

ADDENDUM NO. 3

September 21 , 2020

Montgomery County Shared Services Facility

This addendum is hereby included in and made a part of the Contract. All requirements of the original Bid Documents shall remain in force except as noted by this addendum.

The purpose of this addendum provided by LiRo Engineers, Inc. is to provide bidders with information on the following items:

Item # 1

Drawing Referenced :

Specification Reference : 034500, 074116, 074213, 076200, 133419, 002213, 232113

REPLACE: Referenced specifications with the attached. Please note these are the same specs referenced in addendum #2, but were not attached. This addendum only includes the specs that were intended to be attached to addendum #2.

DOCUMENT 002213 - SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

1.1 INSTRUCTIONS TO BIDDERS

A. Instructions to Bidders for Project consist of the following:

1. AIA Document A701, "Instructions to Bidders.
2. The following Supplementary Instructions to Bidders that modify and add to the requirements of the Instructions to Bidders.

1.2 MINORITY AND WOMEN PARTICIPATION

- A. Montgomery County will finance this project using grant funding provided by the NYS Department of Environmental Conservation (“DEC”) and DEC’s Non-Discrimination and Contract and Supplier Diversity policies will apply. All bidders will be required to comply with the provisions of New York State Executive Law, Article 15-A and the rules and regulations set forth in 5 NYCRR §142-144. These polices are intended to promote and encourage participation by New York State certified Minority- and Women-owned Business (“MWBE”) in state contracting opportunities.
- B. Bidders must document “good faith efforts” to provide meaningful participation by MWBEs as subcontractors and/or suppliers in the performance of this project. All bidders should reference the directory of New York State Certified M/WBE’s at the following website: <http://ny.newnycontracts.com/>
- C. For purposes of this procurement there is an overall goal of 20% for Minority and Women Owned Business/Enterprises (MWBE) participation.
- D. To comply with your contract and the applicable regulations, your company will be required to prepare, maintain and submit the following documentation and forms(see Section 006000) on a regular and timely basis. All required documentation must be submitted to Alex Kuttesch, Montgomery County Senior Planner.
- E. **Consultant/Contractor Detailed M/WBE-EEO Utilization Plan.**
This form is to be included with your bid documents for process with NYSDEC.
Contractor agrees to use such MWBE Utilization Plan for the performance of MWBEs on the Contract pursuant to the prescribed MWBE goals set forth above.
Contractor further agrees that a failure to submit and/or use such MWBE Utilization Plan shall constitute a material breach of the terms of the Contract.
- F. **Quarterly MWBE Contractor Compliance Report**
Contractor is required to submit a Quarterly MWBE Contractor Compliance Report Form to the Montgomery County Business Development Center by the 5th day following each end of quarter over the term of the Contract documenting the progress made towards achievement of the MWBE goals of the Contract.

1.3 EQUAL EMPLOYMENT OPPORTUNITY

- A. This institution is an equal opportunity provider, and employer. To file a complaint of discrimination, write: USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, or call (800) 795-3272 (voice) or (202) 720-6382 (TDD)” The Contractor will be required to comply with

all applicable Equal Employment Opportunity Laws and Regulations. Disadvantaged Business Enterprises will be afforded full opportunity to submit proposals in response to this Request for Proposals and will not be subjected to discrimination on the basis of race, color, sex, or national origin in consideration for an award.

1.4 PREVAILING WAGE RATES

- A. Labor must be in accordance with NYS Labor Laws and current Montgomery County Prevailing Rates(see Section 006000)

1.5 SUPPLEMENTARY INSTRUCTIONS TO BIDDERS, GENERAL

- A. The following supplements modify AIA Document A701, "Instructions to Bidders." Where a portion of the Instructions to Bidders is modified or deleted by these Supplementary Instructions to Bidders, unaltered portions of the Instructions to Bidders shall remain in effect.

1.6 ARTICLE 2 - BIDDER'S REPRESENTATIONS

- A. Add Section 2.1.3.1:

- 1. 2.1.3.1 - The Bidder has investigated all required fees, permits, and regulatory requirements of authorities having jurisdiction and has properly included in the submitted bid the cost of such fees, permits, and requirements not otherwise indicated as provided by Owner.

- B. Add Section 2.1.5:

- 1. 2.1.5 - The Bidder is a properly licensed Contractor according to the laws and regulations of New York State and Montgomery County and meets qualifications indicated in the Procurement and Contracting Documents.

1.7 ARTICLE 3 - BIDDING DOCUMENTS

- A. 3.2 - Interpretation or Correction of Procurement and Contracting Documents:

- 1. Add Section 3.2.2.1:

- a. 3.2.2.1 - Submit Bidder's Requests for Interpretation using form bound in the Project Manual

- B. 3.4 - Addenda:

- 1. Delete Section 3.4.3 and replace with the following:

- a. 3.4.3 - Addenda may be issued at any time prior to the receipt of bids.

- 2. Add Section 3.4.4.1:

- a. 3.4.4.1 - Owner may elect to waive the requirement for acknowledging receipt of 3.4.4 Addenda as follows:

- 1) 3.4.4.1.1 - Information received as part of the Bid indicates that the Bid, as submitted, reflects modifications to the Procurement and Contracting Documents included in an unacknowledged Addendum.
- 2) 3.4.4.1.2 - Modifications to the Procurement and Contracting Documents in an unacknowledged Addendum do not, in the opinion of Owner, affect the Contract Sum or Contract Time.

1.8 ARTICLE 4 - BIDDING PROCEDURES

A. 4.1 - Preparation of Bids:

1. Add Section 4.1.1.1:

- a. 4.1.1.1 - Printable electronic Bid Forms and related documents are available from Architect

2. Add Section 4.1.9:

- a. 4.1.9 - Owner may elect to disqualify a bid due to failure to submit a bid in the form requested, failure to bid requested alternates or unit prices, failure to complete entries in all blanks in the Bid Form, or inclusion by the Bidder of any alternates, conditions, limitations or provisions not called for.

B. 4.3 - Submission of Bids:

1. Add Section 4.3.1.2:

- a. 4.3.1.2 - Include Bidder's Contractor License Number applicable in Project jurisdiction on the face of the sealed bid envelope.

C. 4.4 - Modification or Withdrawal of Bids:

1. Add the following sections to 4.4.2:

- a. 4.4.2.1 - Such modifications to or withdrawal of a bid may only be made by persons authorized to act on behalf of the Bidder. Authorized persons are those so identified in the Bidder's corporate bylaws, specifically empowered by the Bidder's charter or similar legally binding document acceptable to Owner, or by a power of attorney, signed and dated, describing the scope and limitations of the power of attorney. Make such documentation available to Owner at the time of seeking modifications or withdrawal of the Bid.
- b. 4.4.2.2 - Owner will consider modifications to a bid written on the sealed bid envelope by authorized persons when such modifications comply with the following: the modification is indicated by a percent or stated amount to be added to or deducted from the Bid; the amount of the Bid itself is not made known by the modification; a signature of the authorized person, along with the time and date of the modification, accompanies the modification. Completion of an unsealed bid form, awaiting final figures from the Bidder, does not require power of attorney due to the evidenced authorization of the Bidder implied by the circumstance of the completion and delivery of the Bid.

