shall furnish all labor, materials, and equipment to complete the installation of the synthetic exterior insulation finish system as shown on the drawings and as specified in these specifications.

9G-03. QUALIFICATIONS:

Application shall be by qualified subcontractor and shall be able to present evidence of past projects using material submitted with name of project, date, location, and General Contractor name and phone number.

9G-04. MATERIALS:

A. General: Specifications are written around Sto Industries Incorporated Specifications. The Architect will consider substitutions for brand names of equal products. **Procedures for substituting shall be as per specifications, Instructions to Bidders, Paragraph B-5.**

B. System: Shall be Sto. System One Specification A-100 for application over stud wall construction and Specification A-200 for installation over concrete block walls. Equal systems by Senergy (Senerflex System) and / or Finestone are acceptable. All others are to be treated as above for substitutions.

C. Surface Preparation:

Sto Grundex - a deep penetrating, solvent-based substrate hardener and sealer, as manufactured by STO Industries, Inc.

Sto Plex - a solvent-based surface sealer and adhesion intermediary, as manufactured by STO Industries, Inc.

D. Adhesive:

1. STO ADH - a copolymer-based adhesive and leveler as manufactured by STO Industries, Inc., mixed 1:1 with Type 1 Portland Cement.

2. STO BTS-A (Alternate Adhesive) - a copolymer-based adhesive as manufactured by STO Industries, Inc., mixed with 20% by weight of Type 1

Portland Cement. Use where maximum flexibility is required. Because of its low cement content, interaction is minimized and flexibility maximized.

3. STO BTS-B - a polymer-based ground coat and leveler when mixed with 7-10 quarts of clean water.

4. Where applied on stud wall construction - STO DISPERSION ADHESIVE -a non-cementitious, ready-mixed 100% acrylic copolymer emulsion-based adhesive that is waterproof and vapor permeable, as manufactured by STO Industries, Inc.

E. Insulation Board: Expanded Polystyrene (EPS Board) less than 25 flame spread, 1.0 lbs./cu. ft. average density; U=0.26 per inch; ASTM C578-85 Class A. Thickness shall be generally 1" as shown or 1½" or greater where shown. Maximum size of EPS shall not exceed 2' x 4', board shall be manufactured by licensed EPS molder and each board shall bear identification mark. Insulation board shall be grooved on the backside to allow water to drain.

F. E.I.F. System Sheathing: Shall be ½" DENS-Glas Gold sheetrock backing manufactured by Georgia Pacific.

G. Ground Coat:

1. STO RFP - a ready-mixed, noncementitious, 100% acrylic copolymer emulsion-based, water resistant, vapor permeable, glass fiber reinforced non-capillary action ground coat. Tint same shade as finish.

2. STO BTS-A - a copolymer-based ground coat and leveler when mixed with 20% Type 1 Portland Cement by weight. Prior to application of any STO finish over STO BTS-A, STO PRIMER shall be applied as an adhesion intermediary providing water resistance. Tint to the same shade as finish.

3. STO BTS-B - a polymer-based ground coat and leveler.

H. Fabric:

1. On all surfaces **6 Ft above finish floor level and above**, fabric shall be STO REINFORCING FIBER MESH, with symmetrical interlaced glass fiber made from twisted multi-end strands, styrene butadiene coated at least 20 grams per square yard to provide a shift proof and alkaline resistant mesh compatible with STO materials.

2. On all surfaces **6 FT above finish floor level and below**, fabric shall be STO ARMOR MAT, heavy duty, double strand, interwoven glass fiber mesh specifically coated for compatibility with STO materials.

I. Finish: Shall be STO EXTERIOR STOLIT .75 ready-mixed acrylic based wall coating. Type, colors and aggregate size shall be as selected by Architect.

9G-05. INSTALLATION:

A. Installations shall be performed by and/or supervised by Certified Applicators.

Under no circumstances shall any of the products be altered by adding any additives, except for small amounts of clean water as directed on label; or when using STO PLEX. Antifreeze, accelerators, rapid binders, etc., are not acceptable.

B. The surface to receive the Full Thermal System shall be structurally sound, clean, dry and uniform. If the surface of the wood sheathing has weathered or the factory applied seal on gyp sheathing has been exposed longer than the gyp sheathing manufacturer's recommendations, then prime the entire surface with STO PLEX.

For masonry application:

- For leveling of irregularities, STO, ADH, STO BTS-A or STO BTS-B shall be used. For excessive amounts of leveling, use a 2:1:6 Portland: lime/sand mixture.
- For sanded surfaces of old plaster, masonry and concrete, seal surface with STO GRUNDEX.
- For efflorescence, remove with a diluted acid wash or appropriate means.
- Form release agents and other residue must be removed by appropriate means.

C. A starter strip of STO REINFORCING FIBER MESH shall be applied to the wall at the base line using STO ADH, STO BTS-A or STO BTS-B prior to installation of the EPS Board. It shall be wide enough to adhere 4" of mesh onto the wall, be able to wrap around the board edge and cover approximately 4" on the outside surface of the EPS Board. This procedure shall be followed at all exposed EPS Board edges as per STO details (example - window and door heads and jambs).

Use STO DISPERSION ADHESIVE on stud wall application.

D. Masonry: Use STO ADH to adhere EPS Boards to substrate. Mix STO ADH, STO BTS-A or STO BTS-B according to manufacturer's recommendations. Apply the adhesive to the back of the EPS Boards using a 5/8" notched trowel. Ribbons of adhesive shall be uniform and run horizontal with the building walls.

Stud Wall Application: Apply STO DISPERSION ADHESIVE to the back of the EPS Boards using a 3/16" u-notched trowel. Ribbons of adhesive should be uniform and run horizontal with the building walls.

E. The EPS Boards shall be placed horizontally on the walls starting from a level base line. Stagger vertical joints and interlock EPS Boards at all inside and outside corners. Apply firm pressure over entire surface of the boards to insure uniform contact. Sufficient pressure shall be applied to flatten the ribbons of adhesive to result in a minimum of 50% adhesion. All joints shall be butted tightly together to eliminate any thermal breaks in the STO Full Thermal System. Keep any adhesive from getting between the joints of the EPS Boards. Adhesive shall have adequate curing time before any further work can be done over the EPS Boards. All open joints in the EPS Board layer shall be filled with slivers of EPS Board or an approved spray foam.

The use of nails, screws, or any other type of non-thermal mechanical fasteners is not acceptable.

Rasping of the EPS Board surface shall be required to achieve a smooth, even surface and remove possible ultraviolet ray damage.

Use of plastic or metal corner beads, stop beads, etc., will not be acceptable.

F. **All areas where the Full Thermal System meets dissimilar material or terminates shall have the EPS Boards cut back from the adjoining material a minimum of ¼" to form a caulk joint and sealed (caulked) so that no water can penetrate through or behind the system**. Prior to sealing (caulking), all EPS Boards edges shall be coated with STO RFP, STO BTS-A or STO BTS-B and STO PRIMER. Application to be allowed to dry before sealing (caulking).

G. Mixing and preparation of finish material shall be in strict accordance to manufacturer's directions. Apply a ground coat of STO RFP over EPS Board using proper spray equipment or a stainless-steel trowel to a uniform thickness of approximately 1/16". Work horizontally or vertically in strips of 40 inches, and immediately embed the STO REINFORCING FIBER MESH into the wet ground coat.

STO REINFORCING FIBER MESH shall be double wrapped at all corners and overlapped not less than 2½" at mesh joints. Avoid wrinkles in the mesh. The finish thickness of the ground coat shall be such that the STO REINFORCING FIBER MESH is fully imbedded. Allow ground coat to thoroughly dry before applying finish.

H. Caulking: Install backer rod (25% compression) in caulk joint openings to provide a depth equal to the width of the joint. Install a STO approved caulk and tool flush with the ground coat surface. Allow caulk to set per manufacturer's specifications prior to applying the STO finish coat. **(See Paragraph "F" above)**

Caulking shall be in strict conformance to the manufacturer's details and shall be installed at all places where the EIFS abuts a dissimilar material. Caulking shall be installed to make for a neat and professional job.

I. The STO finish, a ready-mixed acrylic-based wall coating shall be applied directly over the STO RFP ground coat or over primed STO BTS-A or STO BTS-B ground coat ONLY AFTER THE GROUND COAT HAS THOROUGHLY DRIED. Finish shall be applied by spraying, rolling, or troweling using a stainless-steel trowel.

9G-06. SOFFIT VENTS: N.A.

9G-07 SUBMITTAL:

Contractor shall submit shop drawings which will include specifications noting type of materials to be used, manufacturer's details, and color charts for color selection. Colors will be selected from manufacturer's standard color chart. Along with color chart contractor shall submit an 8"x 10" sample of finish and color.

9G-08. WARRANTY:

Manufacturer's warranty shall be furnished guaranteeing in writing that the materials are free from defects and the workmanship for a period of five (5) years.

9G-09. CLEANING:

The Contractor shall be responsible for cleaning all surfaces of excess finish material and removal of all equipment and unused material and debris from his operation from the site.

END OF SECTION.

SECTION 10A

MISCELLANEOUS SPECIALTIES

10A-01. GENERAL CONDITIONS:

The General Conditions, Division II, Sections E and F of these specifications shall apply to and form a part of this Section as if written in full herein.

10A-02. SCOPE:

Work under this heading includes necessary labor and materials required to install items listed in this Section or shown on the contract drawings.

10A-03. ACCESS PANELS AND DOORS:

Access panels for access to mechanical or electrical items shall be furnished to the general contractor by the respective subcontractor and installation shall be by the General Contractor.

All other areas which require access, access panels shall be furnished and installed by the General Contractor. Doors shall be suitable for wall or ceiling finish involved. Opening size shall be as required or as indicated and fire rated where rated walls or ceilings are penetrated. Units shall be equal to those manufactured by Milcor, Philip Carey, Zurn, or other approved equal.

10A-04. PAIRED OPERABLE PARTITION: N.A.

10A-05. ALUMINUM LETTERS:

A Furnish and install where shown on exterior of building letters equal to A.R.K. Ramos, Oklahoma City, OK: 405/235/5505. Letters shall be 24” high aluminum Helvetica Medium No. 521, all upper-case letters. All letters will be projected mounted PM-1.

B Letters shall be as follows: As Shown on Drawings
a. **Finish shall be Black Anodized**

C Furnish shop drawings for approval and manufacturer to furnish contractor with paper template for installation.

10A-06. ALUMINUM PLAQUE:

A. The Contractor shall include in his bid, the cost for the furnishing and installation of an aluminum plaque. Plaque shall be manufactured by A.R.K. Ramos Company, Oklahoma City, OK.

B. Size of plaque to be **approximately** 18" x 24" and will include the following:

Project Name
Project Date
Organization Board Member Names
Architect – Donofro Architects
Construction Firm Name - TBD

C. Plaque will contain both raised and engraved letters. Where engraved, background will be polished aluminum, where raised and polished, background will be Black Pebble Finish. Mounting will be by concealed method. Design of plaque to be furnished by the Architect. Shop drawings will be required for approval prior to casting.

10A-07. ALUMINUM SHIPS LADDER: **N.A.**

10A-07. ALUMINUM THRESHOLDS:

See Finish Hardware Section, these specifications. All thresholds to be set in full bed of mastic.

10A-08. ALUMINUM & STEEL MISCELLANEOUS SHAPES:

Furnish and install all aluminum or steel angles, channels, break metal shapes, in sizes and shapes and at locations as shown on drawings, or as required for support, bracing, anchoring, etc. of incidental items whether shown or not.

10A-09. TOILET ROOM AND KITCHEN ACCESSORIES:

Furnish and install the following accessories at locations as stated. Exact locations will be as directed by the Architect.

A. Accessories
   1. Surface-mounted paper towel dispensers; Bradley Model 2441-110000 stainless steel. Quantity required Six (6)
      2 – Kitchen 110
      1 – Restroom 106
      1 – Restrooms 204 & 207
      1 – Custodial 205
   2. Mirrors: Bradley Model #780, 24” x 18” stainless steel frame mirror with ¾’ x ¾” satin finish stainless steel frame and theft-resistant mounting. Quantity required Three (3)
      1 – each restroom 106, 204 & 207
   3. Toilet Tissue Holders: Bradley Model 5106 surface-mounted tissue holder fabricated from 304-type stainless steel. Quantity required Three (3)
      1 – each restroom 106, 204 & 207
   4. Grab Bars: Bradley Series 812 1 ½” diameter stainless steel, sanitary safe, grey finish, 059 configuration and 001 configuration for concealed mounting. Quantity required Three (3) pairs
      1 pair – each restroom 106, 204 & 207

10A-10. CHAIN LINK FENCE:

A. Furnish and install at locations shown on the drawings, vinyl coated chain link fence. Height of fence and size of access gate shall be as shown on drawings.

B. All materials for permanent fence shall be new. Fabric to be vinyl covered No. 9 gauge heavy zinc coated or hot galvanized by hot dip process after weaving. Fabric to be 2" chain link diamond mesh.

Line posts and end posts shall be 2" o.d., .140 wall, 2.72 LBS./FT. Maximum distance between post shall be 6'-0".

Top rail 1-5/8" o.d., 2.27 LBS./FT.

Tension wire No. 7 gauge.

Gate frames of 1-5/8" o.d., 2.27 LBS./FT.

C. Methods of Construction: All posts and fabric shall be installed in accordance with the manufacturer's recommendations and as shown on the plans. Post spacing shall not exceed six (6') feet. Posts shall be set in concrete to a depth of 24". Minimum hole size shall not be less than 4 times the diameter of the post.

All materials and workmanship shall be first-class in every respect and shall conform to the specifications.

Provide caps on all posts and provide all accessories to make for completion installation.

D. **Furnish shop drawings showing size, gauges, etc., of materials and description of construction for review and approval.**

E. See supplementary and special conditions for temporary construction fencing.

10A-11. FIRE EXTINGUISHERS:

Furnish and install at locations shown and indicated on the drawings, 10 lb. capacity fire extinguishers equal to "J L Industries Cosmic 10E A B C with U.L. rating 4A-60BC.

Provide complete with metal hanger. The exact location will be as directed by Architect. Mounting height to be so top of extinguisher not more than 5'-0" A.F.F. Prior to final inspection, each extinguisher shall be inspected by the local fire inspector and tagged with inspection sticker showing the unit fully charged, date, and signature of the inspector.

10A-12. HANDRAILS/ GUARDRAILS: See drawings.

10A-13. HAT CHANNELS:

Furnish and install 1 ½" and ¾" galvanized hat channels for framing and installation of metal fascia and medal siding panels as shown and noted on the drawings. Light gauge framing for

installation of fascia system shall be as shown on the drawings and specified in Section 11 of these specifications.

10A-14. CORRIDOR LOCKERS: N.A.

10A-15. P.E. ATHLETIC LOCKERS: N.A.

10A-16. ATHLETIC LOCKERS: N.A.

10A-17. MARKER BOARDS AND TACK BOARDS: N.A.

10A-18. MOP HOLDERS: N.A.

10A-19. PRECAST CONCRETE SILLS / WALL CAPS: N.A.

10A-20. SIGNAGE:

A. Furnish and install plastic room signs **adjacent to doors as indicated on door schedule.** Signs shall be equal to Best Manufacturing Sign Systems, Montrose, Colorado; (303) 249-0223.

B. Signs shall be 6 x 6 x ¼ MP and shall contain room number, room name, and raised braille copy. Numbers and names shall be engraved. All signs are to be ADA-compliant.

Type style shall be Helvetica Medium, and the finish of the background shall be non-glare. Colors of letters and background will be as selected by Architect.

Signs for restrooms shall have separate integral handicapped pictorial insignia.

The Architect will furnish room numbers and names.

C. Install door signs 60" A.F.F., to the centerline of the sign, on the wall adjacent to the latch side of the door. The signs are to be installed with stainless steel screws.

D. See mechanical and electrical drawings and specifications for engraved signs located at exhaust fan switches and emergency cut-offs. Signs to be red background, white letters. Signs to be installed for gas, water, electrical emergency cut off and for exhaust fans.

E. Furnish shop drawings for approval and color samples for color selection.

10A-21. SOLID PLASTIC TOILET PARTITIONS: N.A.

END OF SECTION

SECTION 20A

MECHANICAL GENERAL

1 GENERAL

1.1 The work covered by this division consists of providing all labor, equipment and materials and performing all operations necessary for the installation of the mechanical work as herein called for and shown on the drawings.

1.2 Related Documents:

1.2.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2.2 This is a Basic Mechanical Requirements Section. Provisions of this section apply to work of all Division 20, 21, and 22 sections.

1.2.3 Review all other contract documents to be aware of conditions affecting work herein.

1.2.4 Definitions:

1.2.4.1 Provide: Furnish and install, complete and ready for intended use.

1.2.4.2 Furnish: Supply and deliver to project site, ready for subsequent requirements.

1.2.4.3 Install: Operations at project site, including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar requirements.

1.3 Permits and Fees: Contractor shall obtain all necessary permits, meters, and inspections required for his work and pay all fees and charges incidental thereto.

1.4 Verification of Owner's Data: Prior to commencing any work the Contractor shall satisfy himself as to the accuracy of all data as indicated in these plans and specifications and/or as provided by the Owner. Should the Contractor discover any inaccuracies, errors, or omissions in the data, he shall immediately notify the Architect/Engineer in order that proper adjustments can be anticipated and ordered. Commencement by the Contractor of any work shall be held as an acceptance of the data by him after which time the Contractor has no claim against the Owner resulting from alleged errors, omissions or inaccuracies of the said data.

1.5 Delivery and Storage of Materials: Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. All material shall be stored to provide protection from the weather and accidental damage.

1.6 Extent of work is indicated by the drawings, schedules, and the requirements of the specifications. Singular references shall not be constructed as requiring only one device if multiple devices are shown on the drawings or are required for proper system operation.

1.7 Field Measurements and Coordination:

1.7.1 The intent of the drawings and specifications is to obtain a complete and satisfactory installation. Separate divisional drawings and specifications shall not relieve the Contractor or subcontractors from full compliance of work of his trade indicated on any of the drawings or in any section of the specifications.

1.7.2 Verify all field dimensions and locations of equipment to insure close, neat fit with other trades' work. Make use of all contract documents and approved shop drawings to verify exact dimension and locations.

1.7.3 Coordinate work in this division with all other trades in proper sequence to insure that the total work is completed within contract time schedule and with a minimum cutting and patching.

1.7.4 Locate all apparatus symmetrical with architectural elements. Install to exact height and locations when shown on architectural drawings. When locations are shown only on mechanical drawings, be guided by architectural details and conditions existing at job and correlate this work with that of others.

1.7.5 Install work as required to fit structure, avoid obstructions, and retain clearance, headroom, openings and passageways. Cut no structural members without written approval.

1.7.6 Carefully examine any existing conditions, piping, and premises. Compare drawings with existing conditions. Report any observed discrepancies. It shall be the Contractor's responsibility to properly coordinate the work and to identify problems in a timely manner. Written instructions will be issued to resolve discrepancies.

1.7.7 Because of the small scale of the drawings, it is not possible to indicate all offsets and fittings or to locate every accessory. Drawings are essentially diagrammatic. Study carefully the sizes and locations of structural members, wall and partition locations, trusses, and room dimensions and take actual measurements on the job. Locate piping, ductwork, equipment and accessories with sufficient space for installing and servicing. Contractor is responsible for accuracy of his measurements and for coordination with all trades. Contractor shall not order materials or perform work without such verification. No extra compensation will be allowed because field measurements vary from the dimensions on the drawings. If field measurements show that equipment or piping cannot be fitted, the Architect/Engineer shall be consulted. Remove and relocate, without additional compensation, any item that is installed and is later found to encroach on space assigned to another use.

1.8 Guarantee:

1.8.1 The Contractor shall guarantee labor, materials and equipment for a period of one (1) year from Final Completion, or from Owner's occupancy, whichever is earlier. Contractor shall make good any defects and shall include all necessary adjustments to and replacement of defective items without expense to the Owner.

1.8.2 Owner reserves right to make emergency repairs as required to keep equipment in operation without voiding Contractor's Guarantee Bond nor relieving Contractor of his responsibilities during guarantee period.

1.9 Approval Submittals:

1.9.1 When approved, the submittal control log and submittals shall be an addition to the specifications herewith, and shall be of equal force in that no deviation will be permitted except with the approval of the Architect/Engineer.

1.9.1.1 Shop drawings, product literature, and other approval submittals will only be reviewed if they are submitted in full accordance with the General and Supplementary Conditions and Division 1 Specification sections and the following.

1.9.1.1.1 Submittals shall be properly organized in accordance with the approved submittal control log.

1.9.1.1.2 Submittals shall not include items from more than one specification section in the same submittal package unless approved in the submittal control log.

1.9.1.1.3 Submittals shall be properly identified by a cover sheet showing the project name, Architect and Engineer names, submittal control number, specification section, a list of products or item names with model numbers in the order they appear in the package, and spaces for approval stamps. A sample cover sheet is included at the end of this section.

1.9.1.1.4 Submittals shall have been reviewed and approved by the General Contractor (or Prime Contractor). Evidence of this review and approval shall be an "Approved" stamp with a signature and date on the cover sheet.

1.9.1.1.5 Submittals that include a series of fixtures or devices (such as plumbing fixtures or valves) shall be organized by the fixture number or valve type and be marked accordingly. Each fixture must include all items associated with that fixture regardless of whether or not those items are used on other fixtures.

1.9.1.1.6 The electrical design shown on the drawings supports the mechanical equipment basis of design specifications at the time of design. If mechanical equipment is submitted with different electrical requirements, it is the responsibility of the mechanical contractor to resolve all required electrical design changes (wire and conduit size, type of disconnect or overload protection, point(s) of connection, etc.) and clearly show the new electrical design on the mechanical submittal with a written statement that this change will be provided at no additional cost. Mechanical submittals made with no written reference to the electrical design will be presumed to work with the electrical design. Any corrections required will be at no additional cost.

1.9.2 If the shop drawings show variation from the requirements of contract because of standard shop practice or other reasons, the Contractor shall make specific mention of such variation in writing in his letter of transmittal and on the submittal cover sheet in order that, if acceptable, Contractor will not be relieved of the responsibility for executing the work in accordance with the contract.

1.9.3 Review of shop drawings, product literature, catalog data, or schedules shall not relieve the Contractor from responsibility for deviations from contract drawings or specifications, unless he has in writing called to the attention of the Architect/Engineer each such deviation in writing at the time of submission, nor shall it relieve him from

responsibility for errors of any sort in shop drawings, product literature, catalog data, or schedules. Any feature or function specified but not mentioned in the submittal shall be assumed to be included per the specification.

1.9.4 Submit shop drawings as called for in other sections after award of the contract and before any material is ordered or fabricated. Shop drawings shall consist of plans, sections, elevations and details to scale (not smaller than ¼" per foot), with dimensions clearly showing the installation. Direct copies of small scale project drawings issued to the Contractor are not acceptable. Drawings shall take into account equipment furnished under other sections and shall show space allotted for it. Include construction details and materials.

1.10 Test Reports and Verification Submittals: Submit test reports, certifications and verification letters as called for in other sections. Contractor shall coordinate the required testing and documentation of system performance such that sufficient time exists to prepare the reports, submit the reports, review the reports and take corrective action within the scheduled contract time.

1.11 O&M Data Submittals: Submit Operation and Maintenance data as called for in other sections. When a copy of approval submittals is included in the O&M Manual, only the final “Approved” or “Approved as Noted” copy shall be used. Contractor shall organize these data in the O&M Manuals tabbed by specification number. Prepare O&M Manuals as required by Division 1 and as described herein.. Submit manuals at the Substantial Completion inspection.

2 PRODUCTS

2.1 All materials shall be new or Owner-supplied reused as shown on the drawings, the best of their respective kinds, suitable for the conditions and duties imposed on them at the building and shall be of reputable manufacturers. The description, characteristics, and requirements of materials to be used shall be in accordance with qualifying conditions established in the following sections.

2.2 Equipment and Materials:

2.2.1 Shall be new and the most suitable grade for the purpose intended. Equipment furnished under this division shall be the product of a manufacturer regularly engaged in the manufacture of such items for a period of three years. Where practical, all of the components shall be products of a single manufacturer in order to provide proper coordination and responsibility. Where required, Contractor shall furnish proof of installation of similar units or equipment.

2.2.2 Each item of equipment shall bear a name plate showing the manufacturer's name, trade name, model number, serial number, ratings and other information necessary to fully identify it. This plate shall be permanently mounted in a prominent location and shall not be concealed, insulated or painted.

2.2.3 The label of the approving agency, such as UL, IBR, ASME, ARI, AMCA, by which a standard has been established for the particular item shall be in full view.

2.2.4 The equipment shall be essentially the standard product of a manufacturer regularly engaged in the production of such equipment and shall be a product of the manufacturer's latest design.

2.2.5 A service organization with personnel and spare parts shall be available within two hours for each type of equipment furnished.

2.2.6 Install in accordance with manufacturer's recommendations. Place in service by a factory trained representative where required.

2.2.7 Materials and equipment are specified herein by a single or by multiple manufacturers to indicate quality, material and type of construction desired. Manufacturer's products shown on the drawings have been used as basis for design; it shall be the Contractor's responsibility to ascertain that alternate manufacturer's products, or the particular products of named manufacturers, meet the detailed specifications and that size and arrangement of equipment are suitable for installation.

2.2.8 Model Numbers: Catalog numbers and model numbers indicated in the drawings and specifications are used as a guide in the selection of the equipment and are only listed for the contractor's convenience. The contractor shall determine the actual model numbers for ordering materials in accordance with the written description of each item and with the intent of the drawings and specifications.

2.3 Requests for Substitution:

2.3.1 Where a particular system, product or material is specified by name, consider it as standard basis for bidding, and base proposal on the particular system, product or material specified.

2.3.2 Requests by Contractor for substitution will be considered only when reasonable, timely, fully documented, and qualifying under one or more of the following circumstances.

2.3.2.1 Required product cannot be supplied in time for compliance with Contract time requirements.

2.3.2.2 Required product is not acceptable to governing authority, or determined to be non-compatible, or cannot be properly coordinated, warranted or insured, or has other recognized disability as certified by Contractor.

2.3.2.3 Substantial cost advantage is offered Owner after deducting offsetting disadvantages including delays, additional compensation for redesign, investigation, evaluation and other necessary services and similar considerations.

2.3.3 All requests for substitution shall contain a "Comparison Schedule" and clearly and specifically indicate any and all differences or omissions between the product specified as the basis of design and the product proposed for substitution. Differences shall include but shall not be limited to data as follows for both the specified and substituted products:

Principal of operation.
Materials of construction or finishes.

Thickness of gauge of materials.
Weight of item.
Deleted features or items.
Added features or items.
Changes in other work caused by the substitution.
Performance curves.

If the approved substitution contains differences or omissions not specifically called to the attention of the Architect/Engineer, the Owner reserves the right to require equal or similar features to be added to the substituted products (or to have the substituted products replaced) at the Contractor's expense.

3 EXECUTION

3.1 Workmanship: All materials and equipment shall be installed and completed in a first-class workmanlike manner and in accordance with the best modern methods and practice. Any materials installed which do not present an orderly and reasonably neat and/or workmanlike appearance, or do not allow adequate space for maintenance, shall be removed and replaced when so directed by the Architect/Engineer.

3.2 Coordination:

3.2.1 The Contractor shall be responsible for full coordination of the mechanical systems with shop drawings of the building construction so the proper openings and sleeves or supports are provided for piping, ductwork, or other equipment passing through slabs or walls.

3.2.2 Any additional steel supports required for the installation of any mechanical equipment, piping, or ductwork shall be furnished and installed under the section of the specifications requiring the additional supports.

3.2.3 It shall be the Contractor's responsibility to see that all equipment such as valves, dampers, filters and such other apparatus or equipment that may require maintenance and operation are made easily accessible, regardless of the diagrammatic location shown on the drawings.

3.2.4 All connections to fixtures and equipment shown on the drawings shall be considered diagrammatic unless otherwise indicated by detail. The actual connections shall be made to fully suit the requirements of each case and adequately provide for expansion and servicing.

3.2.5 The contractor shall protect equipment, material, and fixtures at all times. He shall replace all equipment, material, and fixtures which are damaged as a result of inadequate protection.

3.2.6 Prior to starting and during progress of work, examine work and materials installed by others as they apply to work in this division. Report conditions which will prevent satisfactory installation.

3.2.7 Start of work will be construed as acceptance of suitability of work of others.

3.3 Interruption of Service: Before any equipment is shut down for disconnecting or tie-ins, arrangements shall be made with the Architect/Engineer and this work shall be done at the time best suited to the Owner. This will typically be on weekends and/or holidays and/or after normal working hours. Services shall be restored the same day unless prior arrangements are made. All overtime or premium costs associated with this work shall be included in the base bid.

3.4 Phasing: Provide all required temporary valves, piping, ductwork, equipment and devices as required. Maintain temporary services to areas as required. Remove all temporary material and equipment on completion of work unless Engineer concurs that such material and equipment would be beneficial to the Owner on a permanent basis.

3.5 Cutting and Patching: Notify General Contractor to do all cutting and patching of all holes, chases, sleeves, and other openings required for installation of equipment furnished and installed under this section. Utilize experienced trades for cutting and patching. Obtain permission from Architect/Engineer before cutting any structural items.

3.6 Equipment Setting: Bolt equipment directly to concrete pads or vibration isolators as required, using hot-dipped galvanized anchor bolts, nuts and washers. Level equipment.

3.7 Painting: Touch-up factory finishes on equipment located inside and outside shall be done under Division 20. Obtain matched color coatings from the manufacturer and apply as directed. If corrosion is found during inspection on the surface of any equipment, clean, prime, and paint, as required.

3.8 Clean-up: Thoroughly clean all exposed parts of apparatus and equipment of cement, plaster, and other materials and remove all oil and grease spots. Repaint or touch up as required to look like new. During progress of work, contractor is to carefully clean up and leave premises and all portions of building free from debris and in a clean and safe condition.

3.9 Start-up and Operational Test: Start each item of equipment in strict accordance with the manufacturer's instructions; or where noted under equipment specification, start-up shall be done by a qualified representative of the manufacturer. Alignment, lubrication, safety, and operating control shall be included in start-up check.

3.10 Climate Control: Operate heating and cooling systems as required after initial startup to maintain temperature and humidity conditions to avoid freeze damage and warping or sagging of ceilings and carpet.

3.11 Record Drawings:

3.11.1 During the progress of the work the Contractor shall record on their field set of drawings the exact location, as installed, of all piping, ductwork, equipment, and other systems which are not installed exactly as shown on the contract drawings.

3.11.2 Upon completion of the work, record drawings shall be prepared as described in the General Conditions, Supplementary Conditions, and Division 1 sections.

3.12 Acceptance:

3.12.1 Punch List: Submit written confirmation that all punch lists have been checked and the required work completed.

3.12.2 Instructions: At completion of the work, provide a competent and experienced person who is thoroughly familiar with project, for one day to instruct permanent operating personnel in operation of equipment and control systems. This is in addition to any specific equipment operation and maintenance training.

3.12.3 Operation and Maintenance Manuals: Furnish four complete manuals bound in ring binders with Table of Contents, organized, and tabbed by specification section. Manuals shall contain:

Detailed operating instructions and instructions for making minor adjustments.
Complete wiring and control diagrams.
Routine maintenance operations.
Manufacturer's catalog data, service instructions, and parts lists for each piece of operating equipment.
Copies of approved submittals.
Copies of all manufacturer's warranties.
Copies of test reports and verification submittals.

3.12.4 Record Drawings: Submit record drawings.

3.12.5 Test and Balance Report: Submit four certified copies. The Report shall be submitted for review prior to the Substantial Completion Inspection unless otherwise required by Division 1.

3.12.6 Acceptance will be made on the basis of tests and inspections of job. A representative of firm that performed test and balance work shall be in attendance to assist. Contractor shall furnish necessary mechanics to operate system, make any necessary adjustments and assist with final inspection.

PROJECT NAME
PROJECT NUMBER

This is a sample cover sheet. Use one for each shop drawing.

ARCHITECT/ENGINEER: Watford Engineering, Inc.

CONTRACTOR: XYZ Construction

SUBCONTRACTOR: ABC Mechanical Contractor

SUPPLIER: Jones Supply Co.

MANUFACTURER: Various

Use whatever standard headings you want here

DATE: 2/15/2005

SECTION: 21-M/Hydronic Specialties

1. Vent valves - Hoffman No. 62

List each item separately

2. In-line air separators - Bell & Gossett RL-4

Typical - list mfr name & model number

3. Diaphragm type compression tanks - Bell & Gossett B-200

4. Pump suction diffusers - Bell & Gossett ED-3

5. Triple duty valves - Bell & Gossett 3D-4S

6. Shot feeders - J. Woods No. 2

7. Pressure relief valves - Watts No. 6

8. Pressure reducing valves - Bell & Gossett No. 7

General Contractor's APPROVAL stamp must be on submittal.