D. 4.5 - Break-Out Pricing Bid Supplement:

1. Add Section 4.5:

- a. 4.5 - Provide detailed cost breakdowns on forms provided no later than two business days following Architect's request.

E. 4.6 - Subcontractors, Suppliers, and Manufacturers List Bid Supplement:

1. Add Section 4.6:

- a. 4.6 - Provide list of major subcontractors, suppliers, and manufacturers furnishing or installing products no later than two business days following Architect's request. Include those subcontractors, suppliers, and manufacturers providing work totaling three percent or more of the Bid amount. Do not change subcontractors, suppliers, and manufacturers from those submitted without approval of Architect.

2. Add Section 4.7:

1.9 ARTICLE 5 - CONSIDERATION OF BIDS

A. 5.2 - Rejection of Bids:

1. Add Section 5.2.1:

- a. 5.2.1 - Owner reserves the right to reject a bid based on Owner's and Architect's evaluation of qualification information submitted following opening of bids. Owner's evaluation of the Bidder's qualifications will include: status of licensure and record of compliance with licensing requirements, record of quality of completed work, record of Project completion and ability to complete, record of financial management including financial resources available to complete Project and record of timely payment of obligations, record of Project site management including compliance with requirements of authorities having jurisdiction, record of and number of current claims and disputes and the status of their resolution, and qualifications of the Bidder's proposed Project staff and proposed subcontractors.

1.10 ARTICLE 6 - POSTBID INFORMATION

A. 6.1 - Contractor's Qualification Statement:

1. Add Section 6.1.1:

- a. 6.1.1 - Submit Contractor's Qualification Statement no later than two business days following Architect's request.

B. 6.2 - Submittals:

1. Add Section 6.3.1.4:

- a. 6.3.1.4 - Submit information requested in Sections 6.3.1.1, 6.3.1.2, and 6.3.1.3 no later than two business days following Architect's request.

C. 6.3 – Right to Refusal

1. Montgomery County reserves the right to reject any and all bids for any reason.

D. Montgomery County will award contracts to the successful bidders provided all criteria are met and successful resolution by the County Legislature and NYS DEC approvals(approx. 30-60days post bid).

1.11 ARTICLE 7 - PERFORMANCE BOND AND PAYMENT BOND

A. 7.1 - Bond Requirements:

1. Add Section 7.1.1.1:

- a. 7.1.1.1 - Both a Performance Bond and a Payment Bond will be required, each in an amount equal to 100 percent of the Contract Sum.

B. 7.2 - Time of Delivery and Form of Bonds:

1. Delete the first sentence of Section 7.2.1 and insert the following:

- a. The Bidder shall deliver the required bonds to Owner no later than 10 days after the date of Notice of Intent to Award and no later than the date of execution of the Contract, whichever occurs first. Owner may deem the failure of the Bidder to deliver required bonds within the period of time allowed a default.

2. Delete Section 7.2.3 and insert the following:

- a. 7.2.3 - Bonds shall be executed and be in force on the date of the execution of the Contract.

1.12 ARTICLE 9 - EXECUTION OF THE CONTRACT

A. Add Article 9.1: INSURANCE REQUIREMENTS

- 1. 9.1.1 - Subsequent to the Notice of Intent to Award, and within 10 days after the prescribed Form of Agreement is presented to the Awardee for signature, the Awardee shall execute and deliver the Agreement to Owner through Architect.
- 2. 9.1.2 - Owner may deem as a default the failure of the Awardee to execute the Contract and to supply the required bonds when the Agreement is presented for signature within the period of time allowed.
- 3. 9.1.3 - Unless otherwise indicated in the Procurement and Contracting Documents or the executed Agreement, the date of commencement of the Work shall be the date of the executed Agreement. The official Notice to Proceed will be given within 10 business days of the signed agreements.
- 4. 9.1.4 - In the event of a default, Owner may declare the amount of the Bid security forfeited and elect to either award the Contract to the next responsible bidder or re-advertise for bids.
9.1.5 – Montgomery County must be added as an additional insured with a waiver of subrogation on insurance policies. The Contractor shall have in effect, and shall provide certificates of insurance to evidence same, the following insurance policies and coverages:
 - a. Workers compensation insurance as required by law and including employer's liability insurance in the amount of at least One Million Dollars (\$1,000,000) per occurrence/Two Million Dollars (\$2,000,000) aggregate and disability benefits insurance as may be required by law.
 - b. Commercial general liability and contractual liability on an occurrence basis with the following limits of coverage: bodily injury, property damage and personal injury, one million dollars (\$1,000,000) each occurrence/two million dollars (\$2,000,000) general aggregate and Five Million Dollars (\$ 5,000,000.0) of Excess insurance.
 - c. Vehicle liability including owned, non-owned and hired vehicles and all other vehicles with the following limits of coverage: one million dollars (\$1,000,000) each occurrence and Two Hundred Fifty Thousand Dollars (\$250,000.00) property damage liability and \$5,000,000.00 Excess insurance.
 - d. All certificates of insurance are to provide that the insurance evidenced by the certificate shall not be cancelled or materially altered except after thirty (30) day's prior written notice to Montgomery County.

e. Montgomery County and the commissioners, officers, agents and employees of each such entity, shall be named as additional insureds on all required insurance policies. f. All policies are to be written by insurance companies authorized to do business in the State of New York and which are acceptable to Montgomery County.

B. Add Article 9.2 – Additional NYS Contract requirements are indicated herein as project is in part funded by NYS DEC

1. Subcontractors:

- a. If the Contractor enters into subcontracts for the performance of work pursuant to the Master Contract, the Contractor shall take full responsibility for the acts and omissions of its subcontractors. Nothing in the subcontract shall impair the rights of the State under the Master Contract. No contractual relationship shall be deemed to exist between the subcontractor and the State.
- b. If requested by the State, the Contractor agrees not to enter into any subcontracts, or revisions to subcontracts, that are in excess of \$100,000 for the performance of the obligations contained herein until it has received the prior written permission of the State, which shall have the right to review and approve each and every subcontract in excess of \$100,000 prior to giving written permission to the Contractor to enter into the subcontract. All agreements between the Contractor and subcontractors shall be by written contract, signed by individuals authorized to bind the parties. All such subcontracts shall contain provisions for specifying (1) that the work performed by the subcontractor must be in accordance with the terms of the Master Contract, (2) that nothing contained in the subcontract shall impair the rights of the State under the Master Contract, and (3) that nothing contained in the subcontract, nor under the Master Contract, shall be deemed to create any contractual relationship between the subcontractor and the State. In addition, subcontracts shall contain any other provisions which are required to be included in subcontracts pursuant to the terms herein.
- c. If requested by the State, prior to executing a subcontract, the Contractor agrees to require the subcontractor to provide to the State the information the State needs to determine whether a proposed subcontractor is a responsible vendor.
- d. If requested by the State, when a subcontract equals or exceeds \$100,000, the subcontractor shall submit a Vendor Responsibility Questionnaire (Questionnaire).
- e. If requested by the State, upon the execution of a subcontract, the Contractor shall provide detailed subcontract information (a copy of subcontract will suffice) to the State within fifteen (15) calendar days after execution. The State may request from the Contractor copies of subcontracts between a subcontractor and its subcontractor.
- f. The Contractor shall require any and all subcontractors to submit to the Contractor all financial claims for Services or work to the State agency, as applicable, rendered and required supporting documentation and reports as necessary to permit Contractor to meet claim deadlines and documentation requirements as established in Attachment D (Payment and Reporting Schedule) and Section III. Subcontractors shall be paid by the Contractor on a timely basis after submitting the required reports and vouchers for reimbursement of services or work, as applicable. Subcontractors shall be informed by the Contractor of the possibility of non-payment or rejection by the Contractor of claims that do not contain the required information, and/or are not received by the Contractor by said due date.