END OF SECTION

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SECTION 20B

CODES AND STANDARDS

1 GENERAL

1.1 The work covered by this division consists of providing all labor, equipment and materials and performing all operations necessary for the installation of the mechanical work as herein called for and shown on the drawings.

1.2 This is a Basic Mechanical Requirements section. Provisions of this section apply to work of all Division 20, 21, & 22 sections.

2 CODES

2.1 All work under Division 20, 21, & 22 shall be constructed in accordance with the codes listed herein. The design has been based on the requirements of these codes; and while it is not the responsibility of the Contractor to verify that all work called for complies with these codes, he shall be responsible for calling to the Architect/Engineer's attention any drawings or specifications that are not in conformance with these or other codes prior to ordering equipment or installing work.

2.2 Comply with regulations and codes of utility suppliers.

2.3 Where no specific method or form of construction is called for in the contract documents, the Contractor shall comply with code requirements when carrying out such work.

2.4 Where code conflict exists, generally the most restrictive requirement applies. Comply with current code edition, unless noted.

2.5 Additional codes or standards applying to a specific part of the work may be included in that section.

2.6 The following codes govern the work:

1) Florida Building Code 8th Edition (2023)
2) Florida Building Code 8th Edition (2023)-Plumbing
3) Florida Building Code 8th Edition (2023)-Mechanical
4) Florida Building Code 8th Edition (2023)-Fuel Gas
5) Florida Building Code 8th Edition (2023)-Energy Conservation
6) Florida Building Code 8th Edition (2023)-Accessibility
7) Florida Fire Prevention Code 8th Edition (2023)
8) National Electric Code (NFPA 70-2020).
9) Installation of Air Conditioning and Ventilation Systems (NFPA 90A-2018)
10) Florida Americans with Disabilities Accessibility Implementation Act (October 1, 1993) as described in Accessibility Requirements Manual, Department of Community Affairs (January 1, 1997).
11) Americans with Disabilities Act Accessibility Guidelines (ADAAG), 2010 Standards.

3 STANDARDS

All mechanical materials, installation and systems shall meet the requirements of the following standards, including the latest addenda and amendments, to the extent referenced:

1) Underwriters' Laboratories (UL)
2) American National Standards Institution (ANSI)
3) American Society of Testing Materials (ASTM)
4) National Fire Protection Association (NFPA)
5) National Electrical Manufacturers Association (NEMA)
6) Air Conditioning and Refrigeration Institute (ARI)
7) Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)
8) American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)
9) Air Movement and Control Association (AMCA)

SECTION 20C

MECHANICAL RELATED WORK

1 DIVISION 1 - GENERAL REQUIREMENTS

1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 This is a Basic Mechanical Requirements section. Provisions of this section apply to work of all Division 20 sections.

1.3 Coordinate with the General Contractor for all cutting and patching. Contractors performing Division 20 work shall inform the General Contractor of all cutting and patching required prior to bidding and shall coordinate installation.

2 SITE WORK

2.1 Specific requirements for excavation and backfill for underground piping are contained in Section 20-L.

2.2 Refer to Sitework for:

2.2.1 All water, sewer, and storm water piping greater than five feet from the building.

3 CONCRETE

3.1 Refer to Concrete for:

3.1.1 Rough grouting in and around mechanical work.

3.1.2 Patching concrete cut to accommodate mechanical work.

3.2 The following is part of Division 20 work, complying with the requirements of Division Concrete

3.2.1 Curbs, foundations and pads for mechanical equipment.

3.2.2 Basins, sumps, and vaults of mechanical work.

3.2.3 Underground structural concrete to accommodate mechanical work.

4 MASONRY

4.1 Refer to Masonry for:

4.1.1 Installation of wall louvers.

4.1.2 Installation of access doors in walls.

5 METALS

5.1 Refer to Metals for:

5.1.1 Framing openings for mechanical equipment.

5.2 The following is part of Division 20 work.

5.2.1 Supports for mechanical work.

6 WOOD AND PLASTIC

6.1 Refer to Wood for:

6.1.1 Framing openings for mechanical equipment

7 THERMAL AND MOISTURE PROTECTION

7.1 Refer to Thermal and Moisture Protection for:

7.1.1 Installation of all roof curbs and roof supports for mechanical work.

7.1.2 Caulking and waterproofing of all wall and roof mounted mechanical work.

7.1.3 Providing all roof curbs and all vent flashing for metal roofs.

7.2 The following is part of Division 20 work, complying with the requirements of Thermal and Moisture Protection Section.

7.2.1 Fire barrier penetration seals.

8 DOORS AND WINDOWS

8.1 Refer to Doors & Windows for:

8.1.1 Installation of all door grilles.

8.1.2 Providing all undercuts

9 FINISHES

9.1 Refer to Finishes for:

9.1.1 Painting exposed ductwork, piping, and equipment.

9.1.2 Painting structural metal and concrete for mechanical work.

9.1.3 Painting door grilles and access panels.

9.1.4 Painting color-coded mechanical work indicated for continuous painting. See color schedule in Division 20 section, " I. Mechanical Identification".

9.1.5 Installation of access doors in gypsum drywall.

9.2 Colors shall be selected by the Architect for all painting of exposed mechanical work in occupied spaces, unless specified herein. Do not paint insulated or jacketed surfaces.

9.3 Perform the following as part of Division 20 work:

9.3.1 Touch up painting of factory finishes.

9.3.2 Painting of all hangers.

10 SPECIALTIES

10.1 Refer to Specialties for:

10.1.1 Fire extinguishers and fire extinguisher cabinets and accessories.

11 DIVISION 26 - ELECTRICAL

11.1 Mechanical contractor shall coordinate the exact electrical requirements of all mechanical equipment being provided with the electrical contractor. Where approval submittals are required, this coordination shall be accomplished prior to making the submittals. The electrical design shown on the drawings supports the mechanical equipment basis of design. If mechanical equipment is submitted with different electrical requirements, it is the responsibility of the mechanical contractor to resolve all required electrical design changes (wire and conduit size, type of disconnect or overload protection, point(s) of connection, etc.) and clearly show the new electrical design on the mechanical submittal with a written statement that this design will be provided at no additional cost. Mechanical submittals made with no written reference to the electrical design will be presumed to work with the electrical design. Any corrections required will be at no additional cost.

11.2 Mechanical contractor shall provide all HVAC control wiring including the Energy Management Control system sensors, alarms, and input/output signals and all relays, interlocks, warning lights, and control devices, in conduit and complying with the requirements of Division 21. The intent is for the mechanical contractor to be responsible for the entire HVAC control system, including point-to-point wiring.

11.3 Electrical contractor shall provide disconnect switches, starters, and contactors for mechanical equipment unless specifically noted as being furnished as part of mechanical equipment.

11.4 Electrical contractor shall provide all power wiring, raceway and devices, and make final electrical connections to all mechanical equipment, switches, starters, contactors, controllers, and similar equipment.

11.5 All duct-mounted smoke detectors shall be furnished and wired by the electrical contractor and installed by the mechanical contractor.

END OF SECTION

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SECTION 20D

PIPES AND PIPE FITTINGS

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 This section is a Division-20 Basic Mechanical Materials and Methods section, and is part of each Division-20, 21, & 22 section making reference to pipes and pipe fittings specified herein.

1.3 Extent of pipes and pipe fittings required by this section is indicated on drawings and/or specified in other Division-20, 21, & 22 sections.

1.4 Codes and Standards:

1.4.1 Welding: Qualify welding procedures, welders and operators in accordance with ASME B31.1, or ASME B31.9, as applicable, for shop and project site welding of piping work.

1.4.2 Brazing: Certify brazing procedures, brazers, and operators in accordance with ASME Boiler and Pressure Vessel Code, Section IX, for shop and job-site brazing of piping work.

1.5 Test Report and Verification Submittals:

1.5.1 Submit welding certification for all welding installers.

1.5.2 Submit brazing certification for all brazing installers.

2 PRODUCTS

2.1 Piping Materials: Provide pipe and tube of type, joint type, grade, size and weight (wall thickness or Class) indicated for each service. Where type, grade or class is not indicated, provide proper selection as determined by Installer for installation requirements, and comply with governing regulations and industry standards.

2.2 Pipe/Tube Fittings: Provide factory-fabricated fittings of type, materials, grade, class and pressure rating indicated for each service and pipe size. Provide sizes and types matching pipe, tube, valve or equipment connection in each case. Where not otherwise indicated, comply with governing regulations and industry standards for selections, and with pipe manufacturer's recommendations where applicable.

2.3 Piping Materials/Products:

2.3.1 Soldering Materials:

2.3.1.1 Tin-Antimony (95-5) Solder: ASTM B-32, Grade 95TA.

2.3.1.2 Silver-Phosphorus Solder: ASTM B-32, Grade 96TS.

2.3.2 Pipe Thread Tape: Teflon tape.

2.3.3 Protective Coating: Koppers Bitumastic No. 505 or equal.

2.3.4 Gaskets for Flanged Joints: ANSI B16.21; full-faced for cast iron flanges; raised-face for steel flanges, unless otherwise noted.

2.3.5 Welding Materials: Comply with Section II, Part C, ASME Boiler and Pressure Vessel Code for welding materials. Materials shall be determined by installer to comply with installation requirements.

2.3.6 Brazing Materials: Silver content of not less than 15%. Materials shall be determined by installer to comply with installation requirements.

2.4 Copper Tube and Fittings:

2.4.1 Copper Tube:

2.4.1.1 Copper Tube: ASTM B88; Type K or L as indicated for each service; hard-drawn temper unless specifically noted as annealed.

2.4.1.2 ACR Copper Tube: ASTM B280.

2.4.1.3 DWV Copper Tube: ASTM B306.

2.4.2 Fittings:

2.4.2.1 Wrought-Copper Solder-Joint Fittings: ANSI B16.22.

2.4.2.2 Copper Tube Unions: Provide standard products recommended by manufacturer for use in service indicated.

2.4.2.3 Wrought-Copper Solder-Joint Drainage Fittings: ANSI B16.29.

2.4.2.4 Cast-Copper Flared Tube Fittings: ANSI B16.26.

2.5 Steel Pipes and Pipe Fittings

2.5.1 Pipes:

2.5.1.1 Black Steel Pipe: ASTM A-53 or A-120, seamless.

2.5.1.2 Galvanized Steel Pipe: ASTM A-53 or A-120, seamless.

2.5.2 Pipe Fittings:

2.5.2.1 Threaded Cast Iron: ANSI B16.4.

2.5.2.2 Threaded Malleable Iron: ANSI B16.3; plain or galvanized as indicated.

2.5.2.3 Malleable Iron Threaded Unions: ANSI B16.39; selected by installer for proper piping fabrication and service requirements including style, end connections, and metal-to-metal seats (iron, bronze or brass); plain or galvanized as indicated.

2.5.2.4 Threaded Pipe Plugs: ANSI B16.14.

2.5.2.5 Flanged Cast Iron: ANSI B16.1, including bolting.

2.5.2.6 Steel Flanges/Fittings: ANSI B16.5, including bolting and gasketing.

2.5.2.7 Wrought-Steel Buttwelding Fittings: ANSI B16.9, except ANSI B16.28 for short radius elbows and returns, rated to match connected pipe.

2.5.2.8 Pipe Nipples: Fabricated from same pipe as used for connected pipe; except do not use less than schedule 80 pipe where length remaining unthreaded is less than 1 ½ inches, and where pipe size is less than 1 ½ inches, and do not thread nipples full length (no close-nipples).

2.6 Plastic Pipes and Fittings:

2.6.1 Pipes:

2.6.1.1 PVC DWV Pipe: ASTM D-2665, Schedule 40.

2.6.1.2 PVC Sewer Pipe: ASTM D-3034.

2.6.2 Fittings:

2.6.2.1 PVC Solvent Cement: ASTM D-2564.

2.6.2.2 PVC DWV Socket: ASTM D-2665.

2.6.2.3 PVC Sewer Socket: ASTM D-3034.

2.6.2.4 PVC Schedule 40 Socket: ASTM D-2466.

3 EXECUTION

3.1 Installation

3.1.1 General: Install pipes and pipe fittings in accordance with recognized industry practices which will achieve permanently-leak proof piping systems, capable of performing each indicated service without piping failure. Install each run with minimum joints and couplings, but with adequate and accessible unions for disassembly and maintenance or replacement of valves and equipment. Reduce sizes (where indicated) by use of reducing fittings, not bushings. Align piping accurately at connections, within 1/16" misalignment tolerance.

3.1.2 Comply with ANSI B31 Code for Pressure Piping.

3.1.3 Locate piping runs, except as otherwise indicated, vertically and horizontally (pitched to drain) and avoid diagonal runs wherever possible. Orient horizontal runs parallel

with walls and column lines. Locate runs as shown or described by diagrams, details and notations or, if not otherwise indicated, run piping in shortest route which does not obstruct usable space or block access for servicing building and its equipment. Hold piping close to walls, overhead construction, columns and other structural and permanent-enclosure elements of building; limit clearance to ½" where furring is shown for enclosure or concealment of piping, but allow for insulation thickness, if any. Where possible, locate insulated piping for 1" clearance outside insulation.

3.1.4 Concealed Piping: Unless specifically noted as "Exposed" on the drawings, conceal piping from view in finished and occupied spaces, by locating in column enclosures, chases, in hollow wall construction or above suspended ceilings; do not encase horizontal runs in solid partitions, except as indicated.

3.1.5 Electrical Equipment Spaces: Do not run piping through transformer vaults and other electrical, communications, or data equipment spaces and enclosures unless shown. Install drip pan under piping that must run through electrical spaces.

3.1.5.1 Cut pipe from measurements taken at the site, not from drawings. Keep pipes free of contact with building construction and installed work.

3.2 Piping System Joints: Provide joints of the type indicated in each piping system.

3.2.1 Solder copper tube-and-fitting joints where indicated, in accordance with recognized industry practice. Cut tube ends squarely, ream to full inside diameter, and clean outside of tube ends and inside of fittings. Apply non-acid type solder flux to joint areas of both tubes and fittings. Insert tube full depth into fitting, and solder in manner which will draw solder full depth and circumference of joint. Wipe excess solder from joint before it hardens.

3.2.2 Thread pipe in accordance with ANSI B2.1; cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Apply pipe joint compound, or pipe joint tape (Teflon) where recommended by pipe/fitting manufacturer, on male threads at each joint and tighten joint to leave not more than 3 threads exposed. Paint exposed threads to retard rusting.

3.2.3 Flanged Joints: Match flanges within piping system, and at connection with valves and equipment. Clean flange faces and install gaskets. Tighten bolts to provide uniform compression of gaskets. Bolts shall project 1/8" to 3/8" beyond nut face when tight.

3.2.4 Weld pipe joints in accordance with recognized industry practice and as follows. Be guided by ANSI B.31.

3.2.4.1 Weld pipe joints only when ambient temperature is above 0°F.

3.2.4.2 Bevel pipe ends at a 37.5° angle where possible, smooth rough cuts, and clean to remove slag, metal particles and dirt.

3.2.4.3 Use pipe clamps or tack-weld joints; 4 welds for pipe sizes to 10". All welds shall be open-butt.

3.2.4.4 Build up welds with root pass, followed by filler pass and then a cover pass. Eliminate valleys at center and edges of each weld. Weld by procedures which will ensure elimination of unsound or unfused metal, cracks, oxidation, blow-holes and non-metallic inclusions.

3.2.4.5 Do not weld-out piping system imperfections by tack-welding procedures; refabricate to comply with requirements.

3.2.4.6 At Installer's option, install forged branch-connection fittings wherever branch pipe is less than 3" and at least two pipe sizes smaller than main pipe indicated; or install regular "T" fitting. Weld-O-Let or equal.

3.2.4.7 All field welding and cutting using oxygen-acetylene methods within the building shall be performed in accordance with NFPA-51B (1994).

3.2.5 Plastic Pipe Joints: Comply with manufacturer's instructions and recommendations, and with applicable industry standards.

3.2.5.1 Solvent-cemented joints shall be made in accordance with ASTM D-2235 and ASTM F-402.

3.2.5.2 PVC sewer pipe bell/gasket joints shall be installed in accordance with ASTM D-2321.

3.2.6 Braze copper tube-and-fitting joints where indicated, in accordance with ANSI B.31.

3.3 Piping Installation

3.3.1 Install piping to allow for expansion and contraction.

3.3.2 Isolate all copper tubing from steel and concrete by wrapping the pipe at the contact point, and for one inch on each side, with a continuous plastic sleeve. Isolate all copper tubing installed in block walls with a continuous plastic sleeve.

3.3.3 Underground Piping:

3.3.3.1 Provide plastic tape markers over all underground piping. Provide copper wire over all underground plastic piping. Locate markers 18" above piping.

3.3.3.2 Coat the following underground (uninsulated) pipes with a heavy coat of bitumastic or provide an 8 mil polyvinyl sleeve: black steel pipe, galvanized steel pipe, copper tubing.

END OF SECTION

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SECTION 20E

VALVES

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to the work of this section.

1.2 This section is a Division-20 Basic Materials and Methods section, and is part of each Division-20, 21, & 22 section making reference to or requiring valves specified herein.

1.3 Extent of valves required by this section is indicated on drawings and/or specified in other Division-20, 21, & 22 sections.

1.4 Quality Assurance:

1.4.1 Valve Dimensions: For face-to-face and end-to-end dimensions of flanged or welding-end valve bodies, comply with ANSI B16.10.

1.4.2 Valve Types: Provide valves of same type by same manufacturer.

1.4.3 Valve Listing: For valves on fire protection piping, provide UL listing.

1.5 Approval Submittals: When required by other Division-20, 21, & 22 sections, submit product data, catalog cuts, specifications, and dimensioned drawings for each type of valve. Include pressure drop curve or chart for each type and size of valve. Submit valves with Division-20, 21, & 22 section using the valves, not as a separate submittal. For each valve, identify systems where the valve is intended for use.

Gate Valves. Type GA.
Check Valves. Type CK.
Ball Valves. Type BA.

1.6 O&M Data Submittals: Submit a copy of approval submittals. Submit installation instructions, maintenance data and spare parts lists for each type of valve. Include this data in the O&M Manual.

2 PRODUCTS

2.1 General: Provide factory-fabricated valves recommended by manufacturer for use in service indicated. Provide valves of types and pressure ratings indicated; provide proper selection as determined by Installer to comply with specifications and installation requirements. Provide sizes as indicated, and connections which properly mate with pipe, tube, and equipment connections.

2.2 Acceptable Manufacturers: Subject to compliance with requirements, provide valves of one of the producers listed for each valve type. The model numbers are listed for contractor's convenience only. In the case of a model number discrepancy, the written description shall govern.

2.3 Gate Valves:

2.3.1 Packing: Select valves designed for repacking under pressure when fully opened, equipped with non-asbestos packing suitable for intended service. Select valves designed so back seating protects packing and stem threads from fluid when valve is fully opened, and equipped with gland follower.

2.3.2 Comply with the following standards:

Cast Iron Valves: MSS SP-70. Cast Iron Gate Valves, Flanged and Threaded Ends.
Bronze Valves: MSS SP-80. Bronze Gate, Globe, Angle and Check Valves.
Steel Valves: ANSI B16.34. Steel Standard Class Valve Ratings.

2.3.3 Types of gate (GA) valves:

1 Threaded Ends 2" and Smaller (GA1): Class 125, bronze body, screwed bonnet, rising stem, solid wedge. Stockham B-100. Nibco T-111. Crane 428. Milwaukee 148.

2 Soldered Ends 2" and Smaller (GA2): Class 125, bronze body, screwed bonnet, non-rising stem, solid wedge. Stockham B-108 or B-109. Nibco S-111. Crane 1334. Milwaukee 149.

3 Flanged Ends 2½" and Larger (GA3): Class 125, iron body, bronze mounted, bolted bonnet, rising stem, OS&Y, solid wedge. Stockham G-623. Nibco F617-0. Crane 465½. Milwaukee F2885.

4 Threaded Ends 2" and Smaller (GA4): Class 150, bronze body, screwed bonnet, rising stem, solid wedge. Stockham B-122. Nibco T-131. Crane 431. Milwaukee 1150.

5 Soldered Ends 2" and Smaller (GA5): Class 150, bronze body, screwed bonnet, rising stem, solid wedge. Stockham B-124. Nibco S-134. Milwaukee 1169.

6 Threaded Ends 2" and Smaller (GA6): 175 WWP, bronze body, screwed bonnet, rising stem, OS&Y, solid wedge, UL-listed. Stockham B-133. Nibco T-104-0.

7 Flanged Ends 2½" and Larger (GA7): 175 WWP, iron body, bolted bonnet, rising stem, OS&Y, solid wedge, UL listed. Stockham G-634. Nibco F-607-0TS

8 Threaded Ends 2" and Smaller (GA8): Class 200, bronze body, union bonnet, rising stem, solid wedge, renewable seat. Stockham B-132. Nibco T-154-SS. Milwaukee 1174.

9 Flanged Ends 2½" and Larger (GA9): Class 250, iron body bronze mounted, bolted bonnet, rising stem, OS&Y, solid wedge. Stockham F-667. Nibco F-667-0. Crane 7½E. Milwaukee F-2894.

10 Threaded Ends 2" and Smaller (GA10): Class 300, bronze body, union bonnet, rising stem, solid wedge, renewable seat. Stockham B-145. Nibco T-174-SS. Crane 634E. Milwaukee 1184.

11 Flanged Ends 2½" and Larger (GA11): Class 300, cast steel body, bolted bonnet, rising stem, solid wedge, seal-welded seat rings. Provide trim to match use. Stockham 30-0F. Crane 33.

12 Flanged Ends 2½" and Larger (GA12): 300 WWP, iron body, bolted bonnet, bronze mounted, rising stem, OS&Y, solid wedge, UL-listed. Stockham F-670. Nibco F-697-0.

2.4 Check Valves:

2.4.1 Construction: Construct valves of castings free of any impregnating materials. Construct valves with a bronze regrinding disc with a seating angle of 40º to 45º, unless a composition disc is specified. Provide stop plug as renewable stop for disc hanger, unless otherwise specified. Disc and hanger shall be separate parts with disc free to rotate. Support hanger pins on both ends by removable side plugs.

2.4.2 Comply with the following standards:

Cast Iron Valves: MSS SP-71. Cast Iron Swing Check Valves, Flanged and Threaded Ends.
Bronze Valves: MSS SP-80. Bronze Gate, Globe, Angle and Check Valves.
Steel Valves: ANSI B16.34. Steel Standard Class Valve Ratings.

2.4.3 Types of check (CK) valves:

1 Threaded Ends 2" and Smaller (CK1): Class 125, bronze body, screwed cap, horizontal swing, bronze disc. Stockham B-319. Nibco T-413-BY. Crane 1707. Milwaukee 509.

2 Soldered Ends 2" and Smaller (CK2): Class 125, bronze body, screwed cap, horizontal swing, bronze disc. Stockham B-309. Nibco S-413-B. Crane 1707S. Milwaukee 1509.

3 Flanged Ends 2½" and Larger (CK3): Class 125, iron body, bronze-mounted, bolted cap, horizontal swing, cast-iron or composition disc. Stockham G-931 or G-932 as applicable. Nibco F918-B. Crane 373. Milwaukee F2974 as applicable.

4 Threaded Ends 2" and Smaller (CK4): 200 WWP, bronze body, screwed cap, horizontal swing, regrinding type bronze disc, for fire sprinkler use. Nibco KT-403-W.

5 Flanged Ends 2½" and Larger (CK5): 175 WWP, iron body, bolted cap, bronze mounted, composition disc, UL listed, with ball drip if required. Stockham G-940. Nibco F-908-W.

6 Threaded Ends 2" and Smaller (CK6): Class 200, bronze body, screwed cap, Y-pattern swing, regrinding bronze disc. Stockham B-345. Nibco T-453-B. Crane 36. Milwaukee 518/508.

7 Flanged Ends 2½" and Larger (CK7): Class 250, iron body, bronze mounted, bolted cap, cast-iron disc. Stockham F-947. Nibco F-968-B. Crane 39E.

Milwaukee F2970.

8 Threaded Ends 2" and Smaller (CK8): Class 300, bronze body, screwed cap, Y-pattern swing, regrinding bronze disc. Stockham B-375. Nibco T-473-B. Crane 76E. Milwaukee 517/507.

9 Flanged Ends 2½" and Larger (CK9): Class 300, cast steel body, bolted cap, horizontal swing, seal welded seat rings, chromium stainless disc. Stockham 30-SF. Crane 159.

2.5 Ball Valves:

2.5.1 General: Select with port area equal to or greater than connecting pipe area, include seat ring designed to hold sealing material.

2.5.2 Construction: Ball valves shall be rated for 150 psi saturated steam and 600 psi non-shock cold water. Pressure containing parts shall be constructed of ASTM B-584 alloy 844, or ASTM B-124 alloy 377. Valves shall be furnished with blow-out proof bottom loaded stem constructed of ASTM B-371 alloy 694 or other approved low zinc material. Provide TFE packing, TFE thrust washer, chrome-plated ball and reinforced teflon seats. Valves 1" and smaller shall be full port design. Valves 1¼" and larger shall be conventional port design. Stem extensions shall be furnished for use in insulated piping where insulation exceeds ½" thickness.

2.5.3 Comply with the following standards:

MSS SP-72. Ball Valves with Flanged or Butt Welding Ends for General Service.
MSS SP-110. Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

2.5.4 Types of ball (BA) valves:

1 Threaded Ends 2" and Smaller (BA1): Bronze two-piece full port body with adjustable stem packing. Nibco T-585-70. Stockham S216-BR-R-T. Milwaukee BA125. Apollo 77-100.

2 Soldered Ends 2" and Smaller (BA2): Bronze three-piece full port body with adjustable stem packing. Nibco S-595-Y-66. Milwaukee BA350. Apollo 82-200.

3 Threaded Ends 1" and Smaller (BA3): Bronze two-piece full port body, UL listed (UL 842) for use with flammable liquids and LP gas. Nibco T-585-70-UL.

4 Threaded Ends 2" and Smaller (BA4): 175 WWP, bronze two-piece body, UL listed for fire protection service. Nibco KT-585-70-UL and KT-580-70-UL.

5 Threaded Ends 2" and Smaller (BA5): 400 WWP, bronze two-piece body, for fire protection service. Nibco KT-580.

6 Threaded Ends 2½" and Smaller (BA6): 300 WWP, bronze three-piece body, gear operator with handwheel, indicator flag, accepts tamper switch, for fire protection, UL listed. Nibco T-505-4 and G-505-4.

7 Flanged Ends 2½" and Larger (BA7): Class 150, carbon steel full bore two-piece body with adjustable stem packing. Nibco F515-CS series. Apollo 88-240.

2.6 Valve Features:

2.6.1 General: Provide valves with features indicated and, where not otherwise indicated, provide proper valve features as determined by Installer for installation requirements. Comply with ANSI B31.1

2.6.2 Valve features specified or required shall comply with the following:

1 Bypass: Comply with MSS SP-45, and except as otherwise indicated, provide manufacturer's standard bypass piping and valving. Provide for gate valves 8" and larger.

2 Drain: Comply with MSS SP-45, and provide threaded pipe plugs complying with applicable Division-20, 21, 22, & 23 pipe or tube section. Provide for gate valves 8" and larger.

3 Flanged: Provide valve flanges complying with ANSI B16.1 (cast iron), ANSI B16.5 (steel), or ANSI B16.24 (bronze).

4 Threaded: Provide valve ends complying with ANSI B2.1.

5 Solder-Joint: Provide valve ends complying with ANSI B16.18.

6 Trim: Fabricate pressure-containing components of valve, including stems (shafts) and seats from brass or bronze materials, of standard alloy recognized in valve manufacturing industry unless otherwise specified.

7 Non-Metallic Disc: Provide non-metallic material selected for service indicated in accordance with manufacturer's published literature.

8 Renewable Seat: Design seat of valve with removable disc, and assemble valve so disc can be replaced when worn.

9 Extended Stem: Increase stem length by 2" minimum, to accommodate insulation applied over valve.

10 Mechanical Actuator: Provide factory-fabricated gears, gear enclosure, external chain attachment and chain designed to provide mechanical advantage in operating valve for all valves 4" and larger that are mounted more than 7'-0" above the floor, or are otherwise difficult to operate regardless of height.

3 EXECUTION

3.1 Installation:

3.1.1 General: Install valves where required for proper operation of piping and equipment, including valves in branch lines to isolate sections of piping. Locate valves so as to be accessible and so that separate support can be provided when necessary. Install valves with stems pointed up, in vertical position where possible, but in no case with stems

pointed downward below horizontal plane.

3.1.2 Insulation: Where insulation is indicated, install extended-stem valves, arranged in proper manner to receive insulation.

3.1.3 Applications Subject to Corrosion: Do not install bronze valves and valve components in direct contact with steel, unless bronze and steel are separated by dielectric insulator.

3.1.4 Mechanical Actuators: Install mechanical actuators as recommended by valve manufacturer.

3.2 Selection of Valve Ends (Pipe Connections): Except as otherwise indicated, select and install valves with the following ends or types of pipe/tube connections:

3.2.1 Tube Size 2" and Smaller: Threaded valves.

3.2.2 Pipe Size 2" and Smaller: Threaded valves.

3.2.3 Pipe Size 2½" and Larger: Flanged valves.

3.3 Non-Metallic Disc: Limit selection and installation of valves with non-metallic disc to locations indicated and where foreign material in piping system can be expected to prevent tight shutoff of metal seated valves.

3.4 Renewable Seats: Select and install valves with renewable seats, except where otherwise indicated.

3.5 Installation of Check Valves: Install in horizontal position with hinge pin horizontally perpendicular to center line of pipe. Install for proper direction flow.

END OF SECTION

SECTION 20F

PIPING SPECIALTIES

1 GENERAL

1.1 Drawings and general provisions of contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 This section is a Division-20 Basic Mechanical Materials and Methods section, and is part of each Division-20, 21, & 22 section making reference to or requiring piping specialties specified herein.

2 PRODUCTS

2.1 General: Provide factory-fabricated piping specialties recommended by manufacturer for use in service indicated. Provide piping specialties of types and pressure ratings indicated for each service, or if not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes as indicated, and connections, which properly mate with pipe, tube, and equipment connections. Where more than one type is indicated, selection is Installer's option.

2.2 Escutcheons:

2.2.1 General: Provide pipe escutcheons as specified herein with inside diameter closely fitting pipe outside diameter, or outside of pipe insulation where pipe is insulated. Select outside diameter of escutcheon to completely cover pipe penetration hole in floors, walls, or ceilings; and pipe sleeve extension, if any. Furnish pipe escutcheons with nickel or chrome finish for occupied areas, prime paint finish for unoccupied areas.

2.2.2 Pipe Escutcheons for Moist Areas: For waterproof floors, and areas where water and condensation can be expected to accumulate, provide cast brass or sheet brass escutcheons, solid or split hinged.

2.2.3 Pipe Escutcheons for Dry Areas: Provide sheet steel escutcheons, solid or split hinged.

2.3 Dielectric Unions: Provide standard products recommended by manufacturer for use in service indicated, which effectively isolate ferrous from non-ferrous piping (electrical conductance), prevent galvanic action and stop corrosion. .

2.4 Fire Barrier Penetration Seals:

2.4.1 Provide seals for any opening through fire-rated walls, floors, or ceilings used as passage for mechanical components such as piping or ductwork in accordance with the requirements of Division 7.

2.4.2 Openings 4" or Greater: Use sealing system capable of passing 3-hour fire test in accordance with ASTM E-814, consisting of wall wrap or liner, partitions, and end caps capable of expanding when exposed to temperatures of 250 to 350°F, UL-listed.

2.5 Fabricated Piping Specialties:

2.5.1 Drip Pans: Provide drip pans fabricated from corrosion-resistant sheet metal with watertight joints, and with edges turned up 2-1/2". Reinforce top, either by structural angles or by rolling top over ¼" steel rod. Provide hole, gasket, and flange at low point for watertight joint and 1" drain line connection.

2.5.2 Pipe Sleeves: Provide pipe sleeves of one of the following:

2.5.2.1 Sheet-Metal: Fabricate from galvanized sheet metal; round tube closed with snaplock joint, welded spiral seams, or welded longitudinal joint. Fabricate from the following gages: 3" and smaller, 20 gage; 4" to 6" 16 gage; over 6", 14 gage.

2.5.2.2 Iron-Pipe: Fabricate from cast-iron or ductile-iron pipe; remove burrs.

2.5.3 Sleeve Seals: Provide sleeve seals for sleeves located in foundation walls below grade, or in exterior walls, of one of the following:

2.5.3.1 Caulking and Sealant: Provide foam or caulking and sealant compatible with piping materials used.

3 EXECUTION

3.1 Pipe Escutcheons: Install pipe escutcheons on each pipe penetration through floors, walls, partitions, and ceilings where penetration is exposed to view; and on exterior of building. Secure escutcheon to pipe or insulation so escutcheon covers penetration hole, and is flush with adjoining surface.

3.2 Dielectric Unions: Install at each piping joint between ferrous and non-ferrous piping. Comply with manufacturer's installation instructions.

3.3 Fire Barrier Penetration Seals: Provide pipe sleeve as required. Fill entire opening with sealing compound. Adhere to manufacturer's installation instructions. Refer to Division 7.

3.4 Drip Pans: Locate drip pans under piping passing over or within 3' horizontally of electrical equipment, and elsewhere as indicated. Hang from structure with rods and building attachments, weld rods to sides of drip pan. Brace to prevent sagging or swaying. Connect 1" drain line to drain connection, and run to nearest plumbing drain or elsewhere as indicated.

3.5 Pipe Sleeves: Install pipe sleeves of types indicated where piping passes through walls, floors, ceilings, and roofs. Do not install sleeves through structural members of work, except as detailed on drawings, or as reviewed by Architect/Engineer. Install sleeves accurately centered on pipe runs. Size sleeves so that piping and insulation (if any) will have free movement in sleeve, including allowance for thermal expansion; but not less than 2 pipe sizes larger than piping run. Where insulation includes vapor-barrier jacket, provide sleeve with sufficient clearance for installation. Install length of sleeve equal to thickness of construction penetrated, and finish flush to surface; except floor sleeves. Extend floor sleeves ¼" above level floor finish, and ¾" above floor finish sloped to drain. Provide temporary support of sleeves during placement of

concrete and other work around sleeves, and provide temporary closure to prevent concrete and other materials from entering sleeves.

3.5.1 Install sleeves in fire-rated assemblies in accordance with the listing of the assembly and the fire barrier sealant.

3.5.2 Install sheet-metal sleeves at interior partitions and ceilings other than suspended ceilings. Fill annular space with caulking or fire barrier sealant as required.

3.5.3 Install steel-pipe sleeves at floor penetrations. Fill annular space with caulking or fire barrier sealant as required.

3.5.4 Install iron-pipe sleeves at all foundation wall penetrations and at exterior penetrations; both above and below grade. Fill annular space with caulking or mechanical sleeve seals.

END OF SECTION

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SECTION 20G

VIBRATION ISOLATION

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 This section is a Division-20 Basic Mechanical Materials and Methods section, and is part of each Division-20, 21, & 22 section making reference to vibration isolation equipment.

1.3 Extent of vibration isolation required by this section is indicated on drawings and/or specified in other Division-20, 21, & 22 sections.

1.4 Approval Submittals: When required by other Division-20, 21, & 22 sections, submit product data sheets for each type of vibration isolation equipment including configuration and rating data. Submit with Division-20, 21, & 22 section using vibration isolation, not as a separate submittal. Provide calculations showing supported weight, deflection, and isolator size and type for each item of supported equipment. Submit for:

Equipment Mountings. Type EM.
Hangers. Type HA.

1.5 O&M Data Submittals: Submit a copy of approval submittals for each type of vibration isolation equipment. Include this data in O&M Manual.

2 PRODUCTS

2.1 General: Provide factory-fabricated products recommended by manufacturer for use in service indicated. Provide products of types and deflections indicated; provide proper selection as determined by Installer to comply with specifications and installation requirements. Provide sizes which properly fit with equipment. All metal parts installed outside shall be hot dipped galvanized after fabrication.

2.2 Acceptable Manufacturers: Subject to compliance with requirements, provide vibration isolation equipment of: Mason Industries, Keflex, Consolidated Kinetics, Vibration Mountings & Controls, Wheatley or approved equal. All vibration isolators shall be supplied by a single approved manufacturer.

2.3 Equipment Mountings:

2.3.1 Select mountings with the required deflection and fastening means. Provide steel rails or bases as required to compensate for equipment rigidity and overhang.

2.3.2 Types of equipment mountings (EM):

1 Spring Mountings (EM1): Spring isolators shall be free-standing and laterally stable without any housing. All mounts shall have leveling bolts. Spring diameter shall be not less than 0.8 of the compressed height of the spring at

rated load. Springs shall have a minimum additional travel to solid equal to 50% of the rated deflection. Springs shall be so designed that the ratio of horizontal stiffness to vertical stiffness is approximately one. Provide a nominal static deflection of at least 1.0". Basis of Design: Mason Industries SLFH.

2 Spring Mountings with Housings (EM2): Spring isolators shall consist of open, stable steel springs and include vertical travel limit stops to control extension when weight is removed. The housing of the spring unit shall serve as blocking during erection of equipment. Provide a nominal static deflection of at least 1.0". All mountings used outside shall be hot dipped galvanized. Basis of Design: Mason Industries SLR.

3 Spring Mountings with Housings (EM3): Spring isolators shall consist of open, stable steel springs with neoprene inserts to limit movement between upper and lower housing on start and stop. Provide a nominal static deflection of at least 1.0". Mountings shall be specifically designed for critical areas on light-weight floors. Basis of Design: Mason Industries C.

4 Neoprene Mountings (EM4): Double deflection neoprene-in-shear mountings shall have a minimum static deflection of 0.35". All metal surfaces shall be neoprene covered. The top and bottom surfaces shall be neoprene ribbed and bolt holes shall be provided in the base. Basis of design: Mason Industries ND.

5 Pads (EM5): Waffle or ribbed pattern neoprene pads shall be fabricated from 40-50 durometer neoprene. Provide rigid steel plate and mounting angles as required. Basis of design: Mason Industries Super W.

2.4 Hangers:

2.4.1 Select hangers with the required deflection. Provide all required hanger rods and fasteners.

2.4.2 Types of hangers (HA):

1 Hangers (HA1): Vibration hangers shall contain a steel spring set in a neoprene cup manufactured with a grommet to prevent short-circuiting of the hanger rod. The cup shall contain a steel washer designed to properly distribute the load on the neoprene and prevent its extrusion. Spring diameters and hanger box lower-hole sizes shall be large enough to permit the hanger rod to swing through a 30-degree arc before contacting the hole and short circuiting the spring. Springs shall have a minimum additional travel to solid equal to 50% of the rated deflection. Basis of Design: Mason Industries 30.

2 Hangers (HA2): Vibration hangers shall contain a laterally stable steel spring and 0.3" deflection neoprene or fiberglass element in series. A neoprene neck shall be provided where the hanger rod passes through the steel box supporting the isolator mount to prevent metal to metal contact. Spring diameters and hanger box lower hole sizes shall be large enough to permit the hanger rod to swing through a 30 degree arc before contacting the hole and short circuiting the spring. Springs shall have a minimum additional travel to solid equal to 50% of the rated deflection. Basis of Design: Mason Industries 30N.

3 Hangers (HA3): Double deflection neoprene-in-sheer or EPDM hangers. Units shall be complete with projected neoprene bushing to prevent steel-to-steel contact between hanger box and hanger rod. Average static deflection shall be not less than 0.4 inches. Basis of Design: Mason Industries HD.

3 EXECUTION

3.1 Install vibration isolation devices for the duty indicated and for ease of inspection, adjustment, and proper operation. Install in accordance with the manufacturer's written instructions and coordinate with shop drawings of supported equipment.

3.2 All connections to fixtures and equipment shown on the drawings shall be considered diagrammatic unless otherwise indicated by detail. The actual connections shall be made to fully suit the requirements of each case and adequately provide for expansion and servicing.

3.3 Piping, ductwork and conduit shall not be suspended from one another or physically contact one another. Vibrating systems shall be kept free from non-vibrating systems.

3.4 Equipment Mountings:

3.4.1 Unless otherwise shown or specified, all floor-mounted equipment shall be set on housekeeping equipment bases. Refer to Division-20 section “Supports, Anchors, and Seals”.

3.4.2 No equipment unit shall bear directly on vibration isolators unless its own frame is suitably rigid to span between isolators, and such direct support is approved by the equipment manufacturer. All support frames shall be sufficiently stiff and rigid so as to prevent distortion and misalignment of components installed thereon.

3.4.3 Align equipment mountings for a free, plumb installation. Isolators that are binding, offset or fully compressed will not be accepted.

3.5 Hangers:

3.5.1 Position vibration isolation hangers so that hanger housing may rotate a full 360 degrees without contacting any object.

3.5.2 Install steel angles, channels, rods and fasteners to level equipment, piping or ductwork and to evenly distribute the supported weight.

3.6 Connections of Ducts: Ducts shall be connected to fan intakes and discharges by means of flexible connectors in accordance with Division-21 section "Ductwork Accessories" so that all vibrating equipment is fully isolated.

END OF SECTION

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SECTION 20H

SUPPORTS, ANCHORS, AND SEALS

1 GENERAL

1.1 Drawings and general provisions of Contract, including General Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 This section is a Division-20 Basic Materials and Methods section, and is a part of each Division-20, 21, & 22 section making reference to or requiring supports, anchors, and seals specified herein.

1.3 Extent of supports, anchors, and seals required by this section is indicated on drawings and/or specified in other Division-20, 21, & 22 sections.

1.4 Code Compliance: Comply with applicable codes pertaining to product materials and installation of supports, anchors, and seals.

1.5 MSS Standard Compliance:

1.5.1 Provide pipe hangers and supports of which materials, design, and manufacture comply with ANSI/MSS SP-58.

1.5.2 Select and apply pipe hangers and supports, complying with MSS SP-69.

1.5.3 Fabricate and install pipe hangers and supports, complying with MSS SP-89.

1.5.4 Terminology used in this section is defined in MSS SP-90.

1.6 UL Compliance: Provide products which are Underwriters Laboratories listed .

2 PRODUCTS

2.1 Acceptable Manufacturers: Subject to compliance with requirements, provide supports and hangers by Grinnel, Michigan Hanger Company, B-Line Systems, or approved equal.

2.2 Horizontal-Piping Hangers and Supports: Except as otherwise indicated, provide factory-fabricated horizontal-piping hangers and supports complying with ANSI/MSS SP-58, of one of the following MSS types listed, selected by Installer to suit horizontal-piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping. Provide copper-plated hangers and supports for copper-piping systems.

2.2.1 Adjustable Steel Clevises: MSS Type 1.

2.2.2 Steel Double Bolt Pipe Clamps: MSS Type 3.

2.2.3 Adjustable Steel Band Hangers: MSS Type 7.

2.2.4 Steel Pipe Clamps: MSS Type 4.

2.2.5 Pipe Stanchion Saddles: MSS Type 37, including steel pipe base support and cast-iron floor flange.

2.2.6 Single Pipe Rolls: MSS Type 41.

2.2.7 Adjustable Roller Hanger: MSS Type 43.

2.2.8 Pipe Roll Stands: MSS Type 44 or Type 47.

2.3 Vertical-Piping Clamps: Except as otherwise indicated, provide factory-fabricated vertical-piping clamps complying with ANSI/MSS SP-58, of one of the following MSS types listed, selected by Installer to suit vertical piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Select size of vertical piping clamps to exactly fit pipe size of bare pipe. Provide copper-plated clamps for copper-piping systems.

2.3.1 Two-Bolt Riser Clamps: MSS Type 8.

2.3.2 Four-Bolt Riser Clamps: MSS Type 42.

2.4 Hanger-Rod Attachments: Except as otherwise indicated, provide factory-fabricated hanger-rod attachments complying with ANSI/MSS SP-58, of one of the following MSS types listed, selected by Installer to suit horizontal-piping hangers and building attachments, in accordance with MSS SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select size of hanger-rod attachments to suit hanger rods. Provide copper-plated hanger-rod attachments for copper-piping systems.

2.4.1 Steel Turnbuckles: MSS Type 13.

2.4.2 Malleable Iron Sockets: MSS Type 16.

2.5 Building Attachments: Except as otherwise indicated, provide factory-fabricated building attachments complying with ANSI/MSS SP-58, of one of the following MSS types listed, selected by Installer to suit building substrate conditions, in accordance with MSS SP-69 and manufacturer's published product information. Select size of building attachments to suit hanger rods.

2.5.1 Center Beam Clamps: MSS Type 21.

2.5.2 C-Clamps: MSS Type 23.

2.5.3 Malleable Beam Clamps: MSS Type 30.

2.5.4 Side Beam Brackets: MSS Type 34.

2.5.5 Concrete Inserts: MSS Type 18.

2.6 Saddles and Shields: Except as otherwise indicated, provide saddles or shields under piping hangers and supports, factory-fabricated, for all insulated piping. Size saddles and shields for exact fit to mate with pipe insulation.

2.6.1 Protection Shields: MSS Type 40; of length recommended by manufacturer to prevent crushing of insulation.

2.6.2 Protection Saddles: MSS Type 39; use with rollers, fill interior voids with segments of insulation matching adjoining insulation.

2.7 Miscellaneous Materials:

2.7.1 Metal Framing: Provide products complying with NEMA STD ML 1.

2.7.2 Steel Plates, Shapes and Bars: Provide products complying with ANSI/ASTM A 36.

2.7.3 Cement Grout: Portland cement (ANSI/ASTM C 150, Type I or Type III) and clean uniformly graded, natural sand (ANSI/ASTM C 404, Size No. 2). Mix at a ratio of 1.0 part cement to 3.0 parts sand, by volume, with minimum amount of water required for placement and hydration.

2.7.4 Heavy-Duty Steel Trapezes: Fabricate from steel shapes or continuous channel struts selected for loads required; weld steel in accordance with AWS standards.

3 EXECUTION

3.1 Preparation

3.1.1 Proceed with installation of hangers, supports and anchors only after required building structural work has been completed in areas where the work is to be installed. Correct inadequacies including (but not limited to) proper placement of inserts, anchors and other building structural attachments.

3.1.2 Prior to installation of hangers, supports, anchors and associated work, Installer shall meet at project site with Contractor, installer of each component of associated work, and installers of other work requiring coordination with work of this section for purpose of reviewing material selections and procedures to be followed in performing the work in compliance with requirements specified.

3.2 Installation of Building Attachments:

3.2.1 Install building attachments at required locations within concrete or on structural steel for proper piping support. Space attachments within maximum piping span length indicated in MSS SP-69. Install additional building attachments where support is required for additional concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten insert securely to forms. Where concrete with compressive strength less than 2500 psi is indicated, install reinforcing bars through openings at top of inserts.

3.2.2 In areas of work requiring attachments to existing concrete, use self drilling rod inserts, Phillips Drill Co., "Red-Head" or equal.

3.3 Installation of Hangers and Supports:

3.3.1 General: Install hangers, supports, clamps and attachments to support piping properly from building structure; comply with MSS SP-69. Arrange for grouping of parallel runs of horizontal piping to be supported together on trapeze type hangers where possible. Install supports with maximum spacings complying with MSS SP-69 or as listed herein, whichever is most limiting. Where piping of various sizes is to be supported together by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipe. Do not use wire or perforated metal to support piping, and do not support piping from other piping.

3.3.1.1 Horizontal steel pipe and copper tube 1-1/4" diameter and smaller: support on 6 foot centers.

3.3.1.2 Horizontal steel pipe and copper tube 1-1/2" diameter and larger: support on 10 foot centers.

3.3.1.3 Vertical steel pipe and copper tube: support at each floor.

3.3.1.4 Plastic pipe: support in accordance with manufacturer's recommendations.

3.3.1.5 Horizontal cast iron pipe inside building: support each length of pipe (at the joint).

3.3.1.6 Vertical cast iron pipe: support at each floor and at the base.

3.3.1.7 Fire protection piping: support in accordance with NFPA 13.

3.3.2 Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers and other accessories.

3.3.3 Paint all black steel hangers with black enamel. Galvanized steel and copper clad hangers do not require paint.

3.3.4 Prevent electrolysis in support of copper tubing by use of hangers and supports which are copper plated, or by other recognized industry methods.

3.3.5 Provision for Movement:

3.3.5.1 Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends and similar units.

3.3.5.2 Load Distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

3.3.5.3 Pipe Slopes: Install hangers and supports to provide indicated pipe slopes, and so that maximum pipe deflections allowed by ANSI B31 are not exceeded.

3.3.6 Insulated Piping: Comply with the following installation requirements.

3.3.6.1 Shields: Where low-compressive-strength insulation or vapor barriers are indicated, install coated protective shields. For pipe 8" and over, install wood insulation saddles.

3.3.6.2 Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through insulation; do not exceed pipe stresses allowed by ANSI B31.

3.3.7 Support fire protection piping independently of other piping.

3.4 Installation of Anchors:

3.4.1 Install anchors at proper locations to prevent stresses from exceeding those permitted by ANSI B31, and to prevent transfer of loading and stresses to connected equipment.

3.4.2 Fabricate and install anchors by welding steel shapes, plates and bars to piping and to structure. Comply with ANSI B31 and with AWS standards.

3.4.3 Anchor Spacings: Where not otherwise indicated, install anchors at ends of principal pipe-runs, at intermediate points in pipe-runs between expansion loops and elbows. Make provisions for preset of anchors as required to accommodate both expansion and contraction of piping.

3.4.4 Where expansion compensators are indicated, install anchors in accordance with expansion unit manufacturer's written instructions to limit movement of piping and forces to maximums recommended by manufacturer for each unit.

3.5 Equipment Bases:

3.5.1 Provide concrete housekeeping bases for all floor mounted equipment furnished as part of the work of Division 15. Size bases to extend minimum of 4" beyond equipment base in any direction; and 4" above finished floor elevation. Construct of reinforced concrete, roughen floor slab beneath base for bond, and provide steel rod anchors between floor and base. Locate anchor bolts using equipment manufacturer's templates. Chamfer top and edge corners.

3.5.2 Provide structural steel stands to support equipment not floor mounted or hung from structure. Construct of structural steel members or steel pipe and fittings. Provide factory-fabricated tank saddles for tanks mounted on steel stands. Prime and paint with black enamel.

END OF SECTION

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SECTION 20I

MECHANICAL IDENTIFICATION

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 This section is a Division-20 Basic Mechanical Materials and Methods section, and is part of each Division-20, 21, & 22 section making reference to or requiring identification devices specified herein.

1.3 Extent of mechanical identification work required by this section is indicated on drawings and/or specified in other Division-20, 21, & 22 sections.

1.4 Refer to Division-26 sections for identification requirements of electrical work; not work of this section. Refer to other Division-21 sections for identification requirements for controls; not work of this section.

1.5 Codes and Standards: Comply with ANSI A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

2 PRODUCTS

2.1 General: Provide manufacturer's standard products of categories and types required for each application as referenced in other Division-20, 21, & 22 sections. Where more than single type is specified for application, selection is Installer's option, but provide single selection for each product category.

2.2 Painted Identification Materials

2.2.1 Stencils: Standard fiberboard stencils, prepared for required applications with letter sizes generally complying with recommendations of ANSI A13.1 for piping and similar applications, but not less than 1-¼" high letters for ductwork and not less than ¾" high letters for access door signs and similar operational instructions.

2.2.2 Stencil Paint: Standard exterior type stenciling enamel; black, except as otherwise indicated; either brushing grade or pressurized spray-can form and grade.

2.2.3 Identification Paint: Standard identification enamel.

2.3 Plastic Pipe Markers

2.3.1 Pressure-Sensitive Type: Provide manufacturer's standard pre-printed, permanent adhesive, color-coded, pressure-sensitive vinyl pipe markers.

2.3.1.1 Lettering: Manufacturer's standard pre-printed nomenclature which best describes piping system in each instance, as selected by Architect/Engineer in cases of variance with name as shown or specified.

2.3.1.2 Arrows: Print each pipe marker with arrows indicating direction of flow, either integrally with piping system service lettering (to accommodate both directions), or as separate unit of plastic.

2.4 Valve Tags:

2.4.1 Brass Valve Tags: Provide 19-gage polished brass valve tags with stamp-engraved piping system abbreviation in ¼" high letters and sequenced valve numbers ½" high, and with 5/32" hole for fastener. Provide 1-½" diameter tags, except as otherwise indicated.

2.4.2 Plastic Laminate Valve Tags: Provide manufacturer's standard 3/32" thick engraved plastic laminate valve tags, with piping system abbreviation in ¼" high letters and sequenced valve numbers ½" high, and with 5/32" hole for fastener. Provide 1-½" square black tags with white lettering, except as otherwise indicated.

2.5 Engraved Plastic-Laminate Signs:

2.5.1 General: Provide engraving stock melamine plastic laminate, in the sizes and thicknesses indicated, engraved with engraver's standard letter style a minimum of 3/4" tall and wording indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.

2.5.2 Thickness: 1/16" for units up to 20 sq. in. or 8" length; 1/8” for larger units.

2.5.3 Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate the substrate.

2.6 Stamped Nameplates: Provide equipment manufacturer's standard stamped nameplates for motors, AHUs, pumps, etc.

3 EXECUTION

3.1 Coordination: Where identification is to be applied to surfaces which require insulation, painting or other covering or finish, including valve tags in finished mechanical spaces, install identification after completion of covering and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment.

3.2 Ductwork Identification:

3.2.1 General: Identify air supply, return, exhaust, intake and relief ductwork with stenciled signs and arrows, showing ductwork service and direction of flow, in black or white.

3.2.2 Location: In each space where ductwork is exposed, or concealed only by removable ceiling system, locate signs near points where ductwork originates or continues into concealed enclosures, and at 50' spacings along exposed runs.

3.2.3 Access Doors: Provide stenciled signs on each access door in ductwork and housings, indicating purpose of access (to what equipment) and other maintenance and operating instructions, and appropriate and procedural information.

3.3 Piping System Identification:

3.3.1 General: Install pipe markers of one of the following types on each system indicated to receive identification, and include arrows to show normal direction of flow:

3.3.1.1 Plastic pipe markers.

3.3.1.2 Stenciled markers, black or white for best contrast.

3.3.2 Locate pipe markers as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces and exterior non-concealed locations.

3.3.2.1 Near each valve and control device.

3.3.2.2 Near each branch, excluding short take-offs for fixtures and terminal units; mark each pipe at branch, where there could be question of flow pattern.

3.3.2.3 Near locations where pipes pass through walls, floors, ceilings, or enter non-accessible enclosures.

3.3.2.4 At access doors, manholes and similar access points which permit view of concealed piping.

3.3.2.5 Near major equipment items and other points of origination and termination.

3.3.2.6 Spaced intermediately at maximum spacing of 50' along each piping run, except reduce spacing to 25' in congested areas of piping and equipment.

3.3.2.7 On piping above removable acoustical ceilings, except omit intermediately spaced markers.

3.3.3 The following piping shall be color-coded where exposed in mechanical and electrical rooms by completely painting the piping with the indicated color. Use standard colors where exposed in finished spaces. Use standard identification methods in concealed areas.

Gas Piping-Yellow

3.4 Valve Identification: Provide coded valve tag on every valve, cock and control device in each piping system; exclude check valves, valves within factory-fabricated equipment units, plumbing fixture faucets, convenience and lawn-watering hose bibs, and shut-off valves at plumbing fixtures, HVAC terminal devices and similar rough-in connections of end-use fixtures and units. Coordinate code with operating instructions.

3.5 Valve Charts: Provide framed, glass covered valve charts in each mechanical room. Identify coded valve number, valve function, and valve location for each valve.

3.6 Mechanical Equipment Identification: Install engraved plastic laminate sign on a vertical surface on or near each major item of mechanical equipment and each operational device. Label shall indicate type of system and area served. Provide signs for the following general categories of equipment and operational devices:

3.6.1 Main control and operating valves, including safety devices.

3.6.2 Meters, gauges, thermometers and similar units.

3.6.3 Heat exchangers, coils, evaporators, cooling towers, heat recovery units and similar equipment.

3.6.4 Fans, blowers, primary balancing dampers and VAV boxes.

3.6.5 HVAC air handlers and fan coil units.

3.6.6 Air conditioning indoor and outdoor units.

3.7 Stamped Nameplates: Equipment manufacturers to provide standard stamped nameplates on all major equipment items such as motors, pumps, AHUs, etc. Where motors are hidden from view (within equipment casing, or otherwise not easily accessible, etc.), the equipment supplier shall furnish a duplicate motor data nameplate to be affixed to the equipment casing in an easily visible location, unless data is already included on the equipment nameplate.]

3.8 Adjusting and Cleaning:

3.8.1 Adjusting: Relocate any mechanical identification device which has become visually blocked by work of this division or other divisions.

3.8.2 Cleaning: Clean face of identification devices, and glass frames of valve charts.

END OF SECTION

SECTION 20J

ACCESS DOORS

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 This section is a Division-20 Basic Mechanical Materials and Methods section, and is part of each Division-20, 21, & 22 section making reference to or requiring access panels specified herein.

1.3 Approval Submittals:

1.3.1 Product Data: When required by other Division-20, 21, and 22 sections, submit product data for access doors. Submit with Division-20, 21, & 22 section using access doors, not as a separate submittal. Include rating data.

1.4 O&M Data Submittals: Submit a copy of approval submittal. Include this data in O&M Manuals.

2 PRODUCTS

2.1 Acceptable Manufacturers: Subject to compliance with requirements, provide access doors by Acudor, Milcor, Jay R. Smith, Zurn, BOICO, Elmdor, or approved equal.

2.2 General: Where floors, walls and ceilings must be penetrated for access to mechanical work, provide types of access doors indicated. Furnish sizes indicated or, where not otherwise indicated, furnish adequate size for intended and necessary access. Furnish manufacturer's complete units, of type recommended for application in indicated substrate construction, in each case, complete with anchorages and hardware.

2.3 Access Door Construction: Except as otherwise indicated, fabricate wall/ceiling door units of welded steel construction with welds ground smooth; 16-gauge frames and 14-gauge flush panel doors; 175° swing with concealed spring hinges; flush screw-driver-operated cam locks; factory-applied rust-inhibitive prime-coat paint finish.

2.4 Locks: Where indicated, provide flat pass key type unless otherwise indicated, 2 keys.

2.5 Fire Rated Access Doors: Where required furnish with 20-gauge insulated sandwich panel, automatic closing mechanism, cylinder type lock (self-latching with inside release mechanism), and continuous concealed steel hinge pin. Access doors shall carry the UL 1-½ hour "B" label.

2.6 Insulated Access Doors: Provide 1.0” double wall insulated, hinged access doors. Provide 20 gauge satin coat steel door panels with 0.060” extruded aluminum door panel frames and 0.080” extruded aluminum flanged frame. Provide 0.75 PCF fiberglass insulation sandwiched between inner and outer panel. Provide extruded EDPM or closed cell neoprene draft seal gasket, zinc plated steel continuous hinge. Provide dual acting compression lever type handles, operable from either side of the

door. Provide 2 handles for doors 48” tall or less. Provide 3 handles for doors over 48” tall.

2.7 Air and Water Sealed Access Doors: Provide wall/ceiling door units of welded stainless steel construction with welds ground smooth; 16-gauge frames and 16-gauge flush panel doors; 175° swing with continuous exposed stainless steel piano hinge; continuous bulb trim gasket; Stainless steel Phillips head screw latch; Stainless steel #4 satin polish finish.

3 EXECUTION

3.1 Access doors shall be installed to operate and service all mechanical equipment including valves, dampers, duct access panels, and other items requiring maintenance that are concealed above or behind finished construction. Access doors shall be installed in walls, chase and floors as necessary, but are not required in accessible suspended ceiling systems. Access doors shall have factory applied protective phosphate coating and baked enamel primer suitable for field painting.

3.2 Access doors shall be installed by the Division installing the substrate construction. However, responsibility for furnishing and determining location of access doors is part of this Division's work. The style of access door shall be suitable for construction into which installed.

3.3 Access doors shall be sized and located as required to provide proper maintenance and service access in accordance with the manufacturer's recommendations and code authority requirements for all devices and equipment.

END OF SECTION

SECTION 20K

TESTING, CLEANING, AND STERILIZATION OF PIPING SYSTEMS

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 This section is a Division-20 Basic Mechanical Materials and Methods section, and is part of each Division-20, 21, & 22 section making reference to or requiring the testing and other procedures specified herein.

1.3 Notify the Architect/Engineer when system tests are ready to be witnessed at least 24 hours prior to the test.

1.4 All materials, test equipment, and devices required for cleaning, testing, sterilizing or purging shall be provided by the Contractor.

2 PRESSURE TESTS

2.1 General: Provide temporary equipment for testing, including pump and gauges. Test piping systems before insulation is installed wherever feasible, and remove control devices before testing. Test each natural section of each piping system independently but do not use piping system valves to isolate sections where test pressure exceeds valve pressure rating. Fill each section with indicated medium and pressurize for indicated pressure and time.

2.2 Required test period is four hours.

2.3 No piping, fixtures, or equipment shall be concealed or covered until they have been tested. The contractor shall apply each test and ensure that it is satisfactory for the period specified before calling the Architect/Engineer to observe the test. Test shall be repeated upon request to the satisfaction of those making the inspection.

2.4 Observe each test section for leakage at the end of the test period. Test fails if leakage is observed or if pressure drop exceeds 5% of the test pressure.

2.5 Check of systems during application of test pressures should include visual check for water leakage and soap bubble or similar check for air and nitrogen leakage.

2.6 During heating and cooling cycles, linear expansion shall be checked at all elbows and expansion joints for proper clearance.

2.7 Repair piping systems sections which fail required piping test. Disassemble and re-install using new materials to extent required to overcome leakage. Do not use chemicals, stop-leak compounds, mastics, or other temporary repair methods.

2.8 Pressure Test Requirements:

2.8.1 Soil, Waste, and Vent Test all piping within the building with a 10 foot head of water. Test piping in sections so that all joints are tested. Provide test tees as required.

2.8.2 Domestic Water:: Perform hydrostatic test on all piping within the building at twice the normal static pressure at service point, but not less than 100 psig. Once tested, flush out piping and leave under pressure of the supply main or 40 psig for the balance of the construction period.

2.8.3 Gas: Test with air or nitrogen at 150% of normal working pressure, but not less than 25 psig. The test and check for leaks shall be in accordance with NFPA-54.

3 CLEANING AND STERILIZATION

3.1 General: Clean exterior surfaces of installed piping systems of superfluous materials, and prepare for application of specified coatings (if any). Flush out piping systems with clean water or blowdown with air before proceeding with required tests. Inspect each run of each system for completion of joints, supports and accessory items.

3.2 Flush and drain all water systems at least three times. Reverse flush systems from smallest piping to largest piping. Replace startup strainers with operating strainers.

3.3 Blowdown all systems with air or nitrogen (at a rate of flow exceeding design) at least three times or until no residue shows at each outlet. Reverse blowdown systems from smallest piping to largest piping.

3.4 Sterilization of Domestic Water Systems:

3.4.1 Prerequisites: All new hot and cold water piping installed (complete), all fixtures connected, system flushed out, and system filled with water.

3.4.2 The shut off valve at the point of connection shall be closed, all fixture outlets opened slightly, and a sterilizing solution shall be introduced at a manifold connection installed by the Contractor at the point of connection.

3.4.3 The solution shall contain 50 parts per million of available chlorine. The chlorinating material shall be either liquid chlorine or calcium hypochlorite. The solution shall be allowed to stand in the system for at least eight hours after which the entire system shall be flushed.

3.4.4 After final flushing, all aerators shall be removed, cleaned, and reinstalled. After final flush the residual chlorine shall not exceed 0.2 parts per million.

3.4.5 The Architect/Engineer shall be notified 24 hours prior to the procedure so that it can be witnessed.

3.4.6 Provide sampling and certified report by an independent testing lab. Provide written Health Department approval of disinfection samples.

3.5 Fuel Gas: Purge all fuel gas systems in accordance with NFPA 54.

END OF SECTION

SECTION 20L

EXCAVATION & BACKFILL

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 This section is a Division-20 Basic Mechanical Materials and Methods section, and is part of each Division-20, 21, & 22 section making reference to or requiring excavation and backfill specified herein.

1.3 Existing Utilities: Underground utilities shown were taken from old drawings. The exact location of these utilities and irrigation branches and abandoned services are not known. Use extreme caution when excavating.

1.4 Refer to other Division-20, 21, & 22 sections and/or drawings for specific requirements of the particular piping system being installed. Where another Division-20, 21, & 22 section or the drawings conflict with requirements of this section, the other Division-20, 21, & 22 section or the drawings shall take precedence over the general requirements herein.

1.5 OSHA: Contractor employee worker protection for all trenching and excavation operations shall comply with 29 CFR 1926.650 Subpart P and all current OSHA requirements.

1.6 Trench Safety Act: Contractor shall comply with all requirements of Florida Statutes Chapter 553, including the requirement to provide a separate line item to identify the cost to comply on a per lineal foot of trench and per square foot of shoring.