Equal Opportunities for Minorities and Women; Minority and Women Owned Business Enterprises:

In accordance with Section 312 of the Executive Law and 5 NYCRR 143, if the Master Contract is: (i) a written agreement or purchase order instrument, providing for a total expenditure in excess of \$25,000.00, whereby a contracting State Agency is committed to expend or does expend funds in return for labor, services, supplies, equipment, materials or any combination of the foregoing, to be performed for, or rendered or furnished to the contracting State Agency; or (ii) a written agreement in excess of \$100,000.00 whereby a contracting State Agency is committed to expend or does expend funds for the acquisition, construction, demolition, replacement, major repair or renovation of real property and improvements thereon; or (iii) a written agreement in excess of

\$100,000.00 whereby the owner of a State assisted housing project is committed to expend or does expend funds for the acquisition, construction, demolition, replacement, major repair or renovation of real property and improvements thereon for such project, then the Contractor certifies and affirms that (i) it is subject to Article 15-A of the Executive Law which includes, but is not limited to, those provisions concerning the maximizing of opportunities for the participation of minority and women- owned business enterprises and (ii) the following provisions shall apply and it is Contractor's equal employment opportunity policy that:

- g. The Contractor shall not discriminate against employees or applicants for employment because of race, creed, color, national origin, sex, age, disability or marital status;
- h. The Contractor shall make and document its conscientious and active efforts to employ and utilize minority group members and women in its work force on State contracts;
- i. The Contractor shall undertake or continue existing programs of affirmative action to ensure that minority group members and women are afforded equal employment opportunities without discrimination. Affirmative action shall mean recruitment, employment, job assignment, promotion, upgrading, demotion, transfer, layoff, or termination and rates of pay or other forms of compensation;
- j. At the request of the State, the Contractor shall request each employment agency, labor union, or authorized representative of workers with which it has a collective bargaining or other agreement or understanding, to furnish a written statement that such employment agency, labor union or representative shall not discriminate on the basis of race, creed, color, national origin, sex, age, disability or marital status and that such union or representative shall affirmatively cooperate in the implementation of the Contractor's obligations herein; and
- k. The Contractor shall state, in all solicitations or advertisements for employees, that, in the performance of the State contract, all qualified applicants shall be afforded equal employment opportunities without discrimination because of race, creed, color, national origin, sex, age, disability or marital status.

The Contractor shall include the provisions of subclauses 1 – 5 of this Section (IV)(J), in every subcontract over \$25,000.00 for the construction, demolition, replacement, major repair, renovation, planning or design of real property and improvements thereon (Work) except where the Work is for the beneficial use of the Contractor. Section 312 of the Executive Law does not apply to: (i) work, goods or services unrelated to the Master Contract; or (ii) employment outside New York State. The State shall consider compliance by the Contractor or a subcontractor with the requirements of any Federal law concerning equal employment opportunity which effectuates the purpose of this section. The State shall determine whether the imposition of the requirements of the provisions hereof duplicate or conflict with any such Federal law and if such duplication or conflict exists, the State shall waive the applicability of Section 312 of the Executive Law to the extent of such duplication or conflict. The Contractor shall comply with all duly promulgated and lawful rules and regulations of the Department of

Economic Development's Division of Minority and Women's Business Development pertaining hereto.

Climate Smart Communities Specific Terms and Conditions

I. Local Share Requirements

For all Climate Smart Communities Projects, including Climate Protection Implementation Projects and Climate Smart Communities Certification Projects, the Department share will not exceed fifty percent (50%) of the approved project costs, up to the Contract Funding Amount identified on the Face Page, and the Contractor must provide fifty percent (50%) of required eligible share with eligible costs not paid with state grant funds nor federal funds. This percentage will be specified in the Attachment B-1 (Expenditure Budget).

II. Construction

(a) The Contractor agrees to proceed expeditiously with the Project and shall complete the Project in accordance with the performance measures set forth in Attachment C (Work Plan) or any amendments to such Work Plan which are approved by the Department in writing.

(b) The Contractor agrees that it shall notify the Department in writing thirty (30) calendar days prior to the start of construction or, if the start of construction began on or after May 1, 2017, upon approval of the Contract the Contractor shall notify the Department in writing within thirty (30) calendar days as to the status of any construction.

(c) The Contractor agrees that it shall notify the Department in writing thirty (30) days following initial start-up operation of the Project.

(d) The Contractor agrees that it shall cause the Project to be designed and constructed in accordance with the engineering report or facilities plan, and if applicable to the project, the plans and specifications for the Project shall be stamped with the seal of a licensed professional engineer and shall be signed with the personal signature of such engineer in compliance

with Education Law §7209(1) and (2), and which have been delivered to and approved by the Department, as well as any amendments thereto.

(e) The Contractor agrees that it shall permit the Department to participate in all its meetings and conferences with respect to the Project. Upon request from the Department, the Contractor must submit to the Department reports, documents, data, contractual documents, administrative records, and other information pertinent to the Project.

(f) The Contractor agrees to permit representatives of the Department to have unrestricted access to the Project at all reasonable times, and all contracts of the Contractor for construction or operation of all or a portion of the Project shall contain provisions that permit such access to the Project or work relating to the Project, wherever it is in preparation or progress, and that contractors or subcontractors shall provide proper facilities for such access and inspection and shall permit extracts and copies of Project records to be made by the representatives of the Department.

III. Engineering Certification/As-built Plans

Within sixty (60) calendar days after the end of the Contract Term, or upon final completion of the Project, the Contractor agrees that it will deliver the following to the Department:

(a) A certification stating that all portions of the Project funded by this award have been completed in accordance with this Contract, and constructed per the approved plans and specifications, and any approved amendments thereto.

(b) The certified "as built" plans and specifications for the Project. Any work not in accordance with the approved plans and specifications shall be remedied, unless such non-compliance is agreed to be waived by the Department.

(c) The Contractor shall retain all as-built plans and specifications for the Project for the useful life of the Project.

IV. Useful Life of Project

The Contractor agrees that it is fully responsible for ensuring the proper and efficient monitoring, operation and maintenance of the Project satisfactory to the Department, including, but not limited to, retaining a sufficient number of qualified staff and ensuring performance of required tests and requirements. After completion of the Project, the Contractor shall, for a period of thirty (30) years unless another period of time is specified in the attached Work Plan (the useful life of the Project as provided in the State Finance Law §61]), operate the Project or otherwise cause the Project to be operated properly in a sound and economical manner and shall maintain, preserve and keep the Project, or cause the Project to be maintained, preserved and kept, in good repair, working order and condition and shall make, or cause to be made, all necessary and proper repairs, replacements and renewals from time to time, so that at all times the Project may be operated properly in a manner consistent with the Project performance standards contained in the engineering report of facilities plan for the Project, with this Contract and with the requirements of any related permit or other governmental approval of the Project.

V. Notifications

The Department's authorized representative for the implementation of this Contract and for approval, direction, and receipt of all Project reports called for in this Contract is identified below. Whenever it is provided in this Contract that notice must be given or other communications sent to the Department, the notices or communications must be in writing and delivered or sent to the Department's authorized representative at:

Address: Office of Climate Change
New York State Department of Environmental Conservation
625 Broadway – 9th Floor
Albany, New York, 12233-1030
Tel. No.: (518) 402-8448

A copy of all legal notices shall be sent to:
General Counsel
New York State Department of Environmental Conservation
625 Broadway - 14th Floor
Albany, New York, 12233-1500

The Contractor's authorized representative for the implementation of this Contract is the person authorized in the Resolution of Support for the contract submitted by the Contractor. Notices or communications regarding this Contract should be in writing and delivered or sent to the Contractor's authorized representative at the address identified on the Face Page, with copies sent to the Contractor's contract administrator as identified in the contract application.

Notices delivered or sent shall be deemed for all purposes as notice to all persons who are Parties to this Contract as Department or Contractor.

VI. Eligible Costs

The contract start date for all contracts awarded through this request for application will be March 15, 2019. Only those eligible project related costs incurred on or after March 15, 2019 will be eligible for reimbursement of grant funding. Payments will not be approved or processed by the Department until a MCG is fully approved by the Department and, as applicable, the Attorney General and the State Comptroller, and work has been completed under the state contract. Advance payments are not authorized as part of the Climate Smart Communities Program.

VII. Climate Smart Communities Program Requirements

(a) If the Contractor is not already a registered Climate Smart Community, the Contractor shall take the Climate Smart

Communities Pledge within the term of this Contract.

(b) For climate mitigation projects, including the Clean Transportation and/or Reduction and Recycling of Food Waste categories, the grant recipient shall provide estimates of emissions reduction in the final project report as required by the Department.

(c) For certification actions funded in the Climate Smart Communities Certification Project category, the grant recipient shall adhere to the relevant requirements and standards described in the Climate Smart Communities Certification Portal available at <https://www.ClimateSmart.ny.gov>.

(d) Work plans for certification actions funded in the climate smart communities Certification Project category must include a submittal of documentation required for certification approval through the Climate Smart Communities Certification Portal at <https://www.ClimateSmart.ny.gov>.

(e) If the grant recipient develops, improves, restores or rehabilitates real property that is not owned by the Contractor as part of the work of this Contract, the Contractor shall obtain a climate change mitigation easement from the owner of the real property. Climate change mitigation easements shall be enforced as conservation easements are enforced in ECL section 49-0305.

(f) Construction projects require the installation of an Environmental Protection Fund funding acknowledgement sign. An approved sign design will be provided to the grantee upon full execution of the contract.

(g) Press releases, documents, and other printed materials require the following acknowledgement statement to be printed on the materials "This project has been funded in part by the NYS Department of Environmental Conservation's Climate Smart Communities Grant Program."

(h) Per 6 NYCRR Part 492, Climate Smart Communities Projects, a retainage of 5% will be withheld from each payment request. The retainage is held in case a project is not completed or all required match is not provided by the grantee. All accumulated retainage will be added to the final payment request upon project completion and match fulfillment.

VIII. Lead Applicant Self-Certification

For projects that involve more than one municipality or partner, the lead applicant must certify that an agreement or a signed commitment exists between the Lead Applicant and each participating partner stating the participating partner's commitment and willingness to deliver each output attributed to them in the contract work plan.

IX. Project Insurance Considerations

The Contractor agrees to procure and maintain at its own expense and without expense to the Department until final acceptance by the Department of the services covered by this Contract, insurance of the kinds and amounts as determined by the Department and based upon the project work plan. The insurance policies should be provided by insurance companies licensed to do business in the State of New York. Any delay or time lost as a result of the Contractor not having insurance required by the Contract shall not give rise to a delay claim or any other claim against the Department. Upon execution of this Contract, the Contractor shall furnish to the Department a certificate or certificates, satisfactory to the Department, showing that it has complied with this Article. Upon execution of this contract the contractor shall furnish to the department a certificate or certificates, satisfactory to the Department, showing that it has complied with this article. The insurance documentation shall provide that:

Liability and protective liability insurance policies shall provide primary and non-contributory coverage to the NYS Department of Environmental Conservation for any claims arising from the Contractor's Work under this contract, or as a result of Contractor's activities. The State of New York, NYS Department of Environmental Conservation, its officers, agents and employees, 625 Broadway Albany, New York 12233-1030 shall be listed as Certificate Holder on all liability insurance certificate(s), as additional insureds on endorsements(s) and on additional supporting documentation.

The policies shall include a waiver of subrogation endorsement in favor of the Department as an additional insured. The endorsement shall be on ISO Form Number CG 24 04 or a similar form with same modification to the policy.

Policies shall not be changed or canceled until thirty (30) days prior written notice has been given to the Department; as evidenced by an endorsement or declarations page.

Insurance documentation shall disclose any deductible, self-insured retention, aggregate limit or any exclusion to the policy that materially changes the coverage required by the Contract.

Endorsements in writing must be added to and made part of the insurance contract for the purpose of changing the original terms to reflect the revisions and additions as described. A copy of these endorsements must be provided to the Department within a reasonable amount of time.

Applicable insurance policy number(s) reference on the ACORD form must be referenced in the supporting

documentation requested by the Department and supplied by the insurance company (e.g. endorsement page, declarations page, etc.).

This Contract shall be void and of no effect unless the Contractor procures the required insurance policies and maintains them until completion of the work or acceptance by the Department, whichever event is later.

The kinds and amounts of insurance required are as follows:

A. Workers' Compensation coverage must be provided for work to be performed in New York State. The Contractor shall provide and maintain full New York State coverage during the life of this contract for the benefit of such employees as are required to be covered by the New York State Workers' Compensation Law.

Evidence of Workers' Compensation and Employers Liability coverage must be provided on one of the following forms specified by the Chairman of the New York State Workers' Compensation Board:

FORM #	FORM TITLE
C-105.2	Certificate of Workers' Compensation Insurance
U-26.3	State Insurance Fund Version of the C-105.2 form
SI-12/ GSI-105.2	Certificate of Workers' Compensation Self-Insurance
CE-200	Certificate of Attestation of Exemption – (no employees)

B. Disability Benefits coverage must be provided for work to be performed in New York State. The Contractor shall provide and maintain coverage during the life of the contract for the benefit of such employees as are required to be covered by the New York State Disability Benefits Law. Any waiver of this requirement must be approved by the Department of Environmental Conservation and will only be granted in unique or unusual circumstances.