2 PRODUCTS

2.1 Sand: Clean, hard, uncoated grains free from organic matter or other deleterious substances. Sand for backfill shall be of a grade equal to mortar sand.

2.2 Gravel: Clean, well graded hard stone or gravel, free from organic material. Size range to be from No. 4 screen retentions to 1".

2.3 Earth: Fill free of clay, muck, stones, wood, roots or rubbish.

2.4 Identification Tape: Polyethylene 6 inches wide, 0.004 inches thick, continuously printed with "CAUTION" in large letters and type of pipe below.

2.5 Copper Identification Wire: 14-gauge.

3 EXECUTION

3.1 Ditching and Excavation: Shall be performed by hand wherever there is a possibility of encountering obstacles or any existing utility lines of any nature whatsoever. Where clear and unobstructed areas are to be excavated, appropriate machine excavation methods may be employed. Avoid use of machine excavators within the limits of the building lines.

3.2 Bedding: Excavate to bottom grade of pipe to be installed, and shape bed of undisturbed earth to contour of pipe for a width of at least 50% of pipe diameter. If earth conditions necessitate excavation below grade of the pipe, such as due to the presence of clay, muck, or roots, subcut and bring bed up to proper elevation with clean, new sand (as described in paragraph 2.1), deposited in 6" layers and tamped. Notify Architect/Engineer if subcut exceeds 12", or if bed is of an unstable nature. In this case a 6" minimum layer of gravel will be required before sand bedding begins. Submit cost proposal if the earth conditions require subcut in excess of 12" or if gravel is required to achieve proper bedding.

3.3 Placing: Pipe shall be carefully handled into place. Avoid knocking loose soil from the banks of the trench into the pipe bed. Rig heavier sections with nylon slings in lieu of wire rope to avoid crushing or chipping. Pipe which is handled with insulation in place, coated pipe, and jacketed pipe shall have special handling slings as required to prevent damage to the material.

3.4 Backfilling: Deposit clean new sand (as described in paragraph 2.1) to 6" above the pipe and tamp. Then deposit sand or earth carefully in 6" layers, maintaining adequate side support, especially on nonferrous piping materials. Compact fill in 6" layers, using mechanical means, up to the top elevation of the pipe, and in 12" layers to rough or finish grade as required. Fine grade and restore surface to original condition.

3.5 Special: Excavations shall be installed and maintained in satisfactory condition during the progress of the work. Subsurface structures are to be constructed in adequately sized excavations. De-watering equipment shall be installed and properly maintained where required. Shoring shall be employed in the event of unstable soil condition, and in all cases where required by OSHA regulations and necessary to protect materials and personnel from injury.

3.6 Identification: Install identification tape directly above all underground piping, one tape for each pipe where multiple pipes are installed. Depth of tape shall be at least 6 inches below finished grade and 24" above buried pipe. Install copper wire above non-metallic pipes.

3.7 Depth of Cover: Minimum cover for underground piping is two feet unless indicated otherwise.

END OF SECTION

SECTION 21A

SPLIT SYSTEM AIR CONDITIONING UNITS

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 Division-20 Basic Mechanical Materials and Methods sections apply to work of this section.

1.3 Refer to other Division-21 sections for testing, adjusting, and balancing of air conditioning units (AHUs).

1.4 Approval Submittals:

1.4.1 Product Data: Submit manufacturer's technical product data, including dimensions, ratings, electrical characteristics, weight, capacities, materials of construction, and installation instructions.

Split system units
Vibration Isolation

1.5 O&M Data Submittals: Submit manufacturer's maintenance data including parts lists. Include these data, a copy of approval submittals, product data, and wiring diagrams in O&M manual.

2 PRODUCTS

2.1 Quality Assurance:

2.1.1 Provide units tested by UL, ARL or ETL.

2.1.2 Construct refrigeration system in accordance with ASHRAE 15 (ANSI B 9.1) "Safety Code for Mechanical Refrigeration".

2.1.3 Test and rate AHUs in accordance with the applicable ARI standards and provide certified rating seal. Sound test and rate units in accordance with ARI 270.

2.1.4 Provide units with an EER or SEER2 that meets the Florida Energy Efficiency Code and the schedules on the drawings.

2.1.5 Acceptable Manufacturers: Subject to compliance with requirements provide units by: Carrier, Trane, Lennox, or approved equal.

2.2 General:

2.2.1 Units shall be factory-assembled, wired and tested. All controls shall be factory-adjusted and preset to the design conditions.

2.2.2 Casings: Construct of heavy gauge steel (or aluminum) formed panels rigidly

reinforced and braced. Each unit shall be provided with removable panels to permit the unit (including fans and compressors) to be properly maintained and serviced. Entire casing shall be painted with factory-applied finish. Casing for outdoor units shall be provided with weatherproof construction with all seams bolted. Provide stainless steel hardware.

2.2.3 Heat Pump Condensing Unit Supports: Provide individual concrete pad 4" larger than the unit on all sides.

2.3 Condensing Unit:

2.3.1 Condenser Fans and Drives: Fan shall of rustproof construction: hot-dipped galvanized steel, stainless steel or aluminum. Unit shall have a variable speed motor suitable for the duty indicated. Provide a close fretwork galvanized steel or non-ferrous fan and guard. Motors shall be the permanently lubricated type, resiliently mounted.

2.3.2 Condenser Coil: Construct of copper nonferrous tubes and nonferrous fins. Provide inlet guard to protect condenser fins.

2.3.3 Compressor: Shall be scroll, hermetic, or semi-hermetic reciprocating design for EPA approved refrigerant with vibration isolation. Each compressor shall have separate refrigerant circuit. Motors shall be ball bearing, high starting torque, low starting current type for compressor service. Compressors shall not produce objectionable noise or vibration inside the building. Compressors shall have five (5) year warranty. Provide dual compressor machines if scheduled.

2.3.4 Service Valves: Provide for high and low pressure readings.

2.4 Evaporator Unit:

2.4.1 Interior of unit shall be thermally and acoustically insulated with minimum R=4.2 insulation. Provide removable panels to permit the unit to be properly serviced and maintained.

2.4.2 The evaporator shall include centrifugal fan, fan motor, direct drive ECM fan motors and lubricated bearings. Motors shall be high efficiency type. Provide cooling coils constructed of copper nonferrous tubes and aluminum fins. Filters and coils shall be selected for a maximum face velocity of 500 fpm. Provide thermal expansion valve, sight glass, refrigerant drier, strainer, controls and other necessary devices for a completely automatic unit.

2.4.3 Each unit shall be equipped with sloped IAQ drain pans under the entire evaporator coil to prevent condensate carry-over.

2.5 Electric Heater Section:

2.5.1 Provide electric heating coils controlled by one or more magnetic contactors. Three phase coils shall be wired for balanced current in each wire, if possible. Furnish and install necessary overheating and air flow controls to meet the requirements of the National Electric Code. Provide built-in air flow switch and heater interlock relay.

2.5.2 Heaters shall be factory mounted and wired with all required fuses and contactors to provide single point connection.

2.6 Unit Controls:

2.6.1 All safety and operational controls shall be factory wired.

2.6.2 Safety and Operational Control Features:

Internal compressor overtemperature protection.
Crankcase heaters.
Individual motor overcurrent protection.
High pressure cutout.
Low pressure cutout.
Anti-recycle timer (5 minute)
Timer-type defrost control.

Liquid line solenoid.
Refrigerant monitoring system

2.7 Refrigerant Piping:

2.7.1 Copper tubing ¾" and smaller: Type ACR, hard-drawn temper tubing; wrought-copper, solder-joint fitting; brazed joints.

2.7.2 Copper tubing 7/8" – 4-1/8": Type ACR, hard-drawn temper tubing; wrought-copper, solder-joint fitting; brazed joints.

2.7.3 Silver solder material: Silver solder bearing at least 15% silver; Sil Fos.

2.8 Basic Vibration Isolation: Provide vibration isolation products complying with Division-20 section "Vibration Isolation" and the following list:

2.8.1 Equipment Mounting: Type EM5

3 EXECUTION

3.1 Installation: Install in accordance with producer's printed instructions. Brush out fins on all coils.

3.2 Support: Mount units on concrete housekeeping pads with manufacturer's recommended service and operating clearance.

3.3 Hang air handling units level and plumb from structure using threaded rods and vibration isolators. Where units are above ceilings, provide secondary drain pans. Mount units on vibration isolation for units 5 tons and under; mount on concrete housekeeping pads and vibration isolation for units over 5 tons.

3.4 Brush out fins on all coils.

3.5 Refrigerant Piping: Comply with ANSI B31.5, "Refrigerant Piping," (except lower pressure limits below 15 psig), and ASHRAE 15 (ANSI B9.1). Make all joints carefully

and neatly. Clean pipe and fittings before fluxing. Remove burrs. Braze by the sweat method using Sil Fos. Install field installed refrigerant devices and valves as required.

3.6 Testing: After job erection, or modification of factory installed piping, pressure test for leaks at 150 psig using a nominal amount of a suitable tracer refrigerant and dry nitrogen or a suitable refrigerant. Perform leak tests with an electronic halide leak detector having a sensitivity of at least ½ ounce R-12 per year. Refrigeration piping will not be accepted unless it is gas tight.

3.7 Evacuation: After completing the successful pressure test, multiple-evacuate the system. Leave the compressor isolation valves shut and connect the vacuum pump to both the high and low sides. Evacuate the system to an absolute pressure of 1,500 microns. Then break vacuum to 2 psig with dry nitrogen. Repeat this process. Install the proper biflow drier in the liquid line and evacuate the system to 500 microns. Leave vacuum pump running for at least two hours without interruption. Break vacuum with the refrigerant to be used and raise pressure to 2 psig. Do not operate compressors during the evacuation procedure.

3.8 Charging: After completing the successful evacuation procedure, charge refrigerant directly to the system from the original containers through a filter drier. Charge to the manufacturer's stated conditions of pressure for required temperature. Weigh the refrigerant added and record on the startup report.

3.9 Construction Filters: Provide 2" thick 30% filters in all units during construction. After construction (but prior to the test and balance being performed) install clean final filters.

3.10 Cleaning: Clean tar and all other soil from housing exterior. Leave ready for Division 7, Caulking Work. Caulk around pipe sleeves.

3.11 Condensate Drain: Pipe trapped copper condensate drain (full size of unit outlet) to nearest floor drain or as shown on the drawings. Refer to Division-20 section "Insulation" for pipe insulation.

3.12 Startup: Check entire assembly for correctness of installation, alignment, and control sequencing. Start all component parts in proper sequence. Make all adjustments required to insure proper smooth quiet operation.

END OF SECTION

SECTION 21B

DUCTLESS SPLIT SYSTEM AIR CONDITIONING UNITS

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 Division-20 Basic Mechanical Materials and Methods sections apply to work of this section.

1.3 Refer to other Division-20 sections for testing, adjusting, and balancing of units; not work of this section.

1.4 Approval Submittals:

1.4.1 Product Data: Submit manufacturer's technical product data, including dimensions, ratings, electrical characteristics, weight, capacities, materials of construction, and installation instructions. Submit assembly-type drawings showing all piping and electrical connections and all mounting requirements. Show methods of fastening and assembly of components. Provide wiring diagrams.

1.5 O&M Data Submittals: Submit manufacturer's maintenance data including parts lists. Include these data, product data, and a copy of approval submittals in O&M manual.

2 PRODUCTS

2.1 Quality Assurance:

2.1.1 Test and rate split system air conditioning units in accordance with ARI Standard 210, 240 or 360 as applicable, and provide certified rating seal.

2.1.2 Construct refrigeration system of split system air conditioning units in accordance with ASHRAE 15 (ANSI B 9.1) "Safety Code for Mechanical Refrigeration".

2.1.3 Provide split system air conditioning units with an SEER that meets the Florida Energy Efficiency Code and the schedule on the drawings.

2.1.4 Provide split system air conditioning units that are designed, manufactured, and tested in accordance with UL or ETL requirements.

2.1.5 Acceptable Manufacturers: Submit to compliance with requirements, provide units by Friedrich, Daikin, Carrier, Sanyo, Toshiba, Mitsubishi, or approved equal.

2.2 General:

2.2.1 Casings: Construct of painted mill galvanized steel (or aluminum) formed panels rigidly reinforced and braced. Each unit shall be provided with removable panels to permit the unit (including fans and compressors) to be properly maintained and serviced.

2.3 Condensing Unit:

2.3.1 Condenser Fans and Drives: Fan shall be of rustproof construction, hot dipped galvanized steel, stainless steel or aluminum. Unit shall have weather protected totally enclosed motor. Provide a close fretwork galvanized steel or non-ferrous fan guard. Motors shall be the permanently lubricated type, resiliently mounted.

2.3.2 Condenser Coil: Construct of non-ferrous tubes and aluminum fins. Provide inlet guard to protect condenser fins.

2.3.3 Compressor: Shall be scroll or hermetic design with vibration isolation. Compressor shall not produce objectionable noise or vibration inside the building. Compressors shall have five (5) year warranty.

2.3.4 Service Valves: Provide for high and low pressure readings.

2.4 Evaporator Unit:

2.4.1 Interior of unit shall be thermally and acoustically insulated with 1 inch fiberglass duct liner insulation. Provide removable panels to permit the unit to be properly serviced and maintained.

2.4.2 The evaporator section shall include centrifugal fan, two-speed fan motor, and direct drive. Provide cooling coil, snap out washable filters, refrigerant drier, controls and other necessary devices for a completely automatic unit. Coils shall have copper tubes and aluminum fins. Provide automatic oscillating louver action to facilitate air distribution.

2.5 Controls:

2.5.1 All safety and operational controls shall be factory wired.

2.5.2 Provide remote microprocessor-based controls with room thermostat, timer and fan speed switch.

2.6 Refrigerant Piping:

2.6.1 Copper tubing 3/4" and smaller: Type ACR, hard drawn temper; cast copper-alloy fittings for flared copper tubes; flared joints.

2.6.2 Brazing material: Silver solder bearing at least 15% silver; Sil Fos.

3 EXECUTION

3.1 Installation: Install in accordance with producer's printed instructions.

3.2 Refrigerant Piping: Comply with ANSI B31.5, "Refrigerant Piping," (extend lower pressure limits below 15 psig), and ASHRAE 15 (ANSI B9.1). Make all joints carefully and neatly. Clean pipe and fittings before fluxing. Remove burrs. Braze by the sweat method using Sil Fos.

3.3 Testing: After job erection, pressure test for leaks at 150 psig using a nominal amount

of a suitable tracer refrigerant and dry nitrogen or a suitable refrigerant. Perform leak tests with an electronic halide leak detector having a sensitivity of at least 1/2 ounce R-12 per year. Refrigeration piping will not be accepted unless it is gas tight.

3.4 Evacuation: After completing the successful pressure test, multiple-evacuate the system. Leave the compressor isolation valves shut and connect the vacuum pump to both the high and low sides. Evacuate the system to an absolute pressure of 1,500 microns. Then break vacuum to 2 psig with dry nitrogen. Repeat this process. Install the proper biflow drier in the liquid line and evacuate the system to 500 microns. Leave vacuum pump running for at least two hours without interruption. Break vacuum with the refrigerant to be used and raise pressure to 2 psig. Do not operate compressors during the evacuation procedure.

3.5 Charging: After completing the successful evacuation procedure, charge refrigerant directly to the system from the original containers through a filter drier. Charge to the manufacturer's stated conditions of pressure for required temperature. Weigh the refrigerant added and record on the startup report.

3.6 Cleaning: Clean tar and all other soil from housing exterior. Leave ready for Division 7, Caulking Work. Caulk around pipe sleeves.

3.7 Condensate Drain: Pipe trapped copper condensate drain to outside the building or to a point of disposal as shown on the drawings. Pipe shall be full size of unit outlet. Refer to Division-20 section "Insulation" for pipe insulation.

3.8 Startup: Check entire assembly for correctness of installation, alignment, and control sequencing. Start all component parts in proper sequence. Make all adjustments required to insure proper smooth quiet operation.

END OF SECTION

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SECTION 21C

FANS

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 Division-20 Basic Mechanical Materials and Methods sections apply to work of this section.

1.3 Extent of fan work required by this section as indicated on drawings and schedules, and by requirements of this section.

1.4 Coordination:

1.4.1 Refer to Division-7 sections for installation of prefabricated roof curbs; not work of this section. Furnishing prefabricated roof curbs is part of this section's work.

1.4.2 Refer to Division-21 section "Testing, Adjusting, and Balancing" for balancing of fans.

1.4.3 Refer to Division-21 HVAC control systems sections for control work required in conjunction with fans.

1.4.4 Refer to Division-26 sections for power supply wiring from power source to power connection on fans. Division-26 work will include starters, disconnects, and required electrical devices, except where specified as furnished, or factory-installed, by manufacturer.

1.5 Codes and Standards:

1.5.1 AMCA Compliance: Provide fans which have been tested and rated in accordance with AMCA standards, and bear AMCA Certified Ratings Seal.

1.5.2 UL Compliance: Provide fans which are listed by UL and have UL label affixed.

1.6 Approval Submittals:

1.6.1 Product Data: Submit manufacturer's technical data for fans, including specifications, capacity ratings, dimensions, weights, materials, accessories furnished, and installation instructions. Submit assembly-type drawings showing unit dimensions, construction details, methods of assembly of components, and field connection details.

Fans
Vibration Control

1.7 O&M Data Submittals: Submit maintenance data and parts list for each type of fan, accessory, and control. Include these data, a copy of approved submittals, and wiring diagrams in O&M Manual.

2 PRODUCTS

2.1 General: Except as otherwise indicated, provide standard prefabricated fans of type and size indicated, modified as necessary to comply with requirements, and as required for complete installation. Provide accessories as listed in the schedule on the drawings and as described herein. Motors shall be high efficiency per Division-21 section "Motors".

2.2 Acceptable Manufacturers: Subject to compliance with requirements provide fans manufactured by Acme, Greenheck, Loren Cook, Penn, Carnes, or approved equal unless otherwise noted herein.

2.3 Centrifugal Ceiling Exhausters:

2.3.1 Fan Assembly: Provide steel housing, aluminum grille, backdraft damper, statically and dynamically balanced fan wheel, permanently lubricated motor with internal thermal overloads, vibration isolation and all required mounting hardware and brackets. Provide acoustically treated housing for all fans larger than 60 cfm. Mounting type shall be as indicated on the drawings or on the schedule.

2.3.2 Connectors: Provide adaptors, connectors, and eave elbows as required to connect fan discharges to outlets.

2.3.3 Outlets: Provide where shown on the drawings (or required by the installation) wall caps, vent caps, or roof jacks, each with birdscreen, to match fans and surrounding construction.

2.4 Centrifugal Wall Exhausters:

2.4.1 Housing: Provide heavy gauge aluminum weatherproof housing and base with external drip ring to prevent exhaust contaminants from running down the wall. Provide 1" thick insulation shield to protect the motor compartment from heat and grease clean out port to allow cleaning of the wheel through the windband for kitchen exhaust hood fans. Provide backdraft dampers (omit on kitchen hood exhaust fans). Provide air dry phenolic coating, color to be selected by the architect.

2.4.2 Fan Wheel: Provide aluminum air foil type, statically and dynamically balanced.

2.4.3 Drive: Provide direct or belt drive as scheduled with pre-lubricated, ball bearing, continuous duty type motors. Provide vibration isolation equipment for the entire drive.

2.5 In-Line Centrifugal Fans:

2.5.1 Housing: Provide square weather tight housing constructed of aluminum or steel and painted inside and out with an epoxy finish. Provide venturi type inlet. Provide heavy duty duct collars. Housing and bearing supports shall be constructed of heavy gauge bolted and welded steel construction. Provide two sided access panels, located perpendicular to the motor mounting plane. Provide ½" insulated housing. Provide motor and drive cover for belt drive units.

2.5.2 Fan Wheels: Provide aluminum air foil type, backward curved, statically and dynamically balanced.

2.5.3 Drive: Provide direct or belt drive as scheduled with pre-lubricated, ball bearing, continuous duty type motors. Provide vibration isolation equipment for the entire drive.

2.5.4 Filter Housing: Where indicated, provide insulated filter housing with 2-inch thick disposable MERV 8 filters. Provide construction set, a clean set installed at substantial completion, and one spare set for the owner.

2.5.5 Isolation and Support: Provide spring type vibration isolators and fan support brackets.

2.6 Vibration Isolation: Mount fans on vibration isolators in accordance with the requirements of Division-20 section "Vibration Isolation" and the following list.

2.6.1 Equipment Mountings: Type EM4.

2.6.2 Hangers: Type HA3

3 EXECUTION

3.1 General: Except as otherwise indicated or specified, install fans in accordance with manufacturer's installation instructions and recognized industry practices to insure that fans serve their intended function.

3.2 Coordinate fan work with work of walls, and ceilings as necessary for proper interfacing. Framing of openings, caulking, and curb installation is not work of this section.

3.3 Ductwork: Refer to Division-21 section "Ductwork". Connect ducts to fans in accordance with manufacturer's installation instructions. Provide flexible connections in ductwork at fans.

3.4 Install fans on vibration isolation equipment as required. Set level and plumb.

3.5 Electrical Wiring: Install electrical devices furnished by manufacturer but not specified to be factory-mounted. Furnish copy of manufacturer's wiring diagram submittal to electrical Installer. Verify that electrical wiring installation is in accordance with manufacturer's submittal and installation requirements of Division-26 sections. Verify proper rotation direction of fan wheels. Do not proceed with equipment start-up until wiring installation is acceptable to equipment installer.

3.6 Remove shipping bolts and temporary supports within fans. Adjust dampers for free operation.

3.7 Testing: After installation of fans has been completed, test each fan to demonstrate proper operation of units at performance requirements specified. When possible, field correct malfunctioning units, then retest to demonstrate compliance. Replace units which cannot be satisfactorily corrected.

3.8 Cleaning: Clean factory-finished surfaces. Remove all tar and soil. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

END OF SECTION

SECTION 21D

HVAC METAL DUCTWORK

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 Division-20 Basic Mechanical Materials and Methods Sections apply to work of this section.

1.3 Extent of HVAC metal ductwork is indicated on drawings and in schedules, and by requirements of this section.

1.4 Refer to other Division-21 sections for exterior insulation of metal ductwork.

1.5 Refer to other Division-21 sections for ductwork accessories.

1.6 Codes and Standards:

1.6.1 SMACNA Standards: Comply with SMACNA's "HVAC Duct Construction Standards, Metal and Flexible" 1985 Edition for fabrication and installation of metal ductwork, unless otherwise noted.

1.6.2 NFPA 90A Compliance: Comply with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems".

1.7 Approval Submittals:

1.7.1 Product Data: Submit manufacturer's technical product data and installation instructions for the following.

Factory-fabricated ductwork
Sealants
Flexible duct
Spin-in fittings
Side take-off fittings

1.7.2 Shop Drawings: Submit scaled layout drawings of HVAC metal ductwork and fittings including, but not limited to, duct sizes, locations, elevations, and slopes of horizontal runs, wall and floor penetrations, and connections. Show interface and spatial relationship between ductwork and proximate equipment. Show modifications of indicated requirements, made to conform to local shop practice, and how those modifications ensure that free area, materials, and rigidity are not reduced.

2 PRODUCTS

2.1 Ductwork Materials:

2.1.1 Exposed Ductwork Materials: Where ductwork is indicated to be exposed to view in occupied spaces, provide materials which are free from visual imperfections including pitting, seam marks, roller marks, stains and discolorations, and other imperfections,

including those which would impair painting.

2.1.2 Galvanized Sheet Metal: Except as otherwise indicated, fabricate ductwork from galvanized sheet steel complying with ASTM A 527, lockforming quality; with G 90 zinc coating in accordance with ASTM A 525; and mill phosphatized for exposed locations. Stamp gauge and manufacturer's identification on each sheet. Break sheets so that identification is exposed.

2.2 Miscellaneous Ductwork Materials:

2.2.1 General: Provide miscellaneous materials and products of types and sizes indicated and, where not otherwise indicated, provide type and size required to comply with ductwork system requirements including proper connection of ductwork and equipment.

2.2.2 Duct Sealant: Provide non-hardening, non-migrating mastic or liquid elastic sealant, type applicable for fabrication/installation detail, as compounded and recommended by manufacturer specifically for sealing joints and seams in ductwork.

2.2.3 Ductwork Support Materials: Except as otherwise indicated, provide hot-dipped galvanized steel fasteners, anchors, rods, straps, trim and angles for support of ductwork.

2.2.4 Flexible Ducts: Provide flexible ductwork with an R-value of R-6. The use of flexible ductwork for connection of supply air and return air devices is acceptable only where shown on the drawings.

2.2.4.1 Construction: Provide reinforced metalized polyester jacket that is tear and puncture resistant, air tight inner core with no fiberglass erosion in the air stream and an encapsulated wire helix. Flexible ductwork shall have a recommended operating pressure of 6" w.g. for sizes 4" through 12" diameter and 4" w.g. for sizes 14" through 20" diameter. All diameters shall be suitable for a negative operating pressure of 0.75" w.g. Flexible ductwork shall meet the requirements of UL-181, the Florida Energy Code, FBC, NFPA 90A and NFPA 90B.

2.2.4.2 Acceptable Manufacturers: Subject to compliance with requirements, provide R-6 flexible ductwork by: Atco 36, Flexmaster 8M-R6 or Thermaflex M-KE R6.

2.2.5 Spin-in and Side Take-off Fittings: Provide round branch run-outs as follows.

2.2.5.1 Supply and Return air grille connections shall be straight sided with damper and one inch high insulation standoff equal to Crown 724-D5 or Flexmaster FLD-BO.

2.2.5.2 Exhaust air grille connections shall be straight sided with damper equal to Crown 724 or Flexmaster FLD.

2.2.5.3 Where duct height does not permit the use of conical spin-in fittings, use low profile side take-off fittings equal to Crown 3300-DS or Flexmaster STOD-BO.

2.2.6 Fittings: Provide smooth radius type fittings. Unless specifically detailed otherwise, use 45° laterals and 45° elbows for branch takeoff connections. Where 90° branches are indicated, provide conical type tees.

2.3 Fabrication:

2.3.1 Shop fabricate ductwork in 4, 8, 10 or 12-ft lengths, unless otherwise indicated or required to complete runs. Preassemble work in shop to greatest extent possible, so as to minimize field assembly of systems. Disassemble systems only to extent necessary for shipping and handling. Match-mark sections for reassembly and coordinated installation.

2.3.2 Shop fabricate ductwork of gauges and reinforcement complying with SMACNA "HVAC Duct Construction Standards", except provide sealant at all joints. All supply duct from air conditioning units and all return and exhaust duct shall be minimum 2" pressure class unless otherwise noted.

2.3.3 Fabricate duct fittings to match adjoining ducts, and to comply with duct requirements as applicable to fittings. Except as otherwise indicated, fabricate elbows with center-line radius equal to 1½ times associated duct width; and fabricate to include turning vanes in elbows where shorter radius is necessary. Limit angular tapers to 30° for contracting tapers and 20° for expanding tapers.

2.3.4 Fabricate ductwork with accessories installed during fabrication to the greatest extent possible. Refer to Division-21 section "Ductwork Accessories" for accessory requirements.

2.4 Factory-Fabricated Low Pressure Ductwork (Maximum 2" W.G.):

2.4.1 Material: Galvanized sheet steel complying with ASTM A 527, lockforming quality, with ASTM A 525, G90 zinc coating, mill phosphatized.

2.4.2 Gauge: 28-gauge minimum for round ducts and fittings, 4" through 8" diameter. 26-gauge minimum 9" through 14", 24-gauge minimum 15" through 26".

2.4.3 Elbows: One piece construction for 90° and 45° elbows 14" and smaller. Provide multiple gore construction for larger diameters with standing seam circumferential joint.

2.4.4 Divided Flow Fittings: 90° tees, constructed with saddle tap spot welded and bonded to duct fitting body.

2.4.5 Acceptable Manufacturers: Subject to compliance with requirements, provide factory-fabricated ductwork by Semco Mfg., Inc., Eastern Sheetmetal, United Sheet Metal Div., United McGill Corp, or approved equal.

3 EXECUTION

3.1 General: Examine areas and conditions under which HVAC metal ductwork is to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 Installation Of Metal Ductwork:

3.2.1 General: Assemble and install ductwork in accordance with recognized industry practices which will achieve air-tight (5% leakage for systems rated 3" and under; 1% for systems rated over 3") and noiseless (no objectionable noise) systems, capable of

performing each indicated service. Install each run with minimum number of joints. Align ductwork accurately at connections, within 1/8” misalignment tolerance and with internal surfaces smooth. Support ducts rigidly with suitable ties, braces, hangers and anchors of type which will hold ducts true-to-shape and to prevent buckling. Support vertical ducts at every floor.

3.2.2 Supports: Install concrete inserts for support of ductwork in coordination with formwork, as required to avoid delays in work. Install self-drilling screw anchors in prestressed concrete or existing work.

3.2.3 Field Fabrication: Complete fabrication of work at project as necessary to match shop-fabricated work and accommodate installation requirements. Seal joints in round or oval ductwork with hard cast or shrink bands, and sheet metal screws, or by welding.

3.2.4 Routing: Locate ductwork runs, except as otherwise indicated, vertically and horizontally. Avoid diagonal runs wherever possible. Locate runs as indicated by diagrams, details and notations or, if not otherwise indicated, run ductwork in shortest route which does not obstruct useable space or block access for servicing building and its equipment. Hold ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building. Limit clearance to ½" where furring is shown for enclosure or concealment of ducts, but allow for insulation thickness, if any. Where possible, locate insulated ductwork for 1" clearance outside of insulation. In finished and occupied spaces, conceal ductwork from view by locating in mechanical shafts, hollow wall construction or above suspended ceilings, unless specifically noted as "Exposed". Do not encase horizontal runs in solid partitions, except as specifically shown. Coordinate layout with suspended ceiling and lighting layouts and similar finished work.

3.2.5 Electrical Equipment Spaces: Do not route ductwork through transformer vaults or other electrical equipment spaces and enclosures.

3.2.6 Penetrations: Where ducts pass through interior partitions and exterior walls, and are exposed to view, conceal space between construction opening and duct or duct insulation with sheet metal flanges of same gauge as duct. Overlap opening on 4 sides by at least 1½". Fasten to duct and substrate. Where ducts pass through fire-rated floors, walls, or partitions, provide firestopping between duct and substrate.

3.2.7 Coordination: Coordinate duct installations with installation of accessories, dampers, coil frames, equipment, controls and other associated work of ductwork system.

3.2.8 Installation: Install metal ductwork in accordance with SMACNA HVAC Duct Construction Standards. Fan discharge outlet ducts shall be installed correctly with regard to "system effect" per AMCA Publication 201.

3.3 Installation of Flexible Ducts:

3.3.1 Maximum Length: For any duct run using flexible ductwork, do not exceed 5'-0" extended length. Flexible duct shall only be allowed as detailed on the drawings.

3.3.2 Installation: Install in accordance with Section III of SMACNA's "HVAC Duct Construction Standards, Metal and Flexible". Support flexible ducts to eliminate pinching and kinking which would restrict flow.

3.3.3 Low Pressure Ductwork: Peel back insulation and slide the inner core over the spin-in or diffuser neck, seal with duct sealant and install Panduit strap tightly. Slide insulation back over the inner core and install another Panduit strap over the insulation outer jacket. Tape is not acceptable.

3.3.4 Seal all exposed edges of fiberglass insulation with glassfab and mastic.

3.4 Leakage Tests: After each duct system is completed, test for duct leakage in accordance with Sections 3 and 5 of the SMACNA HVAC Air Duct Leakage Test Manual. Test pressure shall be equal to pressure class of duct, less 0.5" static pressure. Repair leaks and repeat tests until total leakage is less than 5% of system design air flow for low pressure systems and less than 1% for systems rated over 3".

3.5 Equipment Connections: Connect metal ductwork to equipment as indicated, provide flexible connection for each ductwork connection to equipment mounted on vibration isolators, and/or equipment containing rotating machinery. Provide access doors as indicated.

3.6 Clean ductwork internally free of dust and debris. Clean external surfaces of foreign substances which might cause corrosive deterioration of metal or, where ductwork is to be painted, might interfere with painting or cause paint deterioration. Keep ducts closed with poly during construction to prevent contamination by construction dust and debris.

3.7 Balancing: Refer to Division-21 section "Testing, Adjusting, and Balancing" for air distribution balancing of metal ductwork; not work of this section. Seal any leaks in ductwork that become apparent in balancing process.

3.8 System Adjustment: Adjust the system to provide functional operation to the extent possible, and leave ready for Testing and Balancing work. It is not the intent of this section to provide final testing and balancing, but to leave the system operational with a minimum of noise.

END OF SECTION

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SECTION 21E

FACTORY FABRICATED GREASE DUCT

PART 1- GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 Division-20 Basic Mechanical Materials and Methods Sections apply to work of this section.

1.3 Extent of Factory fabricated grease duct is indicated on drawings and in schedules, and by requirements of this section.

1.4 Codes and Standards:

A. ETL listed and complies with safety standards UL1978, UL2221, CAN/ULC-S144 and testing has been extended to recognize ASTM E2336 and AC101 due to similar testing criteria.

B. When installed in accordance with these instructions and National Fire Protection Association “NFPA 96”; Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations.

C. UL 2221: Standard for Fire Resistive Grease Duct Enclosure Assemblies. Chapter 7 of this standard references a test labeled Internal Fire Test. Section 7.1.1 references two installation conditions, Condition A and Condition B. Condition A represents all installation condition except for installation within non-ventilated combustible enclosures. Condition B represents installation within a non-ventilated combustible enclosure.

D. Duct shall be classified under UL2221 (Test of Fire Resistive Duct Enclosure Assemblies) as an alternate to 2-Hr. fire resistive shaft enclosures with a minimum zero clearance to combustibles (sizes 5" to 36" diameter). Duct shall be listed in accordance with the requirements for duct enclosure Condition A and B.

1.5 WARRANTY

A. All units shall be provided with the following standard warranties:

1. Grease duct systems are warranted to be free from defects in material and workmanship, under normal use and service, for a period of 20-years from the date of shipment.

1.6 SUBMITTALS

A. Product Data: Submit manufacturer’s technical product data and installation instructions for the following:

1. Factory Fabricated Grease Duct
2. Fittings

B. Shop Drawings: Submit scaled layout drawings of factory fabricated grease duct and fittings, including, but not limited to, duct sizes, locations, elevations, and slopes of horizontal runs, wall and floor penetrations, cleanouts, and connections. Show interface and spatial relationship between ductwork and

proximate equipment.

PART 2- PRODUCTS

2.1 GENERAL

A. Intended for use with Type I kitchen hoods, which conform to the requirements of NFPA-96.

2.2 CONSTRUCTION

A. Inner duct section wall shall be constructed of .036” thick, 430 type stainless steel and be available in diameters 5" through 36".

B. Outer Duct section wall shall be constructed of 430 stainless steel at a minimum of .024” thickness.

C. Duct shall include 2 layers of Super Wool 607 Plus or Insulfrax Elite Blanket between the inner and outer wall insulation between the inner and outer wall.

D. Duct sections shall be held together by the means of a formed V clamp. V clamps shall be of the hex-head type with flanged stops and tapered "lead in" threads.

E. Duct joints shall be sealed with 3M Fire Barrier 2000+.

F. Duct wall assembly shall be tested and listed at zero inch clearance, according to classifications.

G. Duct access doors shall have a clear sight window.

2.3 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with requirements, provide factory fabricated, zero clearance ductwork and fittings manufactured by Captive Aire, Jeremias, Accurex, or approved equal.

PART 3 -– EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. If unsatisfactory conditions exist, correct conditions prior to installation.

3.2 APPLICATION

A. Suitable for use in commercial cooking installations for the removal of smoke and grease-laden vapors.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions, drawings, written specifications, manufacturer’s installation manual, and all applicable building

codes.

B. Provide cleanouts in duct at each floor and as required by Florida Building Code. Provide sight window in all duct cleanouts.

3.4 CONNECTIONS

A. Piping installation requirements are specified in other Division 20 and 21 Sections. Drawings indicate the general arrangement of piping, fittings, and specialties. Install the duct system to allow service and maintenance.

B. Duct installation requirements are specified in other Division 20 and 21 Sections. Drawings indicate the general arrangement of ducts.

3.5 LEAK TESTING:

A. All duct shall be leak tested prior to concealment in accordance with section 506.3.2.5 of 2023 Florida Building Code-Mechanical. Provide engineer with 24 hour notice to witness test. Ductwork shall be tested by passing a minimum 100 watt light through the entire duct section to be tested. The lamp shall be open so as to emit light equally in all directions. Only joints in factory ductwork are required to be tested. Contractor shall correct any deficiencies found during testing.

END OF SECTION

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SECTION 21F

DUCTWORK ACCESSORIES

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 Division-20 Basic Mechanical Materials and Methods sections apply to work of this section.

1.3 Extent of ductwork accessories work is indicated on drawings and in schedules, and by requirements of this section.

1.4 Refer to other Division-21 sections for testing, adjusting, and balancing of ductwork accessories; not work of this section.

1.5 Codes and Standards:

1.5.1 SMACNA Compliance: Comply with applicable portions of both SMACNA "HVAC Duct Construction Standards, Metal and Flexible" and "Fire, Smoke and Radiation Damper Installation Guide for HVAC Systems".

1.5.2 UL Compliance: Construct, test, and label fire dampers in accordance with UL Standard 555 "Fire Dampers and Ceiling Dampers". Construct, test and label smoke dampers in accordance with UL Standard 555S "Leakage Rated Dampers for use in Smoke Control Systems" .

1.5.3 NFPA Compliance: Comply with applicable provisions of NFPA 90A "Air Conditioning and Ventilating Systems" pertaining to installation of ductwork accessories.

1.6 Approval Submittals:

1.6.1 Product Data: Submit manufacturer's technical product data for each type of ductwork accessory, including dimensions, capacities, and materials of construction; and installation instructions as follows:

Low pressure manual dampers
Control dampers
Duct access doors
Flexible connections

2 PRODUCTS

2.1 Dampers:

2.1.1 Low Pressure Manual Dampers: Provide 16 gauge dampers of single-blade type (12" maximum blade width) or multiblade type. Damper blades to be gang-operated from a single shaft with nylon or ball bearings on each end. Provide indexed locking quadrant. Parallel or opposed blade style is acceptable. Provide 2" standoff on

locking quadrant for externally insulated duct.

2.1.2 Control Dampers: Provide dampers with parallel blades for 2-position control or opposed blades for modulating control. Construct blades of 16-ga. steel. Provide heavy-duty molded self-lubricating nylon bearings and 1/2" diameter steel axles spaced on 9" centers. Provide sponge rubber or felt blade edges. Construct frame of 2" x 1/2" x 1/8" steel channel for face areas 25 sq. ft. and under; 4" x 1-1/4" x 16-ga. channel for face areas over 25 sq. ft. Provide galvanized steel finish with aluminum touch-up. Actuators (motors) are provided by control contractor.

2.1.3 Acceptable Manufacturers: Subject to compliance with requirements, provide dampers by Air Balance, American Warming & Ventilating, Arrow Louver and Damper, Penn Ventilator Co., or Ruskin Mfg. Co.

2.2 Turning Vanes: Provide manufactured or fabricated single wall turning vanes and vane runners, constructed in accordance with SMACNA "HVAC Duct Construction Standards".

2.3 Duct Access Doors:

2.3.1 General: Provide duct access doors of size indicated, or as required for duty indicated.

2.3.2 Construction: Construct of same or greater gauge as ductwork served. Provide insulated doors for insulated ductwork. Provide flush frames for uninsulated ductwork, extended frames for externally insulated duct. Provide one side hinged, other side with one handle-type latch for doors 12" high and smaller, 2 handle-type latches for larger doors.

2.3.3 Acceptable Manufacturers: Subject to compliance with requirements, provide access doors by Air Balance, Inc., Duro Dyne Corp., Ruskin Mfg. Co., or Ventfabrics, Inc.

2.4 Flexible Connections:

2.4.1 General: Provide flexible duct connections wherever ductwork connects to vibration isolated equipment. Construct flexible connections of neoprene-coated flameproof fabric crimped into duct flanges for attachment to duct and equipment. Make airtight joint. Provide adequate joint flexibility to allow for thermal, axial, transverse, and torsional movement, and also capable of absorbing vibrations of connected equipment.

2.4.2 Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following: Duro Dyne Corp., Flexaust (The) Co., or Ventfabrics, Inc.

3 EXECUTION

3.1 Examine areas and conditions under which ductwork accessories will be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 Installation of Ductwork Accessories:

3.2.1 Install ductwork accessories in accordance with manufacturer's installation

instructions, with applicable portions of details of construction as shown in SMACNA standards, and in accordance with recognized industry practices to ensure that products serve intended function.

3.2.2 Install balancing dampers at all main ducts adjacent to units in return air, outside air and where indicated.

3.2.3 Install control dampers as shown. Damper operator provided by control contractor.

3.2.4 Install turning vanes in square or rectangular 90º elbows in supply, return, and exhaust air systems, and elsewhere as indicated.

3.2.5 Install access doors to open against system air pressure, with latches operable from either side, except outside only where duct is too small for person to enter. Install on entering air side of reheat coils and motorized dampers. Install at fire dampers and smoke dampers. Opening size shall be per NFPA 90A for servicing fire and smoke dampers. Provide label with 1-1/2" letters to indicate location of fire protection devices.

3.2.6 Install flexible connections in ductwork such that the clear length of the connector is approximately two inches. Provide thrust restraints as required. Flexible material shall not be so slack as to take a definite concave or convex shape during fan operation.

3.2.7 Coordinate with other work, including ductwork, as necessary to interface installation of ductwork accessories properly with other work.

3.3 Operate installed ductwork accessories to demonstrate compliance with requirements. Test for air leakage while system is operating. Repair or replace faulty accessories as required to obtain proper operation and leakproof performance.

3.4 Adjusting And Cleaning:

3.4.1 Adjusting: Adjust ductwork accessories for proper settings. Install fusible links in fire dampers and adjust for proper action.

3.4.2 Final positioning of manual dampers is specified in Division-21 section "Testing, Adjusting, and Balancing". However, the system shall be left functional with all dampers open or throttled.

3.4.3 Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

END OF SECTION

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SECTION 21G

GRILLES, REGISTERS AND CEILING DIFFUSERS

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 Division-20 Basic Mechanical Materials and Methods sections apply to work of this section.

1.3 Extent of air outlets and inlets work is indicated by drawings and schedules, and by requirements of this section.

1.4 Refer to other Division-21 sections for ductwork and duct accessories required in conjunction with air outlets and inlets and for balancing of air outlets and inlets; not work of this section.

1.5 Codes and Standards:

1.5.1 ADC Compliance: Test and rate air outlets and inlets in certified laboratories under requirements of ADC 1062 "Certification, Rating and Test Manual". Provide air outlets and inlets bearing ADC Certified Rating Seal.

1.5.2 NFPA Compliance: Install air outlets and inlets in accordance with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems".

1.6 Approval Submittals:

1.6.1 Product Data: Submit manufacturer's technical product data for air outlets and inlets indicating construction, finish, and mounting details.

1.6.2 Performance Data: For each type of air outlet and inlet furnished, provide aspiration ability, temperature and velocity traverses, throw and drop, and noise criteria ratings. Indicate selections and data as required.

1.7 O&M Data Submittals: Submit cleaning instructions for finishes and spare parts lists. Include this data and a copy of approval submittals in O&M manual.

2 PRODUCTS

2.1 General:

2.1.1 Except as otherwise indicated, provide manufacturer's standard grilles, registers, and ceiling diffusers where shown; of size, shape, capacity and type indicated; constructed of materials and components as indicated, and as required for complete installation.

2.1.2 Manufacturers not listed in the following specification will not be considered for approval unless accepted by addendum prior to bid.

2.1.3 Performance: Provide grilles, registers and ceiling diffusers that have, as minimum, temperature and velocity traverses, throw and drop, and noise criteria ratings for each

size device equal to the basis of design.

2.1.4 Ceiling and Wall Compatibility: Provide grilles, registers and diffusers with border styles that are compatible with adjacent wall and ceiling systems, and that are specifically manufactured to fit into ceiling module or wall with accurate fit and adequate support. Refer to general construction drawings and specifications for types of ceiling systems and walls which will contain each type of ceiling diffuser, grille, or register.

2.1.5 Appearance: All grilles and registers shall be aluminum construction and all diffusers shall be aluminum construction, unless otherwise noted, with uniform matching appearance for each type of outlet. Ceiling mounted grilles and registers shall be set to be sight tight from the predominant exposure.

2.1.6 Finish: All ceiling mounted grilles, registers, and diffusers shall be finished with baked white enamel. Wall and door mounted grilles and registers shall be finished with clear anodized finish baked white enamel.

2.2 Acceptable Manufacturers: Subject to compliance with requirements, provide products by Titus, Price, Nailor, or Metal Aire.

2.3 Rectangular Ceiling Diffusers: Provide rectangular face, adjustable diffuser with removable inner core, no corner joints. If square or rectangular neck is provided, provide square to round adaptor as required. Provide lay-in panel as required. Provide beveled trim ring for diffusers in hard ceilings.

2.4 Return, Exhaust, and Transfer Grilles and Registers: Provide grilles or registers with one set of 45 degree fixed louvers, parallel to the long dimension. Provide opposed blade damper, screwdriver operated from the face for registers. Provide mounting frame for all wall and plaster ceiling installations.

3 EXECUTION

3.1 Coordinate installation with ceiling and light fixture installation. Locate ceiling outlets as indicated on architectural Reflected Ceiling Plans. Unless otherwise indicated, locate ceiling outlets in the center of acoustical ceiling modules with sides parallel to the grid.

3.2 Install air outlets and inlets in accordance with manufacturer's written instructions and in accordance with recognized industry practices to insure that products serve intended functions.

3.3 Coordinate with other work, including ductwork and duct accessories, as necessary to interface installation of air outlets and inlets with other work.

3.4 Set air volumes to values shown on the drawings so that the system is functional. Leave ready for test and balance contractor.

3.5 Furnish to Owner three operating keys for each type of outlet and inlet that require them; obtain receipt.

END OF SECTION

SECTION 21H

WALL LOUVERS

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 Division-20 Basic Mechanical Materials and Methods sections apply to work of this section.

1.3 Extent of wall louver work is indicated by drawings and schedules, and by the requirements of this section.

1.4 Refer to other Division-21 sections for ductwork, duct accessories and controls work.

1.5 AMCA Compliance: Test and rate louvers in accordance with AMCA Standard 500. Provide AMCA certified rating seal. Ratings based on tests and procedures performed in accordance with AMCA 500-L and complying with the AMCA 511 Certified Ratings Program. AMCA Certified Ratings Seal applies to air performance, water penetration and wind driven rain ratings.

1.6 Product Qualifications:

1. Miami-Dade County, Florida Notice of Acceptance (NOA).
2. Florida Building Code Approval.
3. Louver shall be certified to Florida Building Code Testing Application Standards TAS 100(A) (Wind Driven Rain Resistance), TAS 201 (Large Missile Impact), TAS 202 (Uniform Static Air Pressure) and TAS 203 (Cyclic Wind Loading).
4. AMCA Listed for compliance to AMCA 540 Level D and AMCA 550 standards.

1.7 Approval Submittals:

1.7.1 Product data: Submit manufacturer's technical product data for louvers including: model number, accessories furnished, construction, finish, mounting details, performance data.

1.8 O&M Data Submittals: Submit maintenance data, including cleaning of finishes and a copy of approval submittals. Include in O&M manual.

2 PRODUCTS

2.1 Acceptable Manufacturers: Subject to compliance with requirements, submit products by Ruskin, Greenheck, Arrow, American Warming and Ventilating, or AMCA labeled approved equal.

2.2 General: Except as otherwise indicated, provide manufacturer's standard louvers where shown; of size, shape, capacity and type indicated; constructed of materials and components as indicated, and as required for complete installation. Provide Kynar 500 coated, corrosion resistant finish and 5 year warranty; color to be selected by the Owner.

2.3 Substrate Compatibility: Provide louvers with 3 inch frame, flange and sill extension piece that are compatible with adjacent substrate, and that are specifically manufactured to fit into construction openings with accurate fit and adequate support, for weatherproof installation. Refer to general construction drawings and specifications for types of substrate which will contain each type of louver.

2.4 Materials: Construct of aluminum extrusions, Alloy 6063-T6 0.062" thick for frame and 0.040" thick for blades. Weld units or use stainless steel fasteners.

2.5 Sill Flashing: Formed aluminum, 0.080" thick, upturned sides to prevent water leakage.

2.6 Installation Angles: Material: 1.375 x 2.25 inch x 0.125 inch thick continuous aluminum angles around louver perimeter for installation in concrete, deep CMU, steel and wood substrate wall systems.

2.7 Installation Plates: Material: 0.250 inch (6.4 mm) thick continuous aluminum flat or zee plates for installation in thin CMU substrate wall systems.

2.8 Louver Screens: On inside face of exterior louvers, provide 1/2" square mesh anodized aluminum wire bird screens mounted in removable extruded aluminum frames.

2.9 Stationary Louvers: Hurricane and impact rated louvers, basis of design is Greenheck EHV-901D.

2.10 Performance Data:

1. Performance Ratings: AMCA licensed.
   a. Based on testing 48 inches x 48 inches size unit in accordance with AMCA 500-L.
2. Free Area: 42 percent, nominal.
3. Free Area Size: 6.66 square feet.
4. Maximum Recommended Air Flow through Free Area: 2,155 feet per minute.
5. Air Flow: 10,431 cubic feet per minute.
6. Maximum Pressure Drop (Intake): 0.60 inches w.g..
7. Water Penetration: Beginning point of water penetration of 0.01 ounce per ft^2 of free area shall be above 1,250 feet per minute free area velocity.
8. Wind Load Rating: Maximum wind load of ±150 PSF.
9. AMCA 500-L Wind Driven Rain Performance: 99.9 percent effective at preventing water penetration through louver when tested at 50 miles per hour wind with 8 inches per hour rainfall and 2,155 feet per minute airflow through the free area. Penetration Class 'A' with Discharge Class (Intake) '3' in accordance with AMCA 500-L Wind Driven Rain Test.

3 EXECUTION

3.1 Install where shown on the drawings in accordance with the manufacturer's printed instruction and Florida Product Approval. Exercise care to prevent scratches.

3.2 Isolate dissimilar metals per the manufacturer's recommendations.

3.3 Verify size of louvers shown on drawings prior to fabrication. Coordinate with wall openings. Sizes may be altered subject to approval by Engineer provided free area remains approximately the same as indicated.

END OF SECTION

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SECTION 21I

START-UP REQUIREMENTS FOR HEATING, VENTILATING, & AIR CONDITIONING (HVAC) SYSTEMS

1 GENERAL

1.1 Intent: It is the intent of this section to require that the startup requirements and report noted herein be performed prior to starting TAB work on each system. Work can be phased with permission of the Engineer.

1.2 Coordination:

1.2.1 The Contractor shall furnish to the TAB Contractor a complete set of plans, specifications, addenda, shop drawings, equipment performance data sheets, change orders, etc. as requested by the TAB Contractor.

1.2.2 The Contractor shall participate in a TAB coordination meeting to discuss interface requirements with the TAB Contractor and to establish a schedule for TAB work prior to start of TAB work.

1.3 Test Reports and Verification Submittals:

1.3.1 Submit Startup Report as described herein for each system. Attach Factory Startup Report for equipment as required by other Division-21 sections.

2 PRODUCTS: None

3 EXECUTION:

3.1 The TAB work shall not commence until the Engineer has received written notice from the Contractor that HVAC systems are 100% complete and are fully operational. Submit Startup Report as described herein.

3.2 The Contractor shall place all HVAC systems and equipment into complete operation during each working day of TAB work.

3.3 The Contractor shall provide access to HVAC systems and equipment by supplying ladders and/or scaffolding, and opening access panels and equipment room doors.

3.4 The TAB Contractor will provide to the Contractor TAB punch lists of non-complying HVAC work as they are discovered. The Contractor shall replace or repair non-complying work as soon as possible in order not to delay completion of TAB work.

3.5 Airside Systems: The Contractor shall provide the following information to the Engineer to substantiate proper start-up and preliminary adjustments of air handler units, belt driven fans, and duct systems.

3.5.1 Verify that air grilles (supply, return, exhaust, transfer, outdoor, etc.) are installed and connected to the duct system.

3.5.2 Verify that duct systems are clean of debris.

3.5.3 Verify that ducts attached with flexible connectors are aligned within ½" and have a uniform gap between ducts of 1"-1.5". Flexible connectors shall not leak and shall be insulated.

3.5.4 Verify that filters are clean and filter spacers are installed.

3.5.5 Verify that balancing dampers at grilles and branch ducts are operational and are fully opened.

3.5.6 Verify that fire and smoke dampers are correctly installed and are fully opened.

3.5.7 Verify that fan discharges are appropriate for the outlet ductwork with regards to the "system effect" per AMCA Publication 201. Inappropriate fan discharges will not be accepted.

3.5.8 Verify proper fan rotation.

3.5.9 Verify fan motor overload elements are correctly sized.

3.5.10 Adjust fan sheave until CFM is at or above design CFM. Provide additional sheaves and belts as required. Verify that motor is not overloaded.

3.5.11 Verify that HVAC control systems are fully operational.

3.6 Startup Report: The Contractor shall submit the startup information required by this section to the Engineer in a typed report organized as outlined herein. The Startup Report is required to meet the written notice described herein prior to starting TAB work. TAB work will not start until the Startup Report has been submitted and approved.

END OF SECTION

SECTION 21J

TESTING AND BALANCING OF MECHANICAL SYSTEMS

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section. Division-20 Basic Mechanical Materials Sections apply to work of this section.

1.2 Description of Work:

1.2.1 Extent of testing, adjusting, and balancing work (TAB) is indicated by requirements of this section, and also by drawings and schedules, and is defined to include, but is not necessarily limited to, air distribution systems, hydronic distribution systems and associated equipment and apparatus of mechanical work. The work consists of setting speed and volume (flow) adjusting facilities provided for systems, recording data, conducting tests, preparing and submitting reports, and recommending modifications to work as required.

1.2.2 Coordination: Coordinate with the General Contractor and Mechanical Contractor responsible for the HVAC system installation as required to complete the TAB work.

1.3 The intent of this specification is to balance HVAC systems within the tolerances listed, maintaining the pressure relationships indicated, with a minimum of noise.

1.3.1 Airflow Tolerances:

1.3.1.1 Air Handling: The supply air, return air and outdoor air quantities shall be balanced within ±5% of design values.

1.3.1.2 Exhaust Fans: The exhaust fan quantities shall be set as required to maintain the design exhaust terminal flows within ±5% of design values. If no exhaust terminals exist, exhaust fan air quantities shall be balanced within ± 10% of design values.

1.3.1.3 Ceiling Diffusers, Supply Registers, Return and Exhaust Inlets: Balance to an air quantity within ±10% of the design values.

1.3.2 Temperature Tolerances:

1.3.2.1 Air Handling Temperatures: The controlled temperatures at AHUs shall be verified to be under control within ± 1ºF of design values.

1.3.2.2 Room Temperatures: Balance systems and controls within ±2ºF of indicated settings.

1.4 Quality Assurance: The TAB Contractor shall be certified as one of the following:

1.4.1 Tester: A firm certified by National Environmental Balancing Bureau (NEBB) in those testing and balancing disciplines required for this project, who is not the Installer of the systems to be tested and is otherwise independent of the project. Comply with NEBB's "Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems" as applicable to this work.

1.4.2 Tester: A firm certified by Associated Air Balance Council (AABC) in those testing and balancing disciplines required for this project. AABC-certified firms are independent by definition. Comply with AABC's Manual MN-1 "AABC National Standards", as applicable to this work.

1.4.3 Industry Standards: Comply with American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) recommendations pertaining to measurements, instruments and testing, adjusting and balancing, except as otherwise indicated.

1.5 Job Conditions:

1.5.1 Do not proceed with testing, adjusting, and balancing work until HVAC work (including Controls) has been completed and is operable. Ensure that there is no residual work still to be completed.

1.5.2 Do not proceed until work scheduled for testing, adjusting, and balancing is clean and free from debris, dirt and discarded building materials.

1.5.3 Do not proceed until architectural work that would affect balancing (walls, ceiling, windows, doors) have been installed.

1.5.4 Testing may proceed system by system, but each HVAC system must be complete as described herein.

1.5.5 The mechanical contractor shall make any changes in pulleys, belts, and dampers, and/or add dampers as required for correct balancing.

1.6 Approval Submittals

1.6.1 Submit the name of the proposed test and balance company for the Engineer's approval within thirty (30) days after awarding of contract.

1.7 Test Reports and Verification Submittals:

1.7.1 Submit four (4) copies of the dated test and balance report upon completion of TAB work. The report shall include a list of instruments used for the work. The report shall be signed by the supervisor who performed the TAB work.

2 PRODUCTS

2.1 Patching Materials: Except as otherwise indicated, use same products as used by original Installer for patching holes in insulation, ductwork and housings which have been cut or drilled for test purposes, including access for test instruments, attaching jigs, and similar purposes.

2.2 Test Instruments: Utilize test instruments and equipment of the type, precision, and capacity as recommended in the referenced standard. All instruments shall be in good condition and shall have been calibrated within the previous six (6) months (or more recently if required by standard).

3 EXECUTION

3.1 General:

3.1.1 Examine installed work and conditions under which testing is to be done to ensure that work has been completed, cleaned and is operable. Do not proceed with TAB work until unsatisfactory conditions have been corrected in manner acceptable to Tester.

3.1.2 Test, adjust and balance environmental systems and components, as indicated, in accordance with procedures outlined in applicable standards, and as modified or detailed herein.

3.1.3 Test, adjust and balance systems during summer season for air conditioning systems and during winter season for heating systems, including at least a period of operation at outside conditions within 5ºF wet bulb temperature of maximum summer design condition, and within 10ºF dry bulb temperature of minimum winter design condition. When seasonal operation does not permit measuring final temperatures, then take final temperature readings when seasonal operation does permit. The Contractor shall return for a change of seasons test at no additional cost to the Owner and submit the revised TAB report.

3.1.4 Punch List: Prepare a deficiency (punch)list for the Contractor with a copy of the Engineer that lists all items that are incorrectly installed or are functioning improperly. Provide a retest after all items are corrected.

3.1.5 Prepare TAB report of test results, including instrumentation calibration reports, in format recommended by applicable standards, modified as required to include all data listed herein.

3.1.6 Patch holes in insulation, ductwork and housings, which have been cut or drilled for test purposes, in manner recommended by original Installer.

3.1.7 Mark equipment settings, including damper control positions, valve indicators, fan speed control levers, and similar controls and devices, to show final settings at completion of TAB work. Provide markings with paint or other suitable permanent identification materials.

3.1.8 Include in the TAB report recommendations for correcting unsatisfactory mechanical performances when system cannot be successfully balanced.

3.1.9 Include an extended warranty of ninety (90) days after completion of test and balance work, during which time the Engineer, at his discretion, may request a recheck, or resetting of any component as listed in test report. The TAB company shall provide technicians and instruments and make any tests required by the Engineer during this time period.

3.2 Controls

3.2.1 Check all HVAC controls for proper location, calibration and sequence of operation.

3.2.2 Check operation of all controllers and controlled devices to verify proper action and direction. Check the operation of all interlocks.

3.3 Air Balancing

3.3.1 Leakage tests on ductwork must have been completed before air balancing.

3.3.2 Set dampers, volume controls and fan speeds to obtain specified air delivery with minimum noise level. Rebalance as required to accomplish this. Simulate fully loaded filters during test.

3.3.3 Set grille deflections as noted on plans. Modify deflections if required to eliminate drafts or objectionable air movement.

3.3.4 Record air terminal velocity after completion of balance work.

3.3.5 Record final grille and register deflection settings if different from that specified on contract drawings.

3.3.6 Record all fan speeds.

3.4 Data Collection:

3.4.1 In addition to the data required for any specified performance tests, measure and record the temperatures, pressures, flow rates, and nameplate data for all components listed herein.

3.4.2 It is the intent of this section to record data on balanced systems, under normal operating or design conditions.

3.4.3 Temperatures:

1. Outside dry and wet bulb temperatures.

2. Dry bulb temperature in each room and at least one wet bulb temperature in each zone.

3. Refrigerant liquid and suction temperatures.

4. Inlet and outlet temperature of each heat exchange device - both fluids.

3.4.4 Pressures:

1. Suction and discharge static pressure of each fan.

3.4.5 Flow rates:

1. Flow rate through each fan.

2. Flow rate through each coil or heat exchange device.

3.4.6 Nameplate Data:

1. Complete nameplate data for all equipment.

2. Motor data to include horsepower, phase, voltage, RPM, full load nameplate current, fuse rating in disconnect switch, number or manufacturer's size

designation, and ampere rating of overcurrent and low voltage protection devices in starters.

3.5 All test openings in ductwork shall be resealed in an approved manner.

END OF SECTION

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SECTION 21K

INSULATION FOR HVAC PIPING

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 Division-20 Basic Mechanical Materials and Methods Sections apply to work of this section.

1.3 Approval Submittals:

1.3.1 Product Data: Submit producer's data sheets and installation instructions on each insulation system including insulation, coverings, adhesives, sealers, protective finishes, and other material recommended by the manufacturer for applications indicated. Submit for:

Flexible unicellular piping insulation

1.4 O&M Data Submittals: Submit a copy of all approval submittals. Include in O&M Manual.

2 PRODUCTS

2.1 Acceptable Manufacturers: Subject to compliance with requirements, provide insulation products by Armstrong, Johns Manville, Knauf, Owens Corning, Pittsburgh Corning, U.S. Rubber, or approved equal. All products shall be asbestos-free.

2.2 Flame/Smoke Ratings: Provide composite mechanical insulation (insulation, jackets, coverings, sealers, mastics, and adhesive) with a flame-spread rating of 25 or less, and a smoke-developed rating of 50 or less, as tested by ANSI/ASTM E84.

2.3 Pipe Insulation Materials:

2.3.1 Flexible Unicellular Pipe Insulation: ASTM C534, Type I. (Tubular, suitable for use to 200ºF.)

2.3.2 Staples, Bands, Wires, and Cement: As recommended by the insulation manufacturer for applications indicated.

2.3.3 Adhesives, Sealers, Protective Finishes: Products recommended by the insulation manufacturer for the application indicated.

3 EXECUTION

3.1 General:

3.1.1 Install thermal insulation products in accordance with manufacturer's written instructions, and in compliance with recognized industry practices to ensure that insulation serves intended purpose.

3.1.2 Install insulation materials with smooth and even surfaces and on clean and dry surfaces. Redo poorly fitted joints. Do not use mastic or joint sealer as filler for gapping joints and excessive voids resulting from poor workmanship.

3.1.3 Maintain integrity of vapor-barrier on insulation and protect it to prevent puncture and other damage. Label all insulation "ASBESTOS FREE".

3.1.4 Do not apply insulation to surfaces while they are hot or wet.

3.1.5 Do not install insulation until systems have been checked and found free of leaks. Surfaces shall be clean and dry before attempting to apply insulation. A professional insulator with adequate experience and ability shall install insulation.

3.1.6 Do not install insulation on pipe systems until acceptance tests have been completed except for flexible unicellular insulation. Do not install insulation until the building is "dried-in".

3.2 Flexible Unicellular Pipe Insulation:

3.2.1 Insulate the following piping systems:

3.2.1.1 Condensate drains from air conditioning units - ½" thick.

3.2.1.2 Refrigerant piping - ¾" thick.

3.2.2 Apply insulation in accordance with the manufacturer's recommendations and instructions. Mitre cut insulation to fit pipe fittings. Use approved cement to seal all joints and ends in the insulation.

3.2.3 Insulation outside the building shall be protected by a smooth 0.016" thickness aluminum jacket secured with aluminum bands on 12" centers.

SECTION 21L

EXTERIOR INSULATION FOR DUCTWORK

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 Division-20 Basic Mechanical Materials and Methods sections apply to work of this section.

1.3 Approval Submittals:

1.3.1 Product Data: Submit producer's data sheets and installation instructions on each insulation system including insulation, coverings, adhesives, sealers, protective finishes, and other material recommended by the manufacturer for applications indicated. Submit for:

Flexible duct insulation

1.4 O&M Data Submittals: Submit a copy of all approval submittals. Include in O&M Manual.

2 PRODUCTS

2.1 Acceptable Manufacturers: Subject to compliance with requirements, provide insulation products by Knauf, Owens-Corning, Johns Manville, Certainteed.

2.2 Flame/Smoke Ratings: Provide composite mechanical insulation (insulation, coverings, sealers, mastic, and adhesive) with a flame spread rating of 25 or less, and a smoke-developed rating of 50 or less as tested by ANSI/ASTM 84.

2.3 Flexible Fiberglass Insulation: ASTM C553, Type I, Class B-3 (temperature less than 350ºF). Duct wrap shall be 1 pcf density with UL rated aluminum foil vapor barrier (FSK).

2.4 General Purpose Mastic: Benjamin Foster 35-00 Series, Insulcoustic VIAC Mastic, Childers CP-10, or approved equal. The final selection of this product for the specific application indicated is the responsibility of the insulation supplier. The insulation system must meet the specified application.