Evidence of Disability Benefits coverage must be provided on one of the following forms specified by the Chairman of the New York State Workers' Compensation Board:

FORM #	FORM TITLE
DB-120.1	Certificate of Disability Benefit Insurance
DB-155	Certificate of Disability Benefit Self-Insurance
CE-200	Certificate of Attestation of Exemption – (no employees)

An ACORD form is NOT an acceptable proof of Workers' Compensation coverage. **ALL OF THE ABOVE REFERENCED FORMS, EXCEPT CE-200, SI-12 & DB-155 MUST NAME** The State of New York and The New York State Department of Environmental Conservation, Office of Climate Change, 625 Broadway, Albany, NY 12233-1030 as the Entity Requesting Proof of Coverage.

Additional information can be obtained at the Worker's Compensation website:
<http://www.wcb.ny.gov/content/main/Employers/Employers.jsp>

Upon review of the scope of work outlined in the Grant Application by the Department, the following types of liability insurance may be required:

C. Commercial General Liability Insurance with a limit of not less than \$2,000,000 each occurrence, and \$5,000,000 General aggregate. Such insurance shall cover liability arising from premises operations, independent contractors, products-completed operations, broad form property damage, personal and advertising injury, cross liability assumed in a contract (including tort liability of another assumed in a contract). Limits may be provided through a combination of primary and umbrella/excess liability policies. The CGL aggregate shall be endorsed to apply on a per project basis for construction contracts.

D. Business Automobile Liability with a limit of not less than \$1,000,000 each accident. Such insurance shall cover liability arising out of any registered motor vehicle including owned, leased, hired and non-owned vehicles. If the Contractor does not own, rent or lease any registered vehicles and will not be using any vehicles on State Land proof of Business Automobile Liability Insurance shall not be required for this Contract. The Contractor shall assume full responsibility and liability that owners and operators of any registered vehicles entering State Land to conduct work under this contract carry the same Business Automobile Liability Insurance of the kinds and amounts listed above. NYS Department of Environmental Conservation reserves the right to

MONTGOMERY COUNTY
SHARED SERVICES FACILITY
115 PARK DRIVE, FULTONVILLE, NY

request proof of the same.

E. Environmental Liability with a limit of not less than \$1,000,000 providing primary coverage for bodily injury and property damage, including loss of use of damaged property or of property that has not been physically injured. Such policy shall provide coverage for actual, alleged or threatened emission, discharge, dispersal, seepage, release or escape of pollutants, including any loss, cost or expense incurred as a result of any cleanup of pollutants or in the investigation, settlement or defense of any claim, suit, or proceedings against the Department of Environmental Conservation arising from the Contractor's Work.

F. Professional Liability Insurance includes coverage for its negligent act, error or omission in rendering or failing to render professional services required by this contract arising out of specifications, installation, modification, abatement, replacement or approval of products, materials or processes containing pollutants, and the failure to advise of or detect the existence or the proportions of pollutants. The Contractor, any subcontractor or supplier retained by

the Contractor to work on the contract shall procure and maintain during and for a period of three (3) years after completion of this contract, Professional Liability Insurance in the amount of \$1,000,000. The professional liability insurance may be issued on a claims-made policy form, in which case the Contractor shall purchase at its sole expense, extended Discovery Clause coverage of up to three (3) years after work is completed if coverage is cancelled or not renewed.

Should the Contractor engage a subcontractor, the Contractor shall impose the insurance requirements of this document on the subcontractor. Contractor shall determine the required insurance types and limits, commensurate with the work of

the Subcontractor. The Contractor will maintain the certificate or certificates and endorsements for all subcontractors hired as part of the Contractor's records.

END OF DOCUMENT 002213

SECTION 034500 – ARCHITECTURAL PRECAST CONCRETE

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 SECTION INCLUDES

- A. Precast Concrete Caps.

1.3 REFERENCES

- A. Except as shown or specified otherwise, the Work of this Section shall meet the requirements of the following reference standards:

1. Design Procedure and Allowable Stresses: Building Code Requirements for Reinforced Concrete ACI 318 of the American Concrete Institute.
2. Structural Welding Code - Steel AWS D1.1 by the American Welding Society (AWS Code).

- B. Organizations:

1. ACI: American Concrete Institute, 38800 Country Club Dr., Farmington Hills, MI 48331, (248) 848-3700, www.concrete.org.
2. AWS: American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126, (800) 443-9353, www.aws.org.
3. ASTM: ASTM International, 100 Barr Harbor Dr., PO Box C700, West Conshohocken, PA, 19428-2959, (610) 832-9500, www.astm.org.
4. MPI: The Master Painters Institute Inc., 2808 Ingleton Ave., Burnaby, BC, V5C 6G7, (888) 674-8937, www.specifypaint.com.
5. SSPC: The Society for Protective Coatings, 40 24th Street, 6th Floor, Pittsburgh PA 15222-4656, (877) 281-7772, www.sspc.org.

1.4 DEFINITIONS

- A. Architectural Precast Concrete: Plant cast, architecturally finished, precast concrete units generally referred to in this Section as precast units.

1.5 DESIGN REQUIREMENTS

- A. Wind Loading: 20 psf, minimum, on the vertical building projection.

1.6 SUBMITTALS

- A. Shop Drawings: Submit fully dimensioned fabrication and setting drawings. Include details of clearances, arrangements, piece markings, reinforcing, weld plates and welding, inserts, anchors, connections, accessories, joints, openings, and other requirements. When shop drawings are “Approved as Noted”, promptly resubmit copies of corrected drawings for formal approval and record.
- B. Product Data: Manufacturer’s catalog sheets, specifications, and installation instructions.
- C. Samples: For each type and color of finish required, 12 x 12 x 1-1/2 inch thick samples showing color, pattern, texture, and finish.
- D. Quality Control Submittals:
1. Design Data:
 - a. Design Mix: Submit design mix for each mix used for the Work of this Section 12 weeks prior to start of casting. Precast units shall not be cast until approval of mix(es) has been received in writing.
 - b. Design Calculations: Submit design calculations with shop and setting drawings. Calculations shall include the complete design, including the stresses in steel and concrete, based on service loading and on construction and erection procedures.
 2. Preliminary Test Specimens:
 - a. Strength Test Cylinders: Two 6 inch diameter x 12 inch cylinders for each different concrete mix.
 - b. Freeze-Thaw Test Specimens: Two 3 x 4 x 16 inch specimens for each different concrete mix.
 - c. Compression Test Specimens: Two 12 x 12 x 2 inch specimens for each different concrete mix.
 3. Manufacturer’s Qualifications Data:
 - a. Firm name, address, and telephone number.
 - b. Period of time firm has manufactured architectural precast concrete.
 - c. If requested, furnish to the Director, the names and addresses of 5 similar projects completed by the firm. Include name and phone number of contact person.

4. Installer's Qualifications Data:

- a. Name of each person who will be performing the Work and their employer's name, business address and telephone number.
- b. Period of time installer has installed architectural precast concrete.