2.5 Vapor Barrier Sealant: Benjamin Foster 30-35, Insulcoustic IC-501, 3M EC-1378, Childers CP-30, or approved equal. Provide "Low Odor" type. The final selection of this product for the specific application indicated is the responsibility of the insulation supplier. The insulation system must meet the specified application.

2.6 Adhesive: Benjamin Foster 85-20, Insulcoustic IC-205, 3M EC-35, Childers CP-82, Childers CP-89, or approved equal. The final selection of this product for the specific application indicated is the responsibility of the insulation supplier. The insulation system must meet the specified application.

2.7 Fiber-Glas Mesh: 10x10 Mesh. Foster Mastafab or equal.

3 EXECUTION

3.1 Installation of Flexible Insulation: Insulate all supply, return and outdoor air ductwork and the backs of all ceiling supply outlets with 2" thick fiberglass blanket insulation with vapor barrier.

3.1.1 Insulate round elbows and fittings with wrap such that thickness is equal to adjoining duct covering. Clean and dry ductwork prior to insulating.

3.1.2 Adhere insulation to duct with 50 percent coverage using approved insulation adhesive applied in 6-inch wide swaths with 6-inch spaces between swaths. Additionally secure insulation with perforated pins and Tuff-Bond or by self-sticking pins with a 3/8" self-tapping screw. Space on 12-inch centers and 3 inches from all edges. Ducts up through 24" wide only require one row of pins. Ducts over 24" wide shall have pins spaced as described herein.

3.1.3 Lap all joints 2 inches and seal joints with 4-inch wide strips of open mesh glass fabric embedded in two coats of general purpose mastic.

3.1.4 Seal all punctures and breaks in aluminum vapor barrier with open mesh glass fabric and vapor barrier sealant.

SECTION 22A

INSULATION FOR PLUMBING EQUIPMENT AND PIPING

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 Division-20 Basic Mechanical Materials and Methods Sections apply to work of this section.

1.3 Approval Submittals:

1.3.1 Product Data: Submit a producer's data sheets and installation instructions on each insulation system including insulation, coverings, adhesives, sealers, protective finishes, and other material recommended by the manufacturer for applications indicated. Submit for:

Fiberglass pipe insulation

1.4 O&M Data Submittals: Submit a copy of all approval submittals. Include in O&M Manual.

2 PRODUCTS

2.1 Acceptable Manufacturers: Subject to compliance with requirements, provide insulation products by Armstrong, Johns Manville, Knauf, Owens Corning, Pittsburgh Corning, U.S. Rubber, or approved equal. All products shall be asbestos-free.

2.2 Flame/Smoke Ratings: Provide composite mechanical insulation (insulation, jackets, coverings, sealers, mastics, and adhesive) with a flame-spread rating of 25 or less, and a smoke-developed rating of 50 or less, as tested by ANSI/ASTM E84.

2.3 Pipe Insulation Materials:

2.3.1 Fiberglass Pipe Insulation: ASTM C547, Class 1 unless otherwise indicated. (Preformed sleeving with white all-service jacket, suitable for temperatures up to 450°F)

2.3.2 Staples, Bands, Wires, and Cement: As recommended by the insulation manufacturer for applications indicated.

2.3.3 Adhesives, Sealers, Protective Finishes: Products recommended by the insulation manufacturer for the application indicated.

2.3.4 Jackets: ASTM C921, Type I (vapor barrier) for piping below ambient temperature, Type II (vapor permeable) for piping above ambient temperature. Type I may be used for all piping at Installer's option.

3 EXECUTION

3.1 General:

3.1.1 Install thermal insulation products in accordance with manufacturer's written instructions, and in compliance with recognized industry practices to ensure that insulation serves intended purpose.

3.1.2 Install insulation materials with smooth and even surfaces and on clean and dry surfaces. Redo poorly fitted joints. Do not use mastic or joint sealer as filler for gapping joints and excessive voids resulting from poor workmanship.

3.1.3 Maintain integrity of vapor-barrier on insulation and protect it to prevent puncture and other damage. Label all insulation "ASBESTOS FREE".

3.1.4 Do not apply insulation to surfaces while they are hot or wet.

3.1.5 Do not install insulation until systems have been checked and found free of leaks. Surfaces shall be clean and dry before attempting to apply insulation. A professional insulator with adequate experience and ability shall install insulation.

3.1.6 Do not install insulation on pipe systems until acceptance tests have been completed except for flexible unicellular insulation. Do not install insulation until the building is "dried-in".

3.2 Fiberglass Pipe Insulation:

3.2.1 Insulate the following piping systems (indoor locations):

3.2.1.1 Domestic hot water, 141º-180° F: up to 1-1/4" pipe - 1½" thick, over 1-1/4" pipe 2" thick.

3.2.1.2 Domestic hot water, 105º-140° F: up to 3" pipe - 1½" thick, over 3" pipe - 2" thick.

3.2.2 Apply insulation to pipe with all side and end joints butted tightly. Seal longitudinal lap by pressurizing with plastic sealing tool. Apply 3 inch wide self sealing butt strips to joints between insulation sections. Insulate all fittings, flanges, valves and strainers with premolded insulation. Apply coat of insulating cement to fittings and wrap with glass cloth overlapping each wrap 1" and adjacent pipe 2". Finish with heavy coat of general purpose mastic. Premolded PVC covers may also be used, but no flexible inserts are allowed.

3.2.3 Provide hanger or pipe support shields of 16 gauge (minimum) galvanized steel over the insulation which extends halfway up the pipe insulation cover and at least 6" on each side of the hanger.

3.2.4 Omit insulation on exposed plumbing fixture runouts from faces of wall or floor to fixture; on unions, flanges, strainer blowoffs, flexible connections and expansion joints.

END OF SECTION

SECTION 22B

POTABLE WATER SYSTEM

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 Division-20 Basic Mechanical Requirements and Basic Mechanical Materials and Methods sections apply to work of this section.

1.3 Extent of potable water systems work, is indicated on drawings and schedules, and by requirements of this section.

1.4 Refer to other Division-22 sections for site water distribution system; not work of this section unless noted.

1.5 Refer to appropriate Division-2 sections for exterior potable water system; not work of this section unless noted.

1.6 Insulation for potable water piping is specified in other Division-22 sections, and is included as work of this section. Insulation requirements include:

1.6.1 Domestic hot water piping

1.7 Excavation and backfill required in conjunction with water piping is specified in other Division-20 sections, and is included as work of this section.

1.8 Code Compliance: Comply with applicable portions of Standard Plumbing Code pertaining to selection and installation of plumbing materials and products. Comply with local utility requirements.

1.9 Approval Submittals:

1.9.1 Product Data: Submit manufacturer's technical product data and installation instructions for:

Valves
Hose bibbs
Wall hydrants
Water hammer arresters
Relief valves
Trap primers
Access doors

1.10 Test Reports and Verification Submittals:

1.10.1 Disinfection: Submit report by Health Department.

1.11 O&M Data Submittals: Submit a copy of all approval submittals. Submit maintenance

data and parts lists for valves, trap primers. Include these data in O&M manual.

2 PRODUCTS

2.1 General: Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, temperature ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide materials and products complying with Standard Plumbing Code where applicable. Provide sizes and types matching pipe materials used in potable water systems. Where more than one type of materials or products is indicated, selection is Installer's option.

2.2 Acceptable Manufacturers: Subject to compliance with requirements, provide products of one of the following listed for each item.

2.3 Identification: Provide identification complying with Division-20 Basic Mechanical Materials and Methods section "Mechanical Identification". Provide manufacturer's standard permanent, bright-colored, continuous-printed plastic tape, intended for direct burial service; not less than 6" wide x 4 mils thick. Provide blue tape with black printing reading "CAUTION WATER LINE BURIED BELOW".

2.4 Pipes and Fittings: Provide pipes and pipe fittings complying with Division-20 Basic Mechanical Materials and Methods section "Pipes and Pipe Fittings", in accordance with the following listing:

2.4.1 Interior Water Piping:

2.4.1.1 Above Grade: Copper tube; Type L, hard-drawn temper; wrought-copper fittings, solder-joints.

2.4.1.2 Below Grade: Copper tube; Type L, soft-annealed temper; no joints below floor.

2.4.2 Exterior Water Piping:

2.4.2.1 Copper tube; Type L, hard-drawn temper; wrought-copper fittings, solder-joints.

2.4.3 Solder joints shall be made with 95-5 solder.

2.5 Piping Specialties: Provide piping specialties complying with Division-20 Basic Mechanical Materials and Methods section "Piping Specialties".

2.6 Supports and Anchors: Provide supports and anchors complying with Division-20 Basic Mechanical Materials and Methods section "Supports and Anchors".

2.7 Interior Valves: Provide valves complying with Division-20 Basic Mechanical Materials and Methods section "Valves", in accordance with the following listing:

2.7.1 Sectional and Shutoff Valves: GA1, GA2, GA3, BA1, BA2.

2.7.2 Drain Valves: GA1, GA2, BA1, BA2.

2.7.3 Throttling Valves: BA1, BA2.

2.7.4 Check Valves: CK1, CK2, CK3.

2.8 Hose Bibbs: Provide rough nickel plated hose bibbs with lock shield compression stop and removable handle, solid flange, female connection with ¾" male threaded hose end, and straight line type non-removable vacuum breaker with ¾" male threaded hose end. Acorn 8121 RCP or equal model by Woodford.

2.9 Wall Hydrants: Provide complete bronze body hose bibbs inside stainless steel box with hinged access door with cylinder lock and “WATER” stamped on cover. Provide key operated control valve with all bronze interior parts, replaceable seat washer, screwdriver operated stop valve in supply, and 3/4” male threaded hose connection. Zurn Z1350 or equal by Acorn or Woodford.

2.10 Water Hammer Arresters: Provide bellows type water hammer arresters, stainless steel casing and bellows, pressure rated for 250 psi, tested and certified in accordance with PDI Standard WH-201. Precision Plumbing Products, Josam, Zurn, Amtrol, Wade, Jay R. Smith, or approved equal.

2.11 Combined Pressure-Temperature Relief Valves: Provide relief valves as indicated, of size and capacity as selected by Installer for proper relieving capacity, in accordance with ASME Boiler and Pressure Vessel Code. Provide bronze body, test lever and thermostat complying with ANSI Z21.22 listing requirements for temperature discharge capacity. Provide temperature relief at 210°F, and pressure relief at 150 psi. Watts, Cash, Zurn, or approved equal.

2.12 Mechanical Trap Primers: Provide brass trap primers and distribution units to seal floor drains indicated on drawings. Trap primer valves shall be automatic, self contained type with no springs or diaphragms and shall not require adjustment. Trap primer valves shall be the type that can be installed anywhere on cold water piping. Distribution units shall supply 1-4 floor drains. Trap primer valves shall comply with ASSE 1018. Precision Plumbing Products PR-500, or approved equal. Where P-trap primers are indicated use "Prime-Eze" by Jay R. Smith, or approved equal.

2.13 Access Doors: Provide access doors to service all valves and other devices as required in accordance with Division-20 Basic Materials and Methods Section “Access Doors”.

3 EXECUTION

3.1 General: Examine areas and conditions under which potable water systems are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 Install mechanical identification in accordance with Division-20 Basic Mechanical Materials and Methods section "Mechanical Identification". Install underground plastic pipe markers during backfill, 6"-8" below grade.

3.3 Install water distribution piping in accordance with Division-20 Basic Mechanical Materials and Methods section "Pipes and Pipe Fittings".

3.3.1 Install piping with 1/32" per foot (¼%) downward slope towards drain point.

3.3.2 Locate groups of pipes parallel to each other, spaced to permit applying full insulation and servicing of valves.

3.4 Install exterior water piping in compliance with local governing regulations. Water piping shall be installed with a minimum of 30 inches of cover unless otherwise indicated.

3.5 Install piping specialties in accordance with Division-20 Basic Mechanical Materials and Methods section "Piping Specialties".

3.6 Install supports and anchors in accordance with Division-20 Basic Mechanical Materials and Methods section "Supports and Anchors".

3.7 Install valves in accordance with Division-20 Basic Mechanical Materials and Methods section "Valves".

3.7.1 Sectional Valves: Install on each branch and riser, close to main, where branch or riser serves two or more plumbing fixtures or equipment connections, and elsewhere as indicated.

3.7.2 Shutoff Valves: Install on inlet of each plumbing equipment item, and on inlet of each plumbing fixture, and elsewhere as indicated.

3.7.3 Drain Valves: Install on each plumbing equipment item located to completely drain equipment for service or repair. Install at base of each riser, at base of each rise or drop in piping system, and elsewhere where indicated or required to completely drain potable water system.

3.7.4 Check Valves: Install where indicated.

3.8 Hose Bibbs and Wall Hydrants: Install on concealed piping where indicated with vacuum breaker. Mount 18 inches above grade or finished floor.

3.9 Install relief valves on each water heater, and where indicated in accordance with the manufacturer's instructions. Pipe full size outside or to floor drain. Cut the end of the pipe at a 45° angle and terminate 6 inches above the floor or grade.

3.10 Piping Runouts to Fixtures: Provide hot and cold water piping runouts to fixtures of sizes indicated, but in no case smaller than required by Standard Plumbing Code.

3.11 Install water hammer arresters in upright position, in locations and of sizes indicated in accordance with PDI Standard WH-201.

3.12 Install trap primers as indicated, and in accordance with manufacturer's installation instructions. Provide access panels to all trap primers unless accessible through a lay-in ceiling.

3.13 Locate and coordinate installation of access doors for all valves and devices in accordance with Division-20 Basic Mechanical Materials and Methods section “Access Doors”.

3.14 Piping Tests: Test, clean, and sterilize potable water piping in accordance with testing requirements of Division-20 Basic Mechanical Materials and Methods section "Testing, Cleaning, and Sterilization of Piping Systems".

END OF SECTION

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SECTION 22C

SOIL, WASTE AND VENT SYSTEM

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 Division-20 Basic Mechanical Requirements and Basic Mechanical Materials and Methods sections apply to work of this section.

1.3 Extent of soil waste and vent systems work is indicated on drawings and schedules, and by requirements of this section.

1.4 Refer to appropriate Division-2 sections for exterior sanitary sewer system required in conjunction with soil and waste systems; not work of this section.

1.5 Excavation and backfill required in conjunction with soil, waste and vent piping is specified in other Division-20 sections and is included as work of this section.

1.6 Refer to Division-7 section "Flashing and Sheet Metal" for flashings required in conjunction with soil and waste systems; not work of this section.

1.7 Code Compliance: Comply with applicable portions of Florida Building Code-Plumbing pertaining to plumbing materials, construction and installation of products. Comply with local utility requirements.

1.8 Approval Submittals:

1.8.1 Product Data: Submit manufacturer's technical product data for:

Cleanouts
Floor drains
Grease interceptors.

1.9 O&M Data Submittals: Submit a copy of all approval submittals. Include these data in O&M manual.

2 PRODUCTS

2.1 General: Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in soil and waste systems. Where more than one type of materials or products is indicated, selection is Installer's option.

Underground-Type Plastic Line Marker: Manufacturer's standard permanent, bright-colored, continuous-printed plastic tape, intended for direct-burial service; not less than 6" wide x 4 mils thick. Provide green tape with black printing reading "CAUTION SEWER LINE BURIED BELOW".

2.2 Acceptable Manufacturers: Subject to compliance with requirements, provide products of one of the following listed for each item.

2.3 Pipes and Fittings: Provide pipes and pipe fittings complying with Division-20 Basic Mechanical Materials and Methods section "Pipes and Pipe Fittings", in accordance with the following listing:

2.3.1 Above Ground Soil, Waste, and Vent Piping:

2.3.1.1 Polyvinyl chloride plastic pipe (PVC); Type DWV; PVC plastic type DWV socket-type fitting, solvent cement joints. Do not use in fire-rated assemblies or return air plenums.

2.3.2 Underground Building Drain Piping (within 5 feet of the building):

2.3.2.1 Pipe Size 6" and Smaller: Polyvinyl chloride sewer pipe (PVC); Type DWV; PVC plastic type DWV socket-type.

2.4 Pipe Specialties: Provide piping specialties complying with Division-20 Basic Materials and Methods section "Piping Specialties".

2.5 Supports and Anchors: Provide supports and anchors complying with Division-20 Basic Mechanical Materials and Methods section "Supports and Anchors".

2.6 Cleanouts: Provide factory-fabricated drainage piping products of size and type indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements and governing regulations. Josam, Jay R. Smith, Wade, Zurn.

2.6.1 Cleanout Plugs: Cast-bronze or brass, threads complying with ANSI B2.1 countersunk head.

2.6.2 Cleanout for PVC Systems:

2.6.2.1 Floor Cleanouts: Cast-iron body with adjustable head, brass plug, and scoriated nick-brass cover. Furnish with carpet flange for carpeted floors. Furnish with recessed cover for tile floors. Furnish with clamping ring for floors with membrane. Wade W-6030 hub outlet for push-on.

2.6.2.2 Cleanouts in Piping: PVC cleanout adaptor with threaded PVC plug.

2.6.2.3 Wall Cleanouts: PVC cleanout adaptor with tapped, countersunk, threaded brass plug. Square 8.75”x8.75” hinged wall access cover, with scoriated nickel bronze finish.

2.6.2.4 Grade Cleanouts: PVC cleanout adaptor with countersunk, threaded brass plug. Wade W-8590-D plug. In sidewalks and other finished concrete, provide access cover frames with a non-tilting tractor cover. Wade W-7035-Z or equal.

2.6.2.5 Cleanouts in Paved Areas: Cast iron body, adjustable housing, ferrule with plug and round loose scoriated tractor cover. Wade W-8300-MF. Coordinate concrete depth at site with adjustable flange.

2.7 Floor Drains: Provide floor drains of size as indicated on drawings; and type, including features, as specified herein. Josam, Jay R. Smith, Wade, Zurn.

2.7.1 Floor Drains: Provide inside caulk bottom outlet or TY-Seal hub outlet with adaptor for cast iron trap installation and a 4" deep trap seal. Provide clamping rings for floors with membrane.

2.7.2 Strainer: Provide 5" satin-nickel bronze strainer.

2.7.3 Trap Primer Connection: Provide ½" trap primer tapping.

2.7.4 Funnel: Provide funnel where shown on the drawings.

2.7.5 Basis of Design: Zurn Z415B-P.

3 EXECUTION

3.1 Examine substrates and conditions under which soil and waste systems are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 Piping Installation:

3.2.1 Install above grade soil and waste piping in accordance with Division-20 Basic Mechanical Materials and Methods section "Pipes and Pipe Fittings", and with Florida Building Code-Plumbing.

3.2.2 Install underground soil and waste pipes as indicated and in accordance with Florida Building Code-Plumbing. Lay underground piping beginning at low point of systems, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install required gaskets in accordance with manufacturer's recommendations for use of lubricants, cements, and other special installation requirements. Clean interior of piping of dirt and other superfluous material as work progresses. Maintain swab or drag in line and pull past each joint as it is completed. Place plugs in ends of uncompleted piping at end of day or whenever work stops.

3.2.3 Install building soil and vent piping pitched to drain at minimum slope of ¼" per foot (2%) for piping smaller than 3", and 1/8" per foot (1%) for piping 3" and larger.

3.3 Install piping specialties in accordance with Division-20 Basic Mechanical Materials and Methods section "Piping Specialties".

3.4 Install supports and anchors in accordance with Division-20 Basic Mechanical Materials and Methods section "Supports and Anchors".

3.5 Installation of Cleanouts: Install in above ground piping and building drain piping as indicated, as required by Florida Building Code-Plumbing; and at each change in direction of piping greater than 45°; at minimum intervals of 50' for piping 4" and smaller and 100' for larger piping; and at base of each vertical soil or waste stack. Install floor and wall cleanout covers for concealed piping, select type to match adjacent building finish.

3.5.1 Size: Cleanouts shall be full size up to 4". Piping over 4" shall have a reducing fitting to accommodate a 4" cleanout unless indicated otherwise on drawings.

3.5.2 Install cleanouts to allow adequate clearance for rodding.

3.5.3 Protect all finished surfaces of cleanouts with a suitable adhesive covering until construction is completed.

3.5.4 Cleanouts to Grade: Provide an 18" x 18" x 8" thick concrete pad around the cleanout. Set the cleanout ferrule, adapter, or access cover frame in the concrete as required. The cleanout shall be extended to the finished grade. The concrete pad shall slope away from the cleanout in all directions approximately one inch. Cover pad with fill to finished grade.

3.5.5 Cleanouts in Paved Areas: Provide concrete pad similar to cleanout to grade and coordinate concrete depth at site with adjustable flange. Access cover frames are required.

3.6 Flashing Flanges: Install flashing flange and clamping device with each stack and cleanout passing through waterproof membranes.

3.7 Vent Flashing Sleeves: Install on stack passing through roof, secure to stack flashing in accordance with manufacturer's instructions. For metal roofs, sleeves and flashing are by Division-7.

3.8 Installation of Floor Drains: Install floor drains in accordance with manufacturer's written instructions and in locations indicated.

3.8.1 Coordinate flashing work with work of waterproofing and adjoining substrate work.

3.8.2 Install floor drains at low points of surface areas to be drained, or as indicated. Set tops of drains flush with finished floor.

3.8.3 Install drain flashing collar or flange so that no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes, where penetrated.

3.8.4 Position drains so that they are accessible and easy to maintain.

3.9 Connection of Trap Primers: Connect trap primers as indicated, and in accordance with manufacturer's installation instructions. Pitch piping towards drain trap, minimum of 1/8" per foot (1%). Adjust trap primer for proper flow.

3.10 Piping Runouts to Fixtures: Provide soil and waste piping runouts to plumbing fixtures and drains, with approved trap, of sizes indicated, but in no case smaller than required by Florida Building Code-Plumbing.

3.11 Install oil-water separator and gauging in accordance with manufacturer's printed instructions. Handle tank with care placing.

3.12 Test, clean, flush, and inspect soil and waste piping in accordance with requirements of Division-20 Basic Mechanical Materials and Methods section "Testing, Cleaning and Sterilization of Piping Systems".

END OF SECTION

SECTION 22D

PLUMBING FIXTURES, EQUIPMENT, TRIM & SCHEDULE

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 Division-20 Basic Mechanical Requirements and Basic Mechanical Materials and Methods sections apply to work of this section.

1.3 Extent of plumbing fixtures work required by this section is indicated on drawings and schedules, and by requirements of this section.

1.4 Refer to Division-26 sections for field-installed electrical wiring required for plumbing fixtures; not work of this section.

1.5 Codes and Standards:

1.5.1 Plumbing Fixture Standards: Comply with applicable portions of Florida Building Code-Plumbing pertaining to materials and installation of plumbing fixtures.

1.5.2 ANSI Standards: Comply with applicable ANSI standards pertaining to plumbing fixtures and systems.

1.5.3 PDI Compliance: Comply with standards established by PDI pertaining to plumbing fixture supports.

1.5.4 UL Listing: Construct plumbing fixtures requiring electrical power in accordance with UL standards and provide UL-listing and label.

1.5.5 ARI Compliance: Construct and install water coolers in accordance with ARI Standard 1010 "Drinking-Fountains and Self-Contained Mechanically-Refrigerated Drinking-Water Coolers", and provide Certification Symbol.

1.5.6 ANSI Compliance: Construct and install barrier-free plumbing fixtures in accordance with ANSI Standard A117.1 "Specifications for Making Buildings and Facilities Accessible To and Usable By Physically Handicapped People".

1.6 Approval Submittals:

1.6.1 Product Data: Submit manufacturer's technical product data, including rated capacities of selected model clearly indicated, furnished specialties and accessories; and installation instructions. Submit manufacturer's assembly-type drawings indicating dimensions, roughing-in requirements, required clearances, and methods of assembly of components and anchorages. The submittal shall be organized by “fixture number” and each fixture package shall be so identified. Each fixture package shall include all of the required fitting and trim, even if such devices are used for more than one fixture.

1.7 O&M Data Submittals: Submit a copy of approval submittals. Submit maintenance data and parts lists for each type of plumbing fixture and accessory; including "trouble-shooting" maintenance guide. Include these data in O&M manual.

1.8 Handle plumbing fixtures carefully to prevent breakage, chipping and scoring fixture finish. Do not install damaged plumbing fixtures; replace and return damaged units to equipment manufacturer.

2 PRODUCTS

2.1 General: Provide factory-fabricated fixtures of type, style and material indicated. For each type fixture, provide trim, carrier, seats, and valves as specified. Where not specified, provide products as recommended by manufacturer, and as required for complete installation. Where more than one type is indicated, selection is Installer's option; but, all fixtures of same type must be furnished by single manufacturer. Where type is not otherwise indicated, provide fixtures complying with governing regulations.

2.2 Model Numbers: Basis of design model numbers of a particular manufacturer are listed in the fixture schedule as an aid to contractors. Where conflicts between the model number and the written description occur, the written description shall govern. Where acceptable manufacturers are listed, products are subject to compliance with requirements.

2.3 Refer to plumbing construction documents for fixture specifications.

2.4 Materials:

2.4.1 Provide materials which have been selected for their surface flatness and smoothness. Exposed surfaces which exhibit pitting seam marks, roller marks, foundry sand holes, stains, decoloration, or other surface imperfections on finished units are not acceptable.

2.4.2 All fixtures shall be white vitreous china unless otherwise specifically noted. Where enameled iron fixtures are specified, they shall be furnished with acid resisting enamel.

2.4.3 Where fittings, trim and accessories are exposed or semi-exposed provide bright chrome-plated or polished stainless steel units. Provide copper or brass where not exposed.

2.4.4 Stainless Steel Sheets: ASTM A 167, Type 302/304, hardest workable temper. Finish shall be No. 4, bright, directional polish on exposed surfaces.

2.4.5 Vitreous China: High quality, free from fire cracks, spots, blisters, pinholes and specks; glaze exposed surfaces, and test for crazing resistance in accordance with ASTM C 554.

2.4.6 Synthetic Stone: High quality, free from defects, glaze on exposed surfaces, stain resistant.

2.5 Plumbing Fittings, Trim and Accessories:

2.5.1 Faucets: At locations where water is supplied (by manual, automatic or remote control), provide commercial quality chrome-plated, cast-brass faucets, valves, or other dispensing devices, of type and size indicated, and as required to operate as indicated.

2.5.1.1 Aerators: Provide aerators of types approved by Health Department having jurisdiction.

2.5.1.2 Acceptable Manufacturers: Subject to compliance with requirements, provide products of one of the following for each item. American Standard, Chicago Faucet Co., Kohler Co., Speakman Co., T & S Brass and Bronze Works, Water Saver Faucet Co.

2.5.2 Stops: Provide chrome-plated brass, angle type, manual shutoff valves and 3/8" chrome-plated flexible supply pipes to permit fixture servicing without shutdown of water supply piping systems for all fixtures. Coordinate with fixture requirements.

Provide loose key stops.

2.5.2.1 Acceptable Manufacturers: Subject to compliance with requirements, provide products of one of the following for each item. Zurn or approved equal.

2.5.3 Waste Outlets: Provide removable P-traps, drains, waste arms, tailpieces and wastes-to-wall where drains are indicated for direct connection to drainage system for all fixtures unless otherwise noted. Provide drains, tailpieces and waste arms where indirect drains are indicated. Waste outlets shall be full size of fixture drain connection.

2.5.3.1 Provide chrome-plated cast-brass P-traps and drains with cleanout.

2.5.3.2 P-traps, wastes and drains of all types shall be 17-gauge.

2.5.3.3 Acceptable Manufacturers: Subject to compliance with requirements, provide products of one of the following for each item. Zurn, or approved equal.

2.5.4 Flush Valves: Provide quiet-flush, chrome-plated, cast-brass flush valves with vacuum breaker and screwdriver stop. Where handicap service is indicated, provide ADA compliant handles with the handle on the wide side of the stall.

2.5.4.1 Acceptable Manufacturers: Subject to compliance with requirements, provide products of one of the following for each item. Sloan Valve Co. or Zurn.

2.5.5 Carriers: Provide cast-iron supports for fixtures of either graphitic gray iron, ductile iron, or malleable iron or steel as indicated. Coordinate with specific fixture requirements and conditions of the project.

2.5.5.1 Acceptable Manufacturers: Subject to compliance with requirements, provide products of one of the following for each item. Josam, Wade, Zurn, J.R. Smith.

2.5.6 Fixture Bolt Caps: Provide manufacturer's standard exposed fixture bolt caps finished to match fixture finish.

2.5.7 Escutcheons: Where fixture supplies and drains penetrate walls in exposed locations, provide chrome-plated brass sheet steel escutcheons with friction clips.

2.5.8 Comply with additional fixture requirements listed for each fixture and as required for a complete and functional system.

2.6 Water Closets:

2.6.1 General: Provide white china siphon jet type unless otherwise noted.

2.6.1.1 Acceptable Manufacturers: Subject to compliance with requirements, provide products of one of the following for each item. American Standard, Crane, Kohler, or Zurn.

2.6.2 Fixture Seats: Provide white, heavy molded plastic fixture seats with stainless steel self-sustaining check hinges.

2.6.2.1 Acceptable Manufacturers: Subject to compliance with requirements, provide products of one of the following for each item. Bemis Mfg. Co., Beneke Corp., Zurn, Church or Comfort Seats.

2.7 Urinals:

1. General: Provide white china siphon jet wall hung type with ¾" top spud and 2" outlet unless otherwise noted. Provide short foot carrier with top and bottom hanger plates.

2. Acceptable Manufacturers: Subject to compliance with requirements, provide products of one of the following for each item. American Standard, Crane, Kohler, or Zurn.

2.8 Lavatories:

2.8.1 General: Provide white china lavatories.

2.8.2 Acceptable Manufacturers: Subject to compliance with requirements, provide products of one of the following for each item. American Standard, Crane, Kohler, or Zurn.

2.9 Service Sinks:

2.9.1 General: Provide acid resistant service sinks with back and wall hanger. Provide double faucet with bucket hook, vacuum breaker, stops and hose end. Provide 3" trap to wall, enameled inside, painted outside with foot support. Provide stainless steel rim guard. Paint outside of sink and trap black.

2.9.2 Acceptable Manufacturers: Subject to compliance with requirements, provide products of one of the following for each item. American Standard, Crane co., Eljer co., Fiat Products, Kohler Co., Stern-Williams Co.

2.10 Stainless Steel Sinks:

2.10.1 General: Provide Type 304, 18 gauge self-rimming stainless steel back ledge with No. 4 finish . Provide sound deadening material on the sides and bottom of the sink. Provide grid drain or strainer with removable crumb cup and stopper as indicated.

2.10.2 Acceptable Manufacturers: Subject to compliance with requirements, provide products of one of the following for each item. Elkay, Just

2.11 Water Heaters:

2.11.1 Electric Water Heaters:

2.11.2 Accessories: VB, relief, pan, stand, etc.

2.11.3 Acceptable Manufacturers: Subject to compliance with requirements, provide products of one of the following for each item. Ruud, Rheem, Mor-Flo, State, A.O. Smith.

3 EXECUTION

3.1 Examine roughing-in work of potable water and waste piping systems to verify actual locations of piping connections prior to installing fixtures. Also examine floors and substrates, and conditions under which fixture work is to be accomplished. Correct any incorrect locations of piping, and other unsatisfactory conditions for installation of plumbing fixtures. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 Install plumbing fixtures of types indicated where shown and at indicated heights. Install in accordance with fixture manufacturer's written instructions, roughing-in drawings, and with recognized industry practices. Install in accordance with ADA and applicable handicap code requirements. Ensure that plumbing fixtures comply with requirements and serve intended purposes. Comply with applicable requirements of Florida Building Code-Plumbing pertaining to installation of plumbing fixtures. Furnish templates for cut-outs in countertops. Coordinate exact fixture locations with countertop shop drawings.

3.3 Fasten plumbing fixtures securely to indicated supports or building structure; and ensure that fixtures are level and plumb. Secure plumbing supplies behind or within wall construction so as to be rigid, and not subject to pull or push movement. Mount at heights shown on the drawings. Fixture heights are floor-to-rim distance. Fitting heights are to centerline.

3.4 Install stop valve in water supply to each fixture.

3.5 After fixtures are set, the crack between the fixture and wall shall be caulked with DAP silicone-based caulking, or approved equal.

3.6 Protect installed fixtures from damage during remainder of construction period.

3.7 Upon completion of installation of plumbing fixtures and after units are water pressurized, test fixtures to demonstrate capability and compliance with requirements. When possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with retesting.

3.8 Inspect each installed unit for damage to finish. If feasible, restore and match finish to original at site; otherwise, remove fixture and replace with new unit. Feasibility and match to be judged by Architect/Engineer. Remove cracked or dented units and replace with new units.