1.7 QUALITY ASSURANCE

A. Manufacturer: Precast units shall be plant fabricated.

B. Qualifications:

1. Manufacturer: The firm manufacturing the Work of this Section shall have been regularly engaged in the manufacturer of architectural precast concrete (ornamental in nature) for a minimum of 5 years, and shall have manufactured architectural precast concrete on 5 similar projects in the last 5 years.
 - a. Work on the architectural precast concrete units shall not proceed until approval of the proposed manufacturer has been given by the Director.
2. Installer: The person(s) performing the Work of this Section and their Supervisor shall be personally experienced in the installation of architectural precast concrete and shall have been regularly employed by a Company installing architectural precast concrete for a minimum of 2 years.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Load, transport, and unload precast units by methods that will prevent damage.
- B. Storage: Store precast units on firm surfaces off the ground. Protect from dirt and staining. Upon removal from the casting plant, protect precast units from freezing temperatures and rapid loss of moisture for a minimum period of 4 days.
- C. Handling: Lift and support precast units at design support points.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cement: ASTM C 150, Type I, Type II or Type III Portland cement, except as otherwise indicated.
 1. Cement for Exposed Surfaces/Facing: White, buff, light gray or dark gray Portland cement as necessary to match required color of concrete and mortar.
- B. Aggregates: ASTM C 33, except as otherwise indicated.

1. Exposed/Facing Aggregates: Clean, hard, durable, non-staining, selected and graded aggregate of required appearance, uniform in quality, and free from thin and elongated pieces.
 - a. Appearance/Color: Light Etch face, Light Wheat color – final color and finish to be approved by Architect.
2. Lightweight Concrete Aggregates: ASTM C 330.
- C. Water: Fresh, clean, and free from injurious amounts of oils, acids, alkalis, salts, organic material, and other deleterious substances.
- D. Air-entraining Admixture: ASTM C 260.
- E. Reinforcing Steel:
 1. Bars: ASTM A 615, deformed.
 2. Welded Wire Fabric: ASTM A 185, galvanized.
 3. Tie Wire: Galvanized.
- F. Metal Accessories: Anchors, plates, clip angles, seat angles, inserts, bolts, shims, and other necessary devices and accessories required for a complete installation. Unless otherwise indicated, metal accessories shall be steel and hot dipped galvanized after fabrication, or 300 series stainless steel.
- G. Source of Materials: Individual materials shall be obtained from a single source for all similar precast units.

2.2 CONCRETE MIXES

- A. Concrete shall be proportioned to comply with the following, except as otherwise indicated:
 1. Compressive Strength: Minimum 5000 psi at 28 days.
 2. Air-Entrainment: 8 percent (by volume) total air content, with an allowable tolerance of plus or minus 1.5 percent. Use air-entraining admixture, not air-entrained cement.
 3. Color: Light Wheat
- B. The quantity of water used shall not exceed 5 gallons per 94 pound bag of cement.
- C. Freeze-Thaw Resistance: Freeze-thaw test specimens shall have a minimum durability factor of 70 when tested in accordance with ASTM C 666, Procedure B.

2.3 FABRICATION

- A. Forms shall conform to the shape, lines, and dimensions of the precast units to be produced, be sufficiently tight to prevent leakage of cement paste, and be constructed to prevent damage to the concrete. Forms shall be rigidly assembled, braced, and stiffened as required to produce castings within the specified tolerances.
- B. Steel reinforcement shall be accurately positioned and securely held in place by devices that will not be exposed on or mar the appearance of exposed surfaces on the precast units.
- C. Build-in metal accessories at the time units are cast and, wherever practicable, fasten anchors and inserts to the steel reinforcement.
- D. Place concrete, facing and backing, in a continuous operation for each unit until the full thickness is reached and the unit is completely cast. Place concrete in a manner which will avoid segregation.
- E. Consolidate concrete by vibration so that the concrete is thoroughly worked around the steel reinforcement and other embedded items, and into corners and angles of the forms.
- F. Finishes shall be equal to the approved finish samples.
- G. Finishes for Exposed Surfaces:
 - 1. Surfaces Without Exposed Aggregate Facing: Light Etch
- H. Finishes for Concealed Surfaces: Form finish or screeded finish as applicable.
- I. Curing: Cure precast units in the forms for 16 to 20 hours after casting. Prevent loss of moisture from the units, and supply additional moisture and heat as required by environmental conditions. Continue curing after removal from the forms by moist or steam curing for a minimum of 48 hours unless otherwise approved. Maintain units above 50 degrees F during curing.
- J. Shop Painting: Apply one coat (minimum 3.0 mils wet film thickness) of shop paint to surfaces of metal accessories, except surfaces to be field welded and contact surfaces of high-strength bolted connections (if any).
- K. Tolerances: reference ACI 533.3R-70
 - 1. Casting Tolerances:
 - a. Thickness: Plus or minus 1/8 inch.
 - b. Out-of-Square (difference in length of the two diagonal measurements): 1/4 inch.
 - c. Over-All Height/Length and Width: Plus or minus 1/8 inch.

2.4 SOURCE QUALITY CONTROL

- A. Tests for Air Content: Determine air content of each batch of concrete in accordance with ASTM C 173. Record results of tests and furnish a copy of test results to the Director's Representative.
- B. Test Specimens: On each day castings are produced for the contract Work, make and cure the following test specimens at the plant with the manufacturer's equipment unless otherwise directed by the Director's Representative. Specimens shall be made at the same time and with the same materials as the precast units. Each specimen shall be marked so that it can be identified with the precast units made from the same concrete batch. Pack the specimens in suitable protective containers and send to the laboratory selected by the Director. Tests will be made by the designated testing laboratory at no cost to the Contractor.
 - 1. Strength Test Specimens: Two 6 inch diameter x 12 inch cylinders for each different concrete mix. Comply with ASTM C 31. These specimens will be tested in accordance with ASTM C 39.
 - 2. Freeze-Thaw Test Specimens: Four 3 x 4 x 16 inch specimens for each different concrete mix.
 - 3. Compression Test Specimens: Two 12 x 12 x 2 inch specimens for each different concrete mix. These specimens will be tested in accordance with ASTM C 170.
 - 4. Absorption Test Specimens: When facing mix differs from backing mix, two additional 12 x 12 x 2 inch specimens for each different facing mix.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Examine surfaces to receive precast units for defects that will adversely affect the execution and quality of the Work. Check location and condition of required bearing surfaces, anchors, and inserts. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Surface Preparation: Thoroughly clean surfaces of adjoining construction of loose and foreign matter.

3.3 INSTALLATION

- A. Install precast units in their designed positions and in accordance with the approved setting drawings.
 - 1. Adjust units true to line, with uniform joint width.
 - 2. Anchor precast units securely to supporting construction.

3. Field Welding: Unless otherwise indicated, comply with AWS Code for the procedures for shielded metal-arc welding. Protect adjacent surfaces from damage during welding operations.

3.4 ADJUSTING

- A. Corrective Patching: Patch and refinish minor damage to match adjacent surfaces.
- B. Cure patches. Final patching shall be accepted by Architect, otherwise entire precast item is rejected and must be replaced at no additional cost.