3.9 Clean plumbing fixtures, trim, aerators, and strainers of dirt and debris upon completion of installation.

3.10 Adjust water pressure at drinking fountains, faucets, shower valves, and flush valves to provide proper flow stream and specified gpm.

3.11 Adjust or replace washers to prevent leaks at faucets and stops.

END OF SECTION

SECTION 22E

GAS SYSTEM

1 GENERAL

1.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications sections, apply to work of this section.

1.2 Division-20 Basic Mechanical Requirements and Basic Mechanical Materials and Methods sections apply to work of this section.

1.3 Extent of gas systems work, is indicated on drawings and schedules, and by requirements of this section.

1.4 Excavation and backfill required in conjunction with gas service piping is specified in Division-20 sections, and is included as work of this section.

1.5 Codes and Standards

1.5.1 NFPA Compliance: Fabricate and install gas systems in accordance with NFPA 54 "National Fuel Gas Code".

1.5.2 Utility Compliance: Fabricate and install gas systems in accordance with local gas utility company requirements and standards.

1.6 Approval Submittals:

1.6.1 Product Data: Submit manufacturer's technical product data and installation instructions as follows:

Gas cocks and/or ball valves
Access doors

1.7 O&M Data Submittals: Submit a copy of approval submittals. Submit maintenance data and parts lists for gas cocks, ball valves. Include these data in O&M manual.

2 PRODUCTS

2.1 General: Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide materials and products complying with NFPA 54 where applicable. Base pressure rating on gas piping system maximum design pressures. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in gas systems. Where more than one type of materials or products are indicated, selection is Installer's option.

2.2 Identification: Provide identification complying with Division-20 Basic Mechanical Materials and Methods section "Mechanical Identification".

2.3 Pipes and Fittings: Provide pipes and pipe fittings complying with Division-20 Basic

Mechanical Materials and Methods section "Pipes and Pipe Fittings", in accordance with the following listing:

2.3.1 Building Distribution Piping:

2.3.1.1 Pipe Size 2" and Smaller: Black steel pipe; Schedule 40; malleable-iron threaded fittings.

2.3.1.2 Pipe Sizes 2" and Smaller: Gas piping within each laboratory shall be Type L hard drawn copper with silver solder brazed joints.

2.4 Piping Specialties: Provide piping specialties complying with Division-20 Basic Mechanical Materials and Methods section "Piping Specialties".

2.5 Sealants: Provide UL-listed or AGA approved sealants for gas piping.

2.6 Supports and Anchors: Provide supports and anchors complying with Division-20 Basic Mechanical Materials and Methods section "Supports and Anchors".

2.7 Valves: Provide valves complying with Division-20 Basic Mechanical Materials and Methods section “Valves” and in accordance with the following listing.

2.7.1 Gas Cocks 2" and Smaller: UL-listed, AGA approved, 150 psi non-shock WOG, full port, bronze straightway cock, flat or square head, threaded ends.

2.7.2 Wrenches: Provide operating wrenches for all gas cocks serving boilers.

2.7.3 Acceptable Manufacturers for gas cocks: Subject to compliance with requirements, provide products of one of the following: Resun R1430 and R1431, Milliken 200M and 201M or approved equal.

2.8 Gas Meter and Regulator: Provided by local utility company.

2.9 Access Doors: Provide access doors to service all valves and other devices as required in accordance with Division-20 Basic Materials and Methods Section “Access Doors”.

3 EXECUTION

3.1 Examine areas and conditions under which gas systems materials and products are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer. Coordinate with gas supplier prior to starting work.

3.2 Install mechanical identification in accordance with Division-20 Basic Mechanical Materials and Methods section "Mechanical Identification".

3.3 Install gas piping in accordance with Division-20 Basic Mechanical Materials and Methods section "Pipes and Pipe Fittings".

3.3.1 Use sealants on metal gas piping threads which are chemically resistant to gas. Use sealants sparingly, and apply to only male threads of metal joints.

3.3.2 Remove cutting and threading burrs before assembling piping.

3.3.3 Do not install defective piping or fittings. Do not use pipe with threads which are chipped, stripped or damaged. Do not use bushings in the gas system.

3.3.4 Plug each gas outlet, including valves, with threaded plug or cap immediately after installation and retain until continuing piping, or equipment connections are completed.

3.3.5 Ground gas piping electrically and continuously within project, and bond tightly to grounding connection.

3.3.6 Install drip-legs in gas piping where indicated, and where required by code or gas company requirements.

3.3.7 Install "Tee" fitting with bottom outlet plugged or capped, at bottom of pipe risers.

3.3.8 Use dielectric unions where dissimilar metals are joined together.

3.3.9 Install piping with 1/64" per foot (1/8%) downward slope in direction of flow.

3.3.10 Install piping parallel to other piping, but maintain minimum of 12" clearance between gas piping and steam or hydronic piping above 200°F.

3.4 Install piping specialties in accordance with Division-20 Basic Mechanical Materials and Methods section "Piping Specialties".

3.5 Install supports and anchors in accordance with Division-20 Basic Mechanical Materials and Methods section "Supports and Anchors".

3.6 Installation of Valves:

3.6.1 Gas Cocks: Provide at connection to gas train for each gas-fired equipment item; and on risers and branches where indicated.

3.6.2 Locate gas cocks where easily accessible, and where they will be protected from possible injury.

3.7 Equipment Connections: Connect gas piping to each gas-fired equipment item, with drip leg and shutoff gas cock. Comply with equipment manufacturer's instructions.

3.8 Locate and coordinate installation of access doors for all valves and devices in accordance with Division-20 Basic Mechanical Materials and Methods section “Access Doors”.

3.9 Piping Tests: Inspect, test, and purge gas systems in accordance with NFPA 54, local utility requirements, and Division-20 Basic Mechanical Materials and Methods section "Testing, Cleaning and Sterilization of Piping Systems".

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SECTION 260000

ELECTRICAL GENERAL REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Electrical General Requirements specifically applicable to Division 26 Sections, in addition to Division 1 - General Requirements.

1.2 PROJECT/SITE CONDITIONS:

A. Install work in locations shown on Drawings, unless prevented by project conditions.

B. Prepare drawings showing proposed rearrangement of work to meet project conditions, including changes to work specified in other Sections. Obtain permission of Engineer before proceeding.

C. Before submitting a proposal for the work contemplated in these specifications and accompanying Drawings, each bidder shall examine the site and familiarize himself with all the existing conditions and limitations. No additional compensation will be allowed because of the Contractor's misunderstandings as to the amount of work involved or his lack of knowledge of any condition in connection with the work.

1.3 REGULATORY REQUIREMENTS:

A. Permits and Inspections: This Contractor shall secure and pay for all permits, and inspections required on work performed under this section of the Specifications. He shall assume full responsibility for all assessments and taxes necessary for the completion and acceptance of the work.

B. Applicable Standards and Codes: All materials and workmanship shall comply with all applicable codes, specifications, local ordinances, industry standards and utility company regulations. In case of difference between building codes, specifications, federal and state laws, local ordinances, industry standards and utility company regulations and the Contract Documents, the most stringent requirements shall govern. The Contractor shall promptly notify the Engineer in writing of such differences. Should the Contractor perform any work that does not comply with the requirements of the applicable building codes, federal and state laws, local ordinances, industry standards and utility company regulations, he shall bear all costs arising in correcting the deficiencies. Applicable codes and standards shall include all State laws, State Board of Health and State Rating Bureau, local ordinances, utility company regulations and the applicable requirements of the following:

1. Standard Building Code
2. National Fire Protection Association - NFPA
3. National Electrical Manufacturers Association - NEMA
4. National Bureau of Standards
5. American National Standards Institute - ANSI
6. Underwriters' Laboratories - UL

1.4 COOPERATION:

A. Cooperate with others in laying out the electrical work so that this phase of the work will properly fit the building and other contractors' requirements.

1.5 PRODUCTS FURNISHED BY OTHERS:

A. Products are furnished by the Owner or under other Divisions of these Specifications that require electrical connection.

B. This Contractor shall provide all necessary materials and labor to connect to the electrical system all equipment and fixtures having electrical power connection requirements. Refer to other Divisions of these Specifications for additional or specific requirements. Actual rough-in dimensions shall be obtained from Shop Drawings or measurements of the equipment or fixture.

C. The unpacking, assembling and setting of equipment furnished by the Owner or under other Divisions of these Specifications will be performed by others, unless stated otherwise.

D. Because the manufacturer of the equipment actually purchased or supplied may vary slightly from that specified, as hereinbefore stated, some rearranging of the requirements may be necessary. This Contractor shall make connections as required by the actual equipment furnished.

1.6 SEQUENCING AND SCHEDULING:

A. Construct work in sequence under provisions of applicable sections of these specifications.

B. Power outages shall be scheduled with the Owner and other Contractors. Outages shall be at the convenience of the Owner.

1.7 APPROVAL OF MATERIALS AND EQUIPMENT:

A. Whenever a material, article, or piece of equipment is identified on the Drawings or in these Specifications by reference to manufacturer's or vendor's name, trade name, catalog number or the like, it is so identified for the purpose of establishing a standard of quality and shall not be construed as limiting competition. Any material, article, or piece of equipment of other manufacturers or vendors, which will perform adequately the intent of the design, will be considered equally acceptable provided written approval has been granted by the Engineer. Materials submitted for approval shall comply with all applicable Sections of these Specifications prior to acceptance. Submit proposed substitutions to the Architect for approval at least ten (10) days prior to the bid so that an addendum can be issued to all contractors. Engineer's opinion shall be final on the equality of substituted items.

B. After the Contract has been awarded, catalog cuts on the following items shall be submitted to the Architect/Engineer for final approval before purchase of the equipment whether substitutions are being made or not:

1. Light Fixtures
2. Panelboards and Switchboards
3. Distribution Equipment
4. Wiring Devices
5. Fabricated Equipment
6. Automatic Transfer Switches

1.8 OBSERVATION, TESTING AND

BALANCING:

A. Observation: The complete job will be, during and/or after construction, subject to the administration of the Engineer. Site visit(s) shall be conducted by the Architect/Engineer or his designated representative as necessary to maintain compliance with the Contract requirements.
B. Balancing: All branch circuits and feeders shall be tested under typical load conditions (under maximum load conditions if so desired/requested by general contractor or engineer), and loads shall be balanced on the phases of the electrical system.

1.9 WORKMANSHIP:

A. All work shall be executed in a neat and substantial manner by skilled workman, well qualified, and regularly engaged in the type of work required. Substandard work shall be removed and replaced by the Contractor at no cost to the Owner.

1.10 OPERATING AND MAINTENANCE INSTRUCTIONS/AS BUILT DRAWINGS:

A. Four (4) complete sets of instructions containing the manufacturer's operating and maintenance instructions for each piece of equipment shall be furnished to the Owner. Each set shall be permanently bound and shall have a hard cover. One complete set shall be furnished at the time that the test procedure is submitted, and remaining sets shall be furnished before the Contract is completed. Flysheets shall be placed before instructions covering each subject. The instruction sheets shall be approximately 8-1/2" by 11" with large sheets of Drawings folded in. The instructions shall include information for major pieces of equipment and systems.

B. Upon completion of the work and at the time designated, the services of one project engineer shall be provided by the Contractor to instruct the representative of the Owner in the operation and maintenance of the systems.

C. This Contractor shall provide as-built Drawings at the completion of the job. Drawings shall show all significant changes in equipment, wiring, routing, location, etc.

1.11 GUARANTEE:

A. This Contractor shall guarantee to the Owner, all work performed under this contract to be free from defects in workmanship and material for a period of one year from date of final acceptance by Owner and Architect. Any defects arising during this period will be promptly remedied by the Contractor without cost to the Owner. Lamps and

fuses burned out during normal operation after acceptance are exempt from guarantee. This Contractor shall furnish the Owner with an estimated time, from notification of a problem to presence on the site, for all service calls on warranty items.

1.12 COMPLIANCE:

B. In the event of a conflict between Specifications, Drawings, Codes, Requirements, etc., the most stringent requirements shall govern.

C. The interpretation of conflicts and resolution thereof shall remain the right of the Architect/Engineer or his designated representative.

PART 2 - PRODUCTS**:** Not

Used PART 3 - EXECUTION:

Not Used

SECTION 260519

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS, CABLES, AND DEVICES

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

A. Section 260000 - Electrical General Requirements, apply to the work specified in this Section, with additions and modifications specified herein.

1.2 SECTION INCLUDES:

A. Wire and Cable

B. Wiring Devices

PART 2 PRODUCTS

2.01 WIRE AND CABLE

A. Building Wire:

1. Feeder and Branch Circuits 10 AWG and Smaller: Copper, solid conductor, 600 volt insulation, rated 75 degrees C, THHN/THWN.

2. Feeder and Branch Circuits 8 AWG and 6 AWG: Copper, stranded conductor, 600 volt insulation, rated 75 degrees C, THHN/THWN.

3. Feeder and Branch Circuits Larger Than 6 AWG: Copper, stranded conductor, 600 volt insulation, rated 75 degrees C, THW.

4. Control Circuits: Copper, stranded conductor, 600 volt insulation, THHN/THWN.

NOTE: The use of Romex cable is not allowed on this project. MC (metal clad) cable may be used where applicable and approved by local AHJ **and ARCHITECT/OWNER**. Aluminum wire may be used for feeder conductors provided the local AHJ **and OWNER** approve and the minimal allowable ampacity (as specified) is met.

B. Remote Control Signal Cable (where applicable):

- 1. Control Cable for Class 1 Remote Control and Signal Circuits: Copper conductor, 600 volt insulation, rated 60 degree C, individual conductors twisted together, shielded, and covered with PVC jacket.

- 2. Control Cable for Class 2 or Class 3 Remote Control and Signal Circuits: Copper conductor, 300 volt insulation, rated 60 degree C, individual conductors twisted together, shielded, and covered with PVC jacket; UL listed.

C. Cords: Oil-resistant thermoset-insulated multi-conductor flexible cord with identified

equipment grounding conductor, suitable for extra hard usage in damp locations, type SO.

2.2 WIRING DEVICES AND WALL PLATES:

A. Manufacturers:
   1. Hubbell
   2. Leviton
   3. Arrow Hart

B. Wall Switches: AC general use, quiet-operating snap switch rated 20 amperes and 120/277 volts AC, with plastic toggle handle, ivory color unless noted otherwise on architectural drawings. Confirm with COSCo.

   1. Single Pole Switch: Hubbell 1221-I (or equal)

   2. Three Way Switch: Hubbell 1223-I (or equal)

C. Receptacle:

   1. Convenience Receptacle Configuration: Type 5-20R, plastic face, ivory color. Model 5262-I manufactured by Hubbell (or equal).

   2. Specific Purpose Receptacle: Configuration indicated on Drawings with black plastic face.

   3. Provide straight-blade receptacles to NEMA WD 1.

   4. Provide straight-blade receptacles to NEMA WD 5.

   5. GFCI Receptacles: Duplex convenience receptacle with integral ground fault current interrupter. Model GFR-5352IA manufactured by Hubbell (or equal). Device shall be compliant to the requirements of UL 943.

D. Wall Dimmer: Rotary dial or slide type, ivory color. (Confirm with COSCo) Model C-2000 manufactured by Lutron (or equal). Rating of 2000 watts at 120 volts, AC.

E. Decorative Cover Plate: Smooth Stainless steel, ivory color, ANSI 302.

F. Weatherproof Cover Plate: Gasketed cast metal with hinged gasketed device covers rated raintight while in use in accordance with Article 410-57 of the National Electrical Code.

G. Attachment Plug Cap: Match receptacle configuration provided for equipment connection.

H. Cord Reels: Provide cord reels as indicated on the drawings. Cords shall be sized per loads served and shall be 50’ in length.

PART 3 EXECUTION

3.01 EXAMINATION AND

PREPARATION:

A. Verify that interior of building has been physically protected from weather.

B. Verify that mechanical work which is likely to injure conductors has been completed.

C. Completely and thoroughly swab raceway system before installing

conductors. 3.02 INSTALLATION:

A. Wiring Methods:

1. Concealed Interior Locations: Building wire in raceway.

2. Exposed Interior Locations: Building wire in raceway.

3. Above Accessible Ceilings: Building wire in raceway.

4. Wet or Damp Interior Locations: Building wire in raceway.

5. Exterior Locations: Building wire in raceway.

6. Underground Locations: Building wire in raceway.

7. Hazardous Locations: Building wire in raceway conforming to applicable NEC Articles as identified on the Drawings.

B. Use no wire smaller than 12 AWG for power and lighting circuits, and no smaller than 14 AWG for control wiring. Conductors shall be sized to compensate for voltage drop.

C. Neatly train and secure wiring inside boxes, equipment and panelboards.

D. Use UL listed wire pulling lubricant for pulling conductors in raceways.

E. Make splices, taps, and terminations to carry full ampacity of conductors without perceptible temperature rise.

F. Devices shall mount flush or as indicated on the Drawings.

G. Install wiring devices in accordance with manufacturer's instructions.

1. Install wall switches 48 inches above floor, "OFF" position down.

2. Install wall dimmers 48 inches above floor. De-rate ganged dimmers as instructed by manufacturer. Do not use a common neutral, provide a separate neutral for each dimmed circuit.

3. Unless noted otherwise, install convenience receptacles 18 inches above floor, 6 inches above counters or splashbacks, with grounding pole on bottom.

4. Install GFCI receptacles at all outdoor locations and all indoor locations as required by NFPA70, and as indicated.

5. Install specific purpose receptacles at heights shown on Drawings.

6. Install cord and attachment plug caps on equipment where acceptable and approved by all local AHJ's… and deemed necessary. Size cord for connected load and rating of branch circuit over- current protection.

K. Install wall plates flush and level.

1. Install decorative plates on switch, receptacle, and blank outlets in finished areas.

2. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

3. Install weatherproof coverplates on all devices/boxes in wet or outdoor locations.

3.3 FIELD QUALITY CONTROL:

A. Perform field inspection and testing of circuits under provisions of Section 260000.

1. Inspect wire and cables for physical damage and proper connection.

2. Torque test conductor connections and terminations to manufacturer's recommended values.

3. Perform continuity test on all power and equipment branch circuit conductors. Verify proper phasing connections.

END OF SECTION 260519

SECTION 260530

RACEWAY SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

A. Section 260000 - Electrical General Requirements, apply to the work specified in this section, with additions and modifications specified herein.

1.2 SECTION INCLUDES:

A. Conduit and Conduit Fittings

B. Electrical Boxes and Fittings

C. Cable Tray

PART 2

PRODUCTS

2.1 CONDUIT AND FITTINGS:

A. Conduit:

1. Metal Rigid Conduit: Galvanized steel.

2. Metal Tubing: Galvanized steel.

3. Flexible Conduit: Steel.

4. Liquid-Tight Flexible Conduit: Flexible conduit with PVC Jacket.

5. Plastic Conduit and Tubing: NEMA TC 2; PVC. Use Schedule 40 conduit.

B. Conduit and Fittings:

1. Conduit Fittings and Conduit Bodies: NEMA FB 1. Conduit fittings to be steel, threaded type. Split couplings are not acceptable.

2. Tubing Fittings: NEMA FB 1. Tubing fittings to be steel compression type for conduit up to 2" in diameter and set screw type for conduit 2-1/2" and larger.

3. Flexible Conduit Fittings: NEMA FB 1. Flexible conduit fittings to be steel set screw or screw in type.

4. Liquid-Type Flexible Conduit Fittings: NEMA FB 1. Liquid-tight flexible conduit fittings to be steel compression type.

5. Plastic Fittings and Conduit Bodies: NEMA TC 3.

2.2 ELECTRICAL BOXES:

A. Boxes:

1. Sheet Metal: NEMA OS 1; galvanized steel, 4" or 4-11/16" square. Provide galvanized plaster/tile ring for recessed outlet boxes.

2. Cast Metal: Aluminum or cast feralloy, deep type, gasketed cover, threaded hubs.

3. Nonmetallic: NEMA OS 2.

B. Large Enclosures: NEMA 250; Type 4, steel enclosures with manufacturer's standard enamel finish and cover, held closed screws.

2.03.1 CABLE TRAY (where applicable):

A. Manufacturers:

1. B-line

2. Mono-Systems

B. Ladder type, constructed of aluminum with 9” rung spacing, 6” siderails and 18” wide

C. Fittings: Horizontal 90° elbows, horizontal tees, and horizontal crosses with all metal accessories to connect to straight sections.

D. Support: Supports shall be fabricated channel, and threaded rods.

E. Grounding: Provide grounding straps as each junction, splice,

fitting, etc. PART 3 EXECUTION

3.1 EXAMINATION AND PREPARATION:

A. Examine supporting surfaces to determine that surfaces are ready to receive work.

B. Electrical boxes shown on Contract Drawings are approximate locations unless dimensioned.

3.2 INSTALLATION:

A. Use conduit and tubing for raceways in the following locations:

1. Underground Installations: Rigid steel conduit, painted with two coats of epoxy asphaltum paint, or PVC conduit.

2. Installations In Concrete: Rigid steel conduit, or PVC conduit.

3. In Slab Above Grade: Rigid steel conduit, or PVC conduit.

4. Exposed Outdoor Locations: Rigid steel conduit where damage from an external source is likely. Otherwise, schedule 80 PVC may be used.

5. Wet Interior Locations: Rigid steel conduit or electrical metallic tubing. Use threaded or raintight fittings for conduit.

6. Concealed Dry Interior Locations: Rigid steel conduit or electrical metallic tubing. Raceway to be installed concealed inside walls unless otherwise noted on plans. **Where the electrical contractor foresees that installation inside a wall may be difficult or conflict with another system or construction, EC to verify with GC/Architect prior to surface-mounting.**

7. Exposed Dry Interior Locations: Rigid steel conduit or electrical metallic tubing.

8. Feeders: Galvanized rigid steel conduit on all feeders.

B. Size raceways for conductor type installed.

1. Minimum Size Conduit: 1/2 inch.

C. Arrange conduit and tubing to maintain headroom and to present a neat mechanical appearance.

1. Route exposed raceway parallel and perpendicular to walls and adjacent piping.

2. Maintain minimum 6 inch clearance to piping and 12 inch clearance to heat surfaces such as flues, piping, and heating appliances.

3. Maintain required fire, acoustic, and vapor barrier rating when penetrating walls, floors, and ceilings.

4. Route conduit through roof openings for piping and ductwork where possible; otherwise, route through roof jack with pitch pocket.

5. Group in parallel runs where practical. Use rack constructed of steel channel. Maintain spacing between raceways or de-rate circuit ampacities to NFPA 70 requirements.

6. Use approved manufactured conduit hangers and clamps; do not fasten with wire or perforated pipe straps. Utilize conduit hangers for conduits located below floor slabs.

7. Use conduit bodies to make sharp changes in direction.

8. Terminate all conduits with insulated bushings.

9. Use suitable caps to protect installed raceway against entrance of moisture and dirt.

10. Provide a pull string in all empty raceways.

11. Install expansion joints fittings where raceway crosses building expansion joints.

12. Install plastic conduit and tubing in strict accordance with the manufacturer's recommendations. When plastic conduit is installed, use galvanized rigid elbows for 90E bends.

D. Install electrical boxes as shown on the Drawings, and as required for splices, taps, wire pulling,

equipment connections and regulatory requirements.

1. Use cast outlet box in exterior locations, wet locations, and exposed interior locations.

2. Use large enclosure for interior pull and junction boxes larger than 12 inches in any dimension.

3. Locate and install electrical boxes to allow access. Provide access panels if required.

4. Locate and install electrical boxes to maintain headroom and to present a neat mechanical appearance.

5. Install pull boxes and junction boxes above accessible ceilings or in unfinished areas.

6. Provide knockout closure for unused openings.

7. Align wall-mounted outlet boxes plumb and level for switches, and similar devices.

8. Coordinate mounting heights and locations of outlets above counters and backsplashes.

9. Install lighting outlets to locate luminaires as shown on the Drawings.

E. Use recessed outlet boxes in finished areas where indicated.

1. Secure boxes to interior wall and partition studs, accurately positioning to allow for surface finish thickness, and plaster/tile ring installation.

2. Use stamped steel stud bridges for flush outlets in hollow stud wall, and

adjustable steel channel fasteners for flush ceiling outlet boxes.

3. Locate boxes in masonry walls to require cutting corner only. Coordinate masonry cutting to achieve neat openings for boxes.

4. Do not install boxes back-to-back in walls; provide 6 inch separation, minimum. In acoustic-rated walls provide 24 inch separation minimum.

5. Do not damage insulation.

END OF SECTION 260530

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SECTION 262713

SERVICE AND DISTRIBUTION

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

A. Section 260000 - Electrical General Requirements, apply to the work specified in this Section, with additions and modifications specified herein.

1.02 SECTION INCLUDES:

A. System Description

B. Utility Requirements

C. Grounding

D. Switchboards

E. Panelboards

F. Enclosed Switches

G. Fuses

H. Transformers

I. Enclosed Circuit Breakers

J. Plug-in Duct

1.03 SYSTEM DESCRIPTION:

A. Install new 120/240V, 3-phase, 4-wire service from utility riser pole to building exterior, routed underground. Refer to 'Power Riser Diagram' for details. The EC shall field-coordinate with the utility company prior to construction to confirm method of new service and all requirements.

1.04 PROJECT CONDITIONS:

A. Verify field measurements for the equipment to ensure proper fit within the space proposed.

1.05 UTILITY REQUIREMENTS:

A. The serving utility is FPU. New 120/240V, 3-phase, 4-wire underground service to be installed from utility pole-mounted transformer bank to new service-entrance

equipment. Refer to 'Power Riser Diagram'.

B. If required, metering shall be provided by the utility company and installed by electrical contractor.

1. Coordinate with the utility for exact metering requirements.

2. Install metering devices provided by the utility company.

PART 2 PRODUCTS

2.01 SWITCHBOARD:

A. Manufacturers:

1. Square D Company

2. ITE-Siemens

3. General Electric Company

4. Cutler Hammer

B. Switchboard: NEMA PB2.

1. Line and Load Terminations: Accessible from front only of switchboard, suitable for conductor materials used.

2. Main Sections Devices: Individually mounted.

C. Ratings: As shown on Drawings.

D. Bussing:

1. Bus Material: Copper or Aluminum with tin plating sized in accordance with NEMA PB2.

2. Bus Connections: Accessible from front for maintenance.

3. Ground Bus: Copper

E. Enclosure: Type 1General purpose as shown on the Drawings.

1. Align sections at front and rear.

2. Height: 90 inches

3. Finish: Manufacturer's standard light gray enamel over external surfaces.

F. Future Provisions:

1. Fully equip spaces for future devices with bussing and bus connection provisions; continuous current rating as indicated on the Drawings.

2. Do not taper main bus rating.

G. Switching and Over-Current Protection Devices:

1. Molded Case Circuit Breakers: NEMA AB 1.

2. Solid State Molded Case Circuit Breakers: NEMA AB 1; with electronic sensing, timing and tripping circuits for adjustable current settings; ground fault trip; instantaneous trip and adjustable short time trip.

H. Switchboard Instruments:

1. Ground Fault Sensors: Zero sequence type.

2. Ground Fault Relay: Adjustable ground fault sensitivity from 200 to 1200 amperes, time delay adjustable from 0 to 1 second.

3. Square D Power Logic

metering.

2.02 PANELBOARDS:

A. Manufacturers:

1. Square D Company

2. ITE-Siemens

3. General Electric Company

4. Cutler Hammer

B. Distribution Panelboards: NEMA PB 1; circuit breaker type.

1. Enclosures: Type 1 or 3R as shown on Drawings.

2. Mounting: Surface or flush mount as shown on Drawings.

3. Bus: Copper.

4. Ground Bus: Copper

5. Voltage and phase: As shown on Drawings.

6. Minimum Integrated Equipment: As shown on Drawings.

7. Hinged door with lock.

8. Circuit Breakers: Bolt-on, ratings as shown on Drawings.

C. Light and Power Panelboards: NEMA PB 1; circuit breaker type.

1. Enclosures: Type 1 or 3R as shown on Drawings.

2. Surface or flush mount as shown on Drawings.

3. Bus: Copper.

4. Ground Bus: Copper.

5. Voltage and phase as shown on Drawings.

6. Minimum Integrated Equipment: As shown on Drawings.

7. Hinged door with lock.

8. Circuit Breakers: Bolt-on, ratings as shown on Drawings.

D. Accessories: Provide panel and branch device accessories as shown on Drawings.

E. Future Provisions: Where space provisions are indicated on the Drawings provide bussing, bus extensions, etc. require to mount future circuit breakers. Where spare provisions are indicated on the Drawings provide circuit breakers complete and ready for connection.

2.3 ENCLOSED SWITCHES:

A. Manufacturers:

1. Square D Company

2. ITE-Siemens

3. General Electric Company

4. Cutler Hammer

B. Enclosed Switch Assemblies: NEMA KS 1; Type HD.

1. Fuse Clips: Designed to accommodate Class `R' or `J' fuses as shown on Drawings.

C. Enclosures: NEMA KS 1; Type 1 or 3R as required.

D. Ground: Provide grounding lug.

E. Ratings: 600 or 250 volts to match system service requirements, poles and ampere ratings as indicated on the Drawings.

2.04 FUSES:

A. Manufacturers:

1. Bussman
2. Shawmut
3. Little Fuse

B. Service Entrance/Feeder Circuits-601 Amp and Larger

1. Current Limiting
2. UL Class L
3. 200,000 Ampere RMS Interrupting Rating
4. Voltage Rating: As required for system compatibility.

C. Service Entrance/Feeder Circuits-600 Amp and Smaller

1. Current Limiting
2. UL Class RK1
3. 200,000 Ampere RMS Interrupting Rating
4. Voltage Rating: As required for system compatibility

D. Motor, Motor Controller, Transformer and Inductive Circuits

1. Current Limiting
2. UL Class RK1, Time Delay
3. 200,000 Ampere RMS Interrupting Rating
4. Voltage Rating: As required for system

compatibility. 2.05 TRANSFORMERS:

A. Manufacturers:

1. Square D Company

2. ITE-Siemens

3. General Electric Company

4. Cutler Hammer

B. Description: Enclosed air-cooled dry type transformer.

C. Ratings:

1. Primary Voltage: As shown on Drawings.

2. Secondary Voltage: As shown on Drawings.

3. Capacity: KVA ratings as shown on Drawings.

4. Basic Impulse Level: 10 BIL.

5. Insulation Class/Temperature Rise: Class 220/115 degrees C.

D. Configuration: Two winding, delta-wye.

E. Winding Taps: Four full capacity primary taps, each at 2.5 percent below rated voltage; and two full capacity primary taps, each at 2.5 percent above rated voltage.

F. Mounting: Wall, floor, or trapeze as shown on Drawings.

G. Enclosures: Code gauge steel, NEMA 1 or 3R as

required. 2.06 ENCLOSED CIRCUIT BREAKERS:

A. Manufacturers:

1. Square D Company

2. ITE-Siemens

3. General Electric Company

4. Cutler Hammer

B. Circuit Breaker: NEMA AB 1.

1. Voltage: As shown on Drawings.

2. Enclosure: NEMA AB 1; Type 1 or 3R as required.

3. Accessories: As indicated on Drawings.

2.07.1 PLUG-IN DUCT

A. Manufacturers:

1. Square D Company
2. ITE-Siemens
3. General Electric
4. Cutler Hammer

B. Plug-in Duct

1. Bus Material: Copper
2. Enclosure: NEMA 1
3. Mounting: Suspended from structure
4. Rating: 225 amperes, 600 volt, 3 phase, 4 wire

C. Plug-in Units

1. Fusible

switches PART 3

EXECUTION

3.1 EXAMINATION AND PREPARATION:

A. Make arrangements with utility company to obtain permanent electrical service to the facility.

B. Provide concrete pad for utility transformer. Pad details on the Drawings are for estimating purposes. Coordinate exact pad requirements with the utility prior to installation.

3.02 INSTALLATION:

A. Install utility services in accordance with utility company standards and requirements.

1. Underground Service: Install service entrance conduits and conductors from the utility padmounted

transformer to the service equipment as shown on the Drawings. (Verify

with utility prior to bid/construction.) In addition, coordinate with utility company for required provisions for utility-owned underground primary cabling.

2. If applicable…provide lugs on utility transformer spaces sized to accommodate service entrance conductors.

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

C. Install switchboard to NEMA PB 2.1.

D. Install panelboards to NEMA PB 1.1.

E. Ground the electrical service in accordance with NFPA 70, National Electrical Code, Article 250.

F. Provide labels for all switchboards, panelboards, and distribution equipment.

G. Provide typewritten directory inside panel door for all

panelboards.