3.5 CLEANING

- A. Remove excess sealant and mortar and droppings immediately after soiling.
- B. After completion of installation and other activities liable to soil the precast units, clean exposed surfaces of the units with soap powder in clean water applied by scrubbing with stiff fiber brushes. If recommended by the precast unit manufacturer, a cleaning solution which will not be harmful to the units or the joints may be used in lieu of soap and water. Immediately after cleaning, thoroughly rinse units with clean water.

3.6 PROTECTION

- A. Protect precast units from damage during construction.

END OF SECTION 034500

SECTION 074116 - INSULATED METAL ROOF PANELS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Foamed-insulation-core symmetrical batten-seamed metal roof panels, with related metal trim, snow rails and accessories.
- B. Related Sections:
 - 1. Section 07 Section "Insulated Metal Wall Panels" for factory-formed insulated metal wall panels.
 - 2. Section 07 Section "Snow Guards" for prefabricated devices designed to hold snow on the roof surface, allowing it to melt and drain off slowly.
 - 3. Division 13 Section "Metal Building Systems" for steel framing supporting metal panels.

1.2 REFERENCES

- A. American Society of Civil Engineers (ASCE):
 - 1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- B. ASTM International (ASTM):
 - 1. ASTM A 755 - Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Pre-painted by the Coil-Coating Process for Exterior Exposed Building Products.
 - 2. ASTM A 792/A 792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - 3. ASTM C 920 - Specification for Elastomeric Joint Sealants.
 - 4. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus.
 - 5. ASTM D 2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
 - 6. ASTM D 4214 - Test Methods for Evaluating Degree of Chalking of Exterior Paint Films.
 - 7. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
 - 8. ASTM E 84 - Test Methods for Surface Burning Characteristics of Building Materials.
 - 9. ASTM E 1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
 - 10. ASTM E 1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.

11. ASTM E 1680 - Standard Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems.
12. ASTM E 1980 - Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.

C. Underwriters Laboratories, Inc. (UL):

1. UL 580 - Tests for Uplift Resistance of Roof Assemblies

1.3 QUALITY ASSURANCE

A. Manufacturer/Source: Provide metal panel assemblies and accessories from a single manufacturer.

B. Manufacturer Qualifications: Approved manufacturer listed in this Section with minimum five years' experience in manufacture of similar products in successful use in similar applications.

1. Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for preliminary substitution review. Submit bid cost for any substitution as Alternate 1 along with the specified product base bid.

1. Product data, including certified independent test data indicating compliance with specified product requirements, fabrication and assembly details and compatibility with existing conditions and construction requirements.
2. Samples of each component.
3. Sample submittal from similar project.
4. Project References: Minimum of five installations not less than five years old, with Owner and Architect contact information.
5. Sample warranty.
6. Sample fabrication and erection shop drawings.

2. Substitutions following award of contract are not allowed.

3. Approved manufacturers must meet all requirements of Submittals requirements.

4. The bidding contractors shall assume all responsibility for completeness and cost required to make substitutions.

C. Installer Qualifications: Experienced Installer with minimum of five year's experience with successfully completed projects of a similar nature, difficulty and scope.

1. Installer's Field Supervisor: Experienced mechanic supervising work on site whenever work is underway and certified by the manufacturer to do so and be on site whenever work is in progress.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Construction Meeting: Prior to work, conduct pre-construction start-up meeting at site attended by Owner, Engineer or Architect, metal panel installer, metal panel manufacturer's technical representative, site supervisor, inspection agency, and related trade sub-contractors.
 - 1. Coordinate existing steel building framing in relation to metal panel system requirements.
 - 2. Coordinate openings and penetrations of metal panel system.

1.5 SUBMITTALS

- A. Product Data: Manufacturer's data sheets, details and material information for specified products.
- B. Shop Drawings: Show layouts of metal panels over metal framing. Include details of each condition of installation, panel profiles, and attachment to framing and building. Provide details of edge conditions, joints, fastener and sealant placement, flashings, openings, penetrations, curbs, vents, snow guards, lightning arresting equipment, and special details. Make distinctions between factory and field assembled work. Installing contractor to field-verify building and framing conditions and coordinate dimensionally with panel system and details.
 - 1. Include data indicating compliance with performance requirements.
 - 2. Indicate points of supporting structure that must coordinate with metal panel system installation and any modifications and/or additions to the existing framing required for panel installations.
- C. Samples for Initial Selection: For each exposed product specified including sealants. Provide Architect with panel and trim item sample color charts of manufacturer's full range of colors.
- D. Samples for Verification:
 - 1. Provide 12-inch-long section of each metal panel profile.
 - 2. Provide color chip verifying color selection of panels and exposed trim.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Information: For Installer firm and Installer's field supervisor.
- B. Manufacturer's Warranty: Sample copy of manufacturer's warranty.
- C. Phasing schedule coordinated with Owners operations presenting work areas and installations as they relate to removals and temporary protection of property.
- D. Temporary Methods plan for protecting phasing work, spaces under roof and exterior work to include materials and methods.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Manual: Roof data, contacts, details, shop drawings, system maintenance, routine inspection requirements, manufacturer's warranty inspection requirements and other information for Owners care.
- B. Manufacturer's Warranty: Executed copy of manufacturer's warranty.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect products of metal panel system during shipping, handling, and storage to prevent staining, denting, deterioration of components, or other damage. Protect panels and trim bundles during shipping. Protect painted surfaces with a strippable protective covering before shipping. Coordinate storage location(s) that are approved by the Owner. Keep materials clean and dry out of inclement weather.
 - 1. Deliver, unload, store, and erect metal panels and accessory items without misshaping panels or exposing panels to surface damage from weather or construction operations. Do not store on grade or where damage can occur however support sufficiently to avoid storage deflection (bending).
 - 2. Store in accordance with Manufacturer's written instructions. Provide wood collars for stacking and handling in the field.
 - 3. Shield foam insulated metal panels from direct sunlight until installation.
 - 4. Do not install any panels displaying damage, finish blemishes, fading, discoloration or uneven surfaces including finish.
 - 5. Fully protect in-place panels from other work and possibility of damage.

1.9 WARRANTY

- A. Warranty, General: Warranties specified shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
- B. Roof System Warranty, General: Warranties specified in this Section include the following components and systems specified in other sections supplied by the metal roof panel manufacturer:
 - 1. Penetration flashings.
 - 2. Panels and trim.
- C. Special Warranty for Metal Roof Panels: Written warranty in which Manufacturer agrees to repair or replace metal roof panels that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Structural failures including rupturing, cracking, or puncturing.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - c. Signs of leaks, moisture or condensation indicating installation failures.
 2. Warranty Period: 5 years from date of Final Completion.
- D. Special System Weather-tightness Warranty for Metal Roof Panels: Written warranty in which Manufacturer agrees to repair or replace metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.
1. Warranty Period: 25 (Twenty-Five) years from date of Final Completion.
 2. Limit of Warranty Coverage: Not to exceed original installed cost of metal roof panel assembly including labor and materials.
 3. Qualified Installer Requirement: Installer must meet requirements in Quality Assurance Article.
 4. Installation Inspection Requirement: By manufacturer's technical representative in accordance with requirements of Part 3 Field Quality Control Article.
 5. Annual Manufacturer Inspection Requirement: By qualified manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's annual inspections is included in the Contract Sum.
 6. Manufacturer's Inspections to occur in Years 2, 5, 10, 15 and 20 following Final Completion.
- E. Special Warranty on Panel Finishes: Written warranty in which Manufacturer agrees to repair finish or replace metal roof panels that show evidence of deterioration of factory-applied finishes under normal atmospheric conditions within specified warranty period.
1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 2. Finish Warranty Period: 20 years from date of Substantial Completion.
- F. Installer Warranty: Installer's warranty signed by Installer, covering the Work of this Section and extended system components indicated.
1. Warranty Period: 2 years from date of completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Basis of Design Manufacturers/Products: Subject to compliance with requirements, provide products comparable to the Tremco Inc. Basis of Design product specified:
 - 1. Tremco, Inc.
 - 2. Provide basis of design product, or product meeting or exceeding specified requirements, approved by Architect prior to bid.
- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Ridgeline by Tremco, Inc.
 - 2. ATAS International, Inc.
 - 3. Morin - A Kingspan Group Company
 - 4. Metlspan

2.2 PERFORMANCE REQUIREMENTS

- A. General: Provide metal panel system meeting performance requirements as determined by application of specified tests by a qualified testing facility on manufacturer's standard assemblies.
- B. Structural Performance: Provide metal panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated, as determined by ASTM E 72 applied in accordance with IES AC 04, Section 4, Panel Load Test Option or Section 5, Panel Analysis Option:
 - 1. Wind Loads: Determine loads based on uniform pressure, importance factor, exposure category, and basic wind speed as indicated on drawings.
 - 2. Other Design Loads: As indicated on Drawings.
 - 3. Deflection Limits: Withstand inward and outward wind-load design pressures in accordance with applicable building code with maximum deflection of 1/180 of the span with no evidence of failure.
 - 4. Seismic Performance: Comply with ASCE 7, Section 9, "Earthquake Loads."
- C. Roof Panel Wind Uplift Resistance: Comply with UL 580 for wind-uplift class UL-90.
- D. Fire Performance Characteristics: Provide metal panel systems with the following fire-test characteristics determined by indicated test standard as applied by UL or other testing and inspection agency acceptable to authorities having jurisdiction.
 - 1. Surface-Burning Characteristics: Provide metal panel systems with the following characteristics when tested per ASTM E 84.

2. Flame Spread Index: 25 or less.
 3. Smoke Developed Index: 450 or less.
 4. Fire Performance of Insulated Roof: Class 1 roof and wall panel per ANSI/FM 4880.
- E. Roof Panel Air Infiltration, ASTM E 1680:
1. Maximum 0.001 cfm/sq. ft. at static-air-pressure difference of 12 lb. /sq. ft.
- F. Roof Panel Water Penetration Static Pressure, ASTM E 1646: No uncontrolled water penetration at a static pressure of 20 lb. /sq. ft.
- G. Thermal Movements: Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction. Allow for deflection and design for thermal stresses caused by temperature differences from one side of the panel to the other.
- H. Roof Panel Thermal Performance: Thermal-resistance (R) value indicated, per ASTM C 1363 at a mean temperature of 75 deg. F heat flow up, utilizing test specimen of minimum 64 sq. ft. incorporating at least two side joints, and not including air films.

2.3 INSULATED METAL ROOF PANELS (MRP01)

- A. Symmetrical Batten-Seam-Profile, Foamed-Insulation-Core Metal Roof Panels: Formed with vertical or tapered tongue-and-groove ribs at panel edges and intermediate stiffening ribs symmetrically spaced between ribs with metal faces chemically bonded to a continuously, foamed-in-place, polyisocyanurate, insulating core; designed for sequential installation by interlocking tongue-and-groove panel edges and mechanically attaching panels to supports using concealed clips located between panels and engaging edges of adjacent panels, and installing mechanically-seamed battens with factory-installed sealant over panel joints.
1. Basis-of-Design Product: Tremco, Inc., Trem-Lock Ridge-Line.
 2. Metallic-Coated Steel Sheet: Facings of zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 coating designation; structural quality. Pre-painted by the coil-coating process to comply with ASTM A 755/A 755M.
 3. Nominal Exterior Thickness: 0.028 inch (24 gauge).
 4. Exterior Finish: Two-coat fluoropolymer.
 5. Color: As selected by Architect from manufacturer's full range.
 6. Nominal Interior Thickness: 26 gauge.
 7. Interior Finish: Polyester.
 8. Color: Regal White I.
 9. Joint Type: 2-inch tall, symmetrical tee-shaped rib with separate mechanically-seamed batten.
 10. Panel Coverage: 42 inches.
 11. Panel Thickness: 5.0 inches.

12. Panel Thermal R-Value: R-32.20 @ 75-degree F mean; R-34.4 @ 32 degree F mean.

2.4 METAL ROOF PANEL ACCESSORIES

- A. General: Provide complete metal panel assemblies incorporating trim, copings, fasciae, and miscellaneous flashings. Provide required fasteners, closure strips, and sealants as indicated in manufacturer's written instructions.
- B. Flashing and Trim: Match material, thickness, and finish of metal panel face sheet.
- C. Panel Fasteners: Self-tapping screws and other acceptable fasteners recommended by metal panel manufacturer. Provide corrosion-resistant fasteners with heads matching color of metal panels by means of factory-applied coating, with weathertight resilient washers.
- D. Joint Sealers:
1. Tape Sealers: Manufacturer's standard non-curing butyl tape, AAMA 809.2.
 2. Non-Moving Joint Sealant: Non-curing butyl, AAMA 809.2.
 3. Movement Joint Sealant: Urethane sealant, single-component, ASTM C 920 Type S, Grade NS, Class 25, Use NT, A, M, G, O.
- E. Roof Accessories: Approved by metal panel manufacturer. Refer to Section 077200 "Roof Accessories" for requirements for curbs, equipment supports, roof hatches, heat and smoke vents, ventilators, and preformed flashing sleeves.
- F. Snow Guards: See Section 077253 Snow Guards.
- G. Soffit System: Provide metal support framed pre-painted metal soffit system at overhangs. System shall be panelized, secure but removable. Panels shall be a combination of solid and perforated spaced evenly except at wall fans.

2.5 FABRICATION

- A. General: Provide factory fabricated and finished metal panels, trim, and accessories meeting performance requirements, indicated profiles, and structural requirements.
- B. Fabricate metal panel joints configured to accept sealant tape providing weathertight seal and preventing metal-to-metal contact and minimizing noise resulting from thermal movement.
- C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions, approved shop drawings, and project drawings.

2.6 FINISHES

- A. Finishes, General: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
- B. Exterior Fluoropolymer Two-Coat System: 0.2 – 0.3 mil primer with 0.7 - 0.8 mil 70 percent PVDF fluoropolymer color coat, AAMA 621.
- C. Interior Face Sheet Coil-Coated Finish System:
 - 1. Silicone Polyester Two-Coat System: 0.20 – 0.25 mil primer with 0.7 – 0.8 mil color coat.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine metal panel