END OF SECTION 262713

SECTION 264313

SURGE PROTECTION FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor shall furnish and install the Transient Voltage Surge Suppression (TVSS) equipment having the electrical characteristics, ratings and modifications as specified herein and as shown on the contract drawings. Refer to related sections for surge requirements in:

1.2 SUMMARY

a) Section 262713 -- Panelboards

1.3 DEFINITIONS

The TVSS units and all components shall be designed, manufactured and tested in accordance with the latest applicable UL Listed standards (UL 1449, 2nd Edition), UL 1283 and CSA certified per CSA 22.2

1.4 SUBMITTALS

A. The following information shall be submitted to the Engineer:

1. Provide verification that the TVSS device complies with the required UL 1449 2nd Edition and CSA approvals.

2. Provide actual let through voltage test data in the form of oscillograph results for the ANSI/IEEE C62.41 Category C3 & C1 (combination wave) and B3 (ringwave) tested in accordance with ANSI/IEEE C62.45.

3. Provide spectrum analysis of each unit based on MIL-STD-220A test procedures between 50 kHz and 200 kHz verifying the device's noise attenuation exceeds 41 dB at 100 kHz.

4. Provide test report from a recognized independent testing laboratory verifying the suppressor components can survive published surge current rating on both a per mode and per phase basis using the IEEE C62.41, 8 x 20 microsecond current wave. Note that test data on individual module is not accepted.

B. Submit five (5) copies of the above information.

1.05 SUBMITTALS – FOR INFORMATION:

When requested by the Engineer the following product information shall be submitted to the engineer:

a) UL 1449 Listing classifications, and clamping voltage rating for each mode of protection.
b) ANSI/IEEE C62.41 AND C62.45 Category C3 clamping voltage.
c) Sequential surge survivability per ANSI/IEEE C62.45.
d) Dimensions and weight
e) Recommended connection wiring diagram

1.06 QUALIFICATIONS

A. Manufacturer must have a minimum of five years (in U.S.) experience in producing TVSS systems.

B. TVSS devices and accessories shall be obtained through one manufacturer.

C. Other manufacturers not listed in this document may be considered by the engineer/architect at least 14 days prior to bid. The specifications of the product listed in 1.05 “SUBMITTALS- FOR INFORMATION” shall be highlighted.

1.07 DELIVERY, STORAGE AND HANDLING

A. Equipment shall be handled and stored in accordance with manufacturer’s instructions. One (1) copy of these Shall be included with the equipment at time of shipment.

1.08 OPERATION AND MAINTENANCE MANUALS

A. Five (5) copies of the equipment operation and maintenance manuals shall be provided.

B. Operation and maintenance manuals shall include the following information:

1. Instruction books and/or leaflets
2. Recommended renewal parts list

1.10 EXTRA MATERIALS:

A. Furnish replaceable protection modules for service entrance unit with labeled protective covering for storage.

II. PRODUCTS

2.01 MANUFACTURERS

A. Cutler-Hammer, Square D, Advanced Protection Technologies (APT), Surge Suppression Inc.

2.02 VOLTAGE SURGE SUPPRESSION – GENERAL

A. Electrical Requirements

1. Unit Operating Voltage -- Refer to drawings for operating voltage and unit configuration.

2. Maximum Continuous Operating Voltage (MCOV) -- The MCOV shall be greater than 115% of the nominal system operating voltage.

3. Protection Modes -- For a wye configured system, the device must have directly connected suppression elements between line-neutral (L-N), line-ground (L-G), and neutral-ground (N-G). For a delta configured system, the device must have suppression elements between line to line (L-L) and line to ground (L-G).

4. UL 1449 2nd Edition SVR -- The maximum UL 1449 2nd Edition SVR for the device must not exceed the following:

Modes	208Y/120	480Y/277	600Y/347
L-N; L-G; N-G	500 V	900 V	1000 V
L-L	900 V	1500 V	1800 V

5. ANSI/IEEE Cat C3 Let Through Voltage -- The let through voltage based on IEEE C62.41 and C62.45 recommended procedures for Category C3 surges (20 kV, 10 kA) shall be less than:

Modes	208Y/120	480Y/277	600Y/347
L-N	910 V	1070 V	1300 V

6. ANSI/IEEE Cat. B3 Let Through Voltage -- Let through voltage based on IEEE C62.41 and C62.45 recommended procedures for the ANSI/IEEE Cat. B3 ringwave (6 kV, 5000 amps) shall be less than:

Modes	208Y/120	480Y/277	600Y/347
L-N	375 V	510 V	300 V

B. TVSS Design

1. Balanced Suppression Platform -- The surge current shall be equally distributed to all MOV components to ensure equal stressing and maximum

performance. The surge suppression platform must provide equal impedance paths to each matched MOV. Designs incorporating TVSS modules shall not be acceptable.

2. Electrical Noise Filter -- Each unit shall include a high-performance EMI/RFI noise rejection filter. Noise attenuation for electric line noise shall be 41 dB at 100 kHz using the MIL-STD-220A insertion loss test method. The unit shall be complimentary listed to UL 1283. Products not able to demonstrate noise attenuation of 41 dB @ 100 kHz shall be rejected.

3. Internal Connections -- No plug-in component modules shall be used as surge current conductors. All internal components shall be hardwired with connections utilizing low impedance conductors and compression fittings.

4. Safety and Diagnostic Monitoring -- Each unit shall be equipped with 200 kAIC internal fuses. Each unit shall provide the following three levels of monitoring:

   a) Continuous monitoring of fusing system
   b) Thermal detection circuit shall monitor for overheating in all modes due to thermal runaway.

   c) A green/red solid state indicator light shall be provided on each phase. The absence of a green light and the presence of a red light, shall indicate which phase(s) have been damaged. Fault detection will activate a flashing trouble light. Units which can not detect open-circuit damage, thermal conditions and over current will not be accepted.

5. Warranty -- The manufacturer shall provide a full ten (10) year warranty from the date of shipment against any TVSS part failure when installed in compliance with manufacturer's written instructions and any applicable national or local electric code.

2.03 SYSTEM APPLICATION

A. The TVSS applications covered under this section include distribution and branch panel locations, bus plugs, motor control centers (MCC), switchgear, and switchboard assemblies.

B. Surge Current Capacity -- The minimum total surge current 8 x 20 microsecond waveform that the device is capable of withstanding shall be as shown in the following table:

Application	Min. Surge Current (per mode)
Service Entrance (Switchboards Switchgear, MCC Main Entrance)	120 kA
Distribution Panelboards	80 kA
High Exposure Roof Top Locations	80 kA

Branch Locations (Panelboards, MCC's, Busway)	40 kA

2.04 Accessories

A. Push to test feature to verify operational integrity.

B. Form C dry contacts one NO, one NC for remote status monitoring.

2.05 Enclosures

A. All enclosed equipment shall have NEMA 1 general purpose enclosures, unless otherwise noted. Provide enclosures suitable for locations as indicated on the drawings and as described below:

1. NEMA 1 surface or flush-mounted general purpose enclosures primarily intended for indoor use
2. NEMA 12 dust-tight enclosures intended for indoor use primarily to provide protection against circulating dust, falling dirt and dripping non-corrosive liquids (Panelboards Only)
3. NEMA 3R rainproof enclosures intended for outdoor use primarily to provide protection against rain, sleet and damage from external ice formation
4. NEMA 4 watertight stainless steel intended for indoor or outdoor use primarily to provide protection against windblown dust and rain, splashing rain, hose-directed water, and damage from external ice formation. (Side Mounted Units Only)

III. EXECUTION

3.01 Examination

3.02 Factory testing

A. Standard factory tests shall be performed on the equipment under this section. All tests shall be in accordance with the latest version of NEMA and UL standards.

3.03 Installation

A. The Contractors shall install all equipment per the manufacturer's recommendations and the contract drawings.

B. Surge protection devices shall be installed and connected before the service entrance is connected or energized.

C. Existing utilities shall not be interrupted without written permission from project's architect.

END OF SECTION 264313

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SECTION 265000

BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

A. Section 260000 - Electrical General Requirements, apply to the work specified in this Section, with additions and modifications specified herein.

1.2 SECTION INCLUDES:

A. Grounding and Bonding

B. Supports

C. Identification

D. Connection of Equipment

E. Excavation, Trenching, and Backfilling

F. Cleaning and Painting

G. Cutting and Patching

1.3 PROJECT CONDITIONS:

A. Existing project conditions indicated on Drawings are based on casual field observation and existing record documents.

B. Verify field measurements and circuiting arrangements as shown on the Drawings.

C. Report discrepancies to Engineer before disturbing existing installation.

PART 2 PRODUCTS

2.1 GROUNDING MATERIALS:

A. Ground Rod: Copper clad steel, 3/4 inch in diameter x 10 feet in length.

B. Mechanical Connectors: Cast bronze construction with matching bolt, nuts, and washers.

C. Exothermic Welds: Materials shall be from the same source. Materials shall be Cadweld or approved equal.

D. Conductors: Insulated type complying with applicable Sections of these Specifications or bare soft drawn copper as indicated.

2.2 SUPPORTS:

A. Fabrication Steel: Galvanized or painted steel of standard shapes and sizes.

B. Manufactured Channel: Hot dipped galvanized with all hardware required for mounting as manufactured by

Unistrut, Kindorf, or Powerstrut.

C. Miscellaneous Hardware: Standard sizes treated for corrosion resistance.

2.3 IDENTIFICATION:

A. Nameplates: Engraved three-layer laminated plastic, black letters on white background.

B. Panel Directories: Typewritten under plastic cover.

C. Wire and Cable Markers: Cloth type, split sleeve type, or

tubing type.

PART 3 EXECUTION

3.1 INSTALLATION:

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

B. Except where specifically indicated otherwise, all exposed non-current-carrying metallic parts of electrical equipment, metallic raceway systems, and service neutral of the electrical system shall be grounded.

1. Equipment grounding shall be accomplished by installing a separate grounding conductor in each raceway of the system. The Conductor shall be provided with a distinctive green insulation or marker and shall be sized in accordance with Table 250-122 of the National Electrical Code for circuit ampacity ratings.

2. The electrical system grounding electrode shall be made at the main service equipment and shall be extended to the point of entrance of the metallic cold water service. Ground to be sized in accordance with Table 250-66 of the National Electrical Code. Connection to the water pipe shall be made by a suitable ground clamp. If flanged pipes are encountered, connection shall be made on the street side of the flange connection. If the metallic water service

is coated with an insulating material or there is no metallic water service to the building, ground connection shall be made to ground rods at the exterior of the building driven full length into the earth. The maximum resistance of the driven ground shall not exceed 25 ohms under normally dry conditions. If this resistance cannot be obtained with a single rod, additional rods shall be installed not less than 6 feet on centers, or if sectional type rods are used, additional sections may be coupled together and driven with the first rod. The resultant resistance shall not exceed 25 ohms measured not less than 48 hours after rainfall.

3. Ground all building steel including reinforcing bars in concrete and all piping entering the building from outside. Where applicable, see Section 16900 for additional requirements.

C. Make electrical connections to equipment in accordance with equipment manufacturer's instructions.

1. Verify that wiring and outlet rough-in work is complete and that equipment is ready for electrical connection, wiring, and energization.

2. Make wiring connections in control panel or in wiring compartment of pre-wired equipment. Provide interconnecting wiring as required by equipment manufacturer.

3. Install and connect disconnect switches, controllers, control stations, and control devices as required by equipment manufacturer.

4. Make conduit connections to equipment using flexible conduit. Use liquid-tight flexible conduit in damp or wet locations.

5. Install pre-fabricated cord set where connections with attachment plug is indicated or specified, or use attachment plug with suitable strain-relief clamps.

6. Provide suitable strain-relief clamps for cord connections to outlet boxes and equipment connection boxes.

D. Install support systems sized and fastened to accommodate weight of equipment and conduit, including wiring, which they carry.

1. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structure using precast insert system, expansion anchors, preset inserts, beam clamps, or spring steel clips.

2. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; expansion anchors or preset inserts in solid masonry walls; self- drilling anchors or expansion and anchors on concrete surfaces; sheet metal screws in sheet metal studs; and wood screws in wood construction.

3. Do not fasten supports to piping, ceiling support systems, ductwork,

mechanical equipment, conduit, etc.

4. Do not use powder-actuated anchors.

5. Do not drill structural steel members.

6. Fabricate supports from structural steel or steel channel.

7. Install surface mounted cabinets and panelboards with minimum of four anchors.

8. Provide steel channel supports to stand cabinets one inch off wall in wet locations.

9. Bridge studs top and bottom with channels to support flush mounted cabinets and panelboards in stud walls.

10. Install free-standing electrical equipment on 4 inch high concrete pads.

E. Identify electrical distribution and control equipment, and loads served, to meet regulatory

requirements and as specified herein.

1. Degrease and clean surface to receive nameplates.

2. Secure nameplates to equipment fronts using screws or rivets with edges parallel to equipment lines.

3. Use nameplates with 1/4 inch lettering to identify Switchboard, Panelboards, Safety Switches, Motor Starters and Branch Devices of Switchboards.

4. Panel directories shall accurately indicate load served and location of load.

5. Engrave plates as indicated by Schedules on the Drawings.

F. Install wire markers on each conductor in panelboard gutters, boxes, and at load connections.

1. Use distribution panel and branch circuit or feeder number to identify power and lighting circuits.

2. Use control wire number as indicated on schematic and interconnection diagrams or equipment manufacturer's shop drawings to identify control wiring.

G. Excavating, trenching, and backfilling shall be accomplished as indicated on the Drawings or where required to install systems and/or equipment.

1. Trenches for all underground conduits or equipment shall be excavated to the required depths. Where soft, wet, or unstable soil is encountered, the

bottom of the trench shall be filled with 6 inches of compacted gravel and sand fill. All trench bottoms shall be tamped hard. Trenches shall be shored as required to meet OSHA requirements and general safe working conditions.

2. After conduits or equipment have been inspected and approved by the Architect and prior to backfilling, all forms shall be removed and the excavation shall be cleaned of all trash and debris. Material for backfilling shall consist of the excavation, or borrow of sand, gravel, or other materials approved by the Architect and shall be free of trash, lumber, or other debris. Backfill shall be placed in horizontal layers, not exceeding 9 inches in depth and properly moistened to approximate optimum requirements. Each layer shall be compacted by hand or machine tamped to a density equivalent to surrounding soil.

H. Cleaning and Painting: The respective Contractors for the various phases of work shall clear away all debris, surplus materials, etc., resulting from their work or operations, leaving the job and equipment furnished in the clean first class condition.

1. All fixtures and equipment shall be thoroughly cleaned of plaster, stickers, rust, stains and other foreign matter or discoloration, leaving every part in an acceptable condition ready for use.

2. The Contractor shall refinish and restore to the original condition and appearance, all electrical equipment which has sustained damage to manufacturer's prime and finish coats or enamel or paint. Materials and workmanship shall be equal to the requirements described for other painting.

I. Cutting and Patching: This Contractor shall provide all cutting, digging, etc., incident to his work and shall make all required repairs thereafter to the satisfaction to the Engineer, but in no case shall the Contractor cut into any major structural element, beam, or column without written approval of the Engineer.

1. Pavements, sidewalks, roads, curbs, walls, ceilings, floors, and roofs shall be cut, patched, repaired and/or replaced as required to permit the installation of the electrical work.

2. The Contractor shall bear the expense of all cutting, patching, painting, repairing, or replacing of the work of other trades required because of his fault, error, or tardiness or because of any damage done by him.

END OF SECTION 265000

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SECTION 265100

LIGHTING

PART 1 – GENERAL

Luminaire Schedule: Product requirements for each luminaire are specified in luminaire schedule on Drawings. **EQUALS MUST BE SUBMITTED TO ARCHITECT/ENGINEER FOR APPROVAL 10 DAYS PRIOR TO SUBMITTING BID.**

1.1 SUMMARY

A. Section includes the following types of LED luminaires:

1. Cylinder.
2. Downlight.
3. Lowbay.
4. Recessed linear.
5. Strip light.
6. Surface mount, linear.
7. Surface mount, nonlinear.
8. Suspended, linear.
9. Suspended, nonlinear.
10. Materials.
11. Finishes.
12. Luminaire support.

2.1 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color Rendering Index.

C. Fixture: See "Luminaire."

D. IP: International Protection or Ingress Protection Rating.

E. LED: Light-emitting diode.

F. Lumen: Measured output of lamp and luminaire, or both.

G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

3.1 ACTION SUBMITTALS

A. Product Data: For each type of product, arranged by designation.

B. Shop Drawings: For nonstandard or custom luminaires.

1. Include plans, elevations, sections, and mounting and attachment details.
2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.

C. Product Schedule: For luminaires and lamps, **Use same designations indicated on Drawings.**

4.1 INFORMATIONAL SUBMITTALS

A. Seismic Qualification Certificates: For luminaires, accessories, and components, from manufacturer.

B. Product Certificates: For each type of luminaire.

C. Sample warranty.

5.1 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

6.1 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.

PART 2 - PRODUCTS

1.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Luminaires shall withstand the effects of earthquake motions determined according to ASCE 7.

2.1 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. California Title 24 compliant.
3. NRTL Compliance (where applicable): Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by an NRTL.
4. FM Global Compliance (where applicable): Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.
5. UL Listing: Listed for damp location.
6. Recessed luminaires shall comply with NEMA LE 4.

C. CRI of minimum 80. CCT of minimum 2700 K (interior fixtures) and minimum 4000 K (exterior fixtures unless noted otherwise on drawings).

D. Rated lamp life of 50,000 hours to L70.

E. Lamps dimmable from 100 percent to 0 percent of maximum light output.

F. Internal driver.

G. Nominal Operating Voltage: 120-277 V ac (unless specified otherwise on drawings).

1. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.

H. Housings:

1. Extruded-aluminum housing and heat sink.
2. Fixture dependent; refer to 'LIGHTING FIXTURE SCHEDULE' on drawings.

3.1 CYLINDER wall-mounted luminaires, used for direct or indirect lighting.

A. If 'Other Than Specified' fixtures are to be considered as equal for bidding, equal fixture shall be submitted to Architect/Engineer a minimum of 10 days prior to submitting bid.

B. Minimum 1000 lumens. Minimum allowable efficacy of 80 lumens per watt.

C. With integral mounting provisions.

4.1 DOWNLIGHT

A. Minimum 1,000 lumens. Minimum allowable efficacy of **80** lumens per watt.

B. Universal mounting bracket.

C. Integral junction box with conduit fittings.

D. Optics:

1. Refer to drawings to determine if fixtures are to have Fixed or Adjustable lens.
2. Refer to drawings to determine Spot/[Medium/[Wide light distribution.

5.1 LOWBAY

A. Minimum 5,000 lumens. Minimum allowable efficacy of 80 lumens per watt.

B. Universal mounting bracket.

6.1 RECESSED LINEAR

A. Minimum 1,500 lumens. Minimum allowable efficacy of 85 lumens per watt.

B. Integral junction box with conduit fittings.

7.1 STRIP LIGHT

A. Minimum 750 lumens. Minimum allowable efficacy of 80 lumens per watt.

B. Integral junction box with conduit fittings.

8.1 SURFACE MOUNT, LINEAR

A. Minimum 750 lumens. Minimum allowable efficacy of 8**0** lumens per watt.

B. Integral junction box with conduit fittings.

9.1 SURFACE MOUNT, NONLINEAR

A. Minimum 750 lumens. Minimum allowable efficacy of 80 lumens per watt.

B. Integral junction box with conduit fittings.

10.01 SUSPENDED, LINEAR

A. Minimum 1,500 lumens. Minimum allowable efficacy of 85 lumens per watt.

11.01 SUSPENDED, NONLINEAR

A. Minimum 1,500 lumens. Minimum allowable efficacy of 85 lumens per watt.

B. Integral junction box with conduit fittings.

12.01 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. Diffusers, and Globes:

1. Acrylic: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
2. Glass: Annealed crystal glass unless otherwise indicated.
3. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.

D. Housings:

1. Extruded-aluminum housing and heat sink.
2. Refer to drawings for type of finish.

13.01 METAL FINISHES

A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

14.01 LUMINAIRE SUPPORT

A. Comply with requirements in Section 265000 "Basic Electrical Materials & Methods" for channel and angle iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.

C. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage.

D. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.

E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

1.1 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: Sized and rated for luminaire weight.

E. Flush-Mounted Luminaire Support: Secured to outlet box.

F. Wall-Mounted Luminaire Support:

1. Attached to structural members in walls, to a minimum 20 gauge backing plate attached to wall structural members, or using through bolts and backing plates on either side of wall.

2. Do not attach luminaires directly to gypsum board.

G. Ceiling-Mounted Luminaire Support:

1. Ceiling mount with minimum one (1) 5/32-inch diameter aircraft cable supports 120 inches in length.
2. Ceiling mount with pendant mount with 5/32-inch diameter aircraft cable supports adjustable to [120 inches in length.
3. Ceiling mount with hook mount.

H. Suspended Luminaire Support:

1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
2. 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.
3. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of luminaire chassis, including

one at each end.

4. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

I. Ceiling-Grid-Mounted Luminaires:

1. Secure to any required outlet box.
2. Secure luminaire using approved fasteners in a minimum of four locations, spaced near corners of luminaire.

J. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

2.1 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 265100

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SECTION 28 31 00
FIRE DETECTION AND ALARM

PART 1 GENERAL

1.01 SECTION INCLUDES:

A. Fire alarm and smoke detection system.

1.02 REFERENCES:

A. NFPA 13: Standard for the Installation of Sprinkler Systems.

B. NFPA 13A: Recommended Practice for the Inspection, Testing and Maintenance of Sprinkler Systems.

C. NFPA 70: National Electrical Code

D. NFPA 72: Installation, Maintenance, and Use of Local Protective Signaling System.

E. NFPA 72E: Automatic Fire Detectors.

F. NFPA 72G: Notification Appliances for Protective Signaling Systems.

G. NFPA 72H: Guide for Testing Procedure for Local, Auxiliary, Remote Station and Proprietary Protective Signaling Systems.

H. NFPA 90: Standard for the Installation of Air Conditioning and Ventilating Systems.

I. NFPA 101: Life Safety Code.

1.03 REGULATORY REQUIREMENTS:

A. Systems: UL and FM listed.

B. Conform to requirements of NFPA.

C. Conform to requirements of Standard Building Code.

D. Conform to requirements of Americans with Disabilities Act - ADA.

1.04 SYSTEM REQUIREMENTS:

A. The existing addressable fire alarm system to remain. The new devices to match the existing system and be 100% compatible with the existing FACP. Where applicable, the system shall include, but not be limited to the following elements.

1. Master system CPU including all fire detection.

2. Circuit interface panels including all modules.

3. Power supplies, batteries and battery chargers.

4. Equipment enclosures.

5. Intelligent addressable manual pull stations, heat detectors, analog smoke detectors, alarm monitoring modules, and supervised control modules.

6. Annunciator panels, printers and video display terminals.

7. Audible and visual evacuation signals.

8. Color graphic displays and historical archiving.

9. Software and firmware as required to provide a complete functioning system.

10. Wiring and raceway.

11. Installation, testing and certification and education labor.

12. Multipliex, system driven remote annunciator.

1.05 SYSTEM FUNCTION:

A. The system shall be a complete, electrically supervised multiplex style fire detection and audio/visual evacuation system with intelligent analog alarm initiation, to be device addressable and annunciated as described and shown on the Drawings.

B. The system shall support intelligent analog smoke detection, conventional smoke detection, manual station, water flow, supervisory, security, and status monitoring devices. The system shall also support audio/visual circuits.

C. The panel shall be UL listed as a test instrument for the measurement of the sensitivity of connected intelligent analog ionization and photoelectric smoke detectors to comply with the testing requirements of NFPA 72E.

D. The system shall annunciate a trouble condition when any smoke detector approaches 80% of its alarm threshold due to gradual contamination, signaling the need for service and eliminating unwanted alarms.

E. Any intelligent analog smoke detector or conventional smoke detector zone shall include a selectable alarm verification capability. This feature shall provide automatic verification capability. This feature shall provide automatic verification of smoke detector alarms as described by NFPA 72E.

F. The system shall recognize initiating of an alarm and indicate the alarm condition in a degrade mode of operation, in the event of processor failure or the loss of system communications to the circuit interface panels.

G. The system shall provide a one-person field test of either the complete system or a specified area, maintaining full function of areas not under test.

H. The system shall be provided with eight levels of password protection with up to forty passwords.

I. The system shall be programmed in the field via a laptop computer. All programmed information shall be stored in nonvolatile memory after downloading into the control panel. No special programming terminal or prom burning shall be required and the system shall continue in service during reprogramming. Systems requiring on line programming or not capable of mass uploading of software for offsite documentation or editing will not be considered acceptable.

J. The system shall consist of central architecture using a single centrally located control unit. The system also shall be operable in a distributed multiplex architecture using a centrally located control unit with interconnection to remote circuit interface panels containing any combination of plug-in intelligent analog signaling circuits, plug in conventional initiating device circuits and plug in relays.

K. The system shall support a UL listed supervised printer.

L. The system as installed shall be expandable to its predetermined maximum capacity of 3,000 initiation devices and/or 2,000 combined zones of audio/visual devices.

1.06 SYSTEM OPERATION:

A. Activation of any fire alarm initiating device shall cause the following actions and indications:

1. Display a custom message describing the device originating the alarm condition, at the fire alarm control panel LCD alpha numeric display. Remote LCD annunciators shall display the alarm condition via unique messages as required by the system Owner. LED type annunciator displays conventional and graphic style shall indicate alarm zoning as specified.

2. Sound the audio/voice circuits, and activate the visual signals.

3. Shut down all air handling units within the smoke zone of alarm origin.

4. Furnish an alarm system closure for connection to an off-site reporting device as contracted for by the system user, via a dialer provided under this Section. THIS OPTION REQUIRED IF EXISTING SYSTEM IS NOT EQUIPPED TO PROVIDE THIS OPTION.

5. Close all smoke doors and smoke dampers (if any present in facility) shown on the Drawings to prevent the spread of smoke.

6. Record within the non-volatile system historical memory the occurrence of the event, the time and date of occurrence and the device initiating the event.

B. WHERE APPLICABLE… Activation of any smoke detector or two cross zoned smoke detectors in a single elevator lobby or an elevator equipment room shall, besides the actions described above, cause the recall of that bank of elevators to the terminal floor and the lockout of controls. In the event of recall initiation by a detector in the first-floor

lobby, the recall shall be to the alternate floor.

C. Activation of any detector in an elevator hoist way or machine room shall cause the capture of that bank of elevators per local requirements, upon completion of these actions, activate the sprinkler system pre-action release panel.

D. Activation of any supervisory circuit, shall cause the following actions and indications:

1. Display the origin of the supervisory condition report at the alarm control panel alphanumeric LCD display.

2. Activate supervisory audible and visual signals as indicated on the Drawings.

3. Furnish an alarm system closure for connection to an off-site reporting device as contracted for by the system user.

4. Record the occurrence of the event, the time of occurrence and the device initiating the event.

E. Receipt of a trouble report (primary power loss, open or grounded initiating or signaling circuit wiring, open, grounded or shorted indication system wiring, device communication failure, battery disconnect) at the fire alarm control panel shall cause the following actions and indications:

1. Display at the alarm control panel alphanumeric LCD display, the origin of the trouble condition report.

2. Activate trouble audible and visual signals at the control panel and as indicated on the Drawings.

3. Furnish an alarm system closure for connection to an off-site reporting device as contracted for by the system user, via a Dialer furnished under this Section.

4. Record the occurrence of the event, the time of occurrence and the device initiating the event.

1.07 SYSTEM ZONING:

A. Each intelligent addressable device or conventional zone on the system shall be displayed at the fire alarm control panel by a unique alpha numeric label identifying its location.

1.08 QUALIFICATIONS:

A. Manufacturer: Company specializing in smoke detection and fire alarm systems with five years' experience and an office within 125 miles of job site.

B. Installer: Company specializing in smoke detection and fire alarm system with three years' experience.

1.09 SUBMITTALS:

A. Submit shop Drawings and products data.

B. Provide wiring diagrams, data sheets, and equipment ratings, layout, dimensions, and finishes. Include location of end-of-line devices.

C. Submit manufacturer's installation instructions.

1.10 OPERATION AND MAINTENANCE DATA:

A. Submit as-built Drawings indicating location of all devices, wiring, and end-of-line devices.

B. Include operating instructions, and maintenance and repair procedures.

C. Include manufacturer representative's letter stating that system is operational, and install in accordance with NFPA 72A, 72B, 72E, 72G and 101 and tested in accordance with NFPA 72H.

PART 2 PRODUCTS

2.01 MANUFACTURERS:

A. Where new fire alarm systems are required, acceptable manufacturers are: Pyrotronics, Simplex, EST, Gamewell, Notifier, and FCI (Fire Control Instruments)

2.02 FIRE ALARM CONTROL PANEL:

A. The control panel shall be modular in construction and shall include, but not limited to; the hardware, software and firmware required to perform system functions.

B. The control panel shall be housed within a code gage steel enclosure flush wall mounted.

C. System power supplies shall be housed within the enclosure. Primary power supply shall be from the building distribution system. Secondary power shall be provided by internal sealed gelled electrolyte batteries with capability to operate the system for eight (8) hours.

D. The panel shall provide a system for maintaining a historical event record.

2.03 FIRE ALARM INITIATING DEVICES:

A. Smoke Detector, Intelligent Ionization: The detector shall be addressable, dual chamber, self-compensating for ambient temperature and humidity. Detectors shall be suitable for two wire operation.

B. Smoke Detector, Intelligent Photoelectric: The detector shall be addressable, self-compensating for ambient temperature and humidity with integral self, restoring 135 degree heat detector. Detectors shall be suitable for two wire operation.

C. Smoke Detector, Intelligent Duct Type: The detector shall be addressable, self-compensating for ambient temperature and humidity, ionization or photoelectric type as application requires.

D. Smoke Detector, Projected Beam: The detector shall consist of an infrared light beam

transmitter and a light receiver. The detector shall be self-compensating for ambient and temperature changes.

E. Thermal Detector, Intelligent: The detectors shall be addressable, rate compensated rated at 135 degrees or 200 degrees Fahrenheit. Detectors shall be suitable for two wire operation.

F. Manual Pull Station, Intelligent: The pull station shall be addressable single station type. Pull stations shall be flush wall mounted.

2.04 ZONE AND INTERFACE MODULES:

A. Remote Conventional Zone Module: Provide, for integration of compatible 2 wire and shorting style contact devices into the analog signaling circuit.

B. Intelligent System Interface Module: Furnish and install, for the monitoring of contact type initiation devices and for the control of electrical devices where required.

C. Intelligent Supervised Control Module: Furnish and install for the control of supervised relays, contractors, audible signal circuits, visual signal circuits, distributed speaker circuits and two-way fire fighters' communication circuits.

2.05 EVACUATION/SIGNALLING DEVICES:

A. Evacuation Horn (Speaker)/Strobe. Provide audible horns with strobe as indicated on the Drawings. Integral strobe shall be flashing, polarized type with polycarbonate lens producing 8000 peak candlepower at one flash per second.

B. Evacuation Strobe: Provide visual evacuation strobes at locations indicated on the Drawings. Strobes shall be flush wall mounted, flashing, polarized type with polycarbonate lens producing 8000 peak candlepower at one flash per second.

2.06 FIRE ALARM WIRE AND CABLE:

A. Fire Alarm Power Circuits: Building wire as specified in Section 260519. Minimum size conductors shall be 12 AWG.

B. Fire Alarm Loop Circuits: Analog loop circuits shall be 18 AWG twisted pair.

C. Fire Alarm Speaker Circuits: Speaker circuits shall be 18 AWG twisted pair.

D. Fire Alarm Initiating and Strobe Circuits: Circuits shall be minimum 14 AWG building wire as specified in Section 260519.

2.07 DIALER: Provide dialer for off-site notification where required locally. Verify if existing system is equipped with the local requirement.

PART 3 EXECUTION

3.01 INSTALLATION:

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

B. Install manual station with operating handle 48 inches above floor. Install audible and visual devices 80 inches above floor or as indicated.

C. Install cables and wiring in conduit.

D. Mount end-of-line device in control panel or in box with last device or separate box adjacent to last device in circuit.

E. Make conduit and wiring connections to sprinkler flow switches, sprinkler valve tamper switches, duct smoke detectors, HVAC shutdown equipment, and elevator control equipment.

F. Automatic Detector Installation: NFPA 72E.

G. Provide surge suppression for all wiring of the fire alarm system.

3.02 FIELD QUALITY CONTROL:

A. Field inspection and testing will be performed.

B. Test in accordance with NFPA 72H and local fire department requirements.

3.03 MANUFACTURER'S FIELD SERVICES:

A. Provide manufacturer's field services as required for installation.

B. Include services of certified technician to supervise installation, adjustments, final connections, and system testing.

C. Instruct Owner in operation and function of the system.

END OF SECTION 283100

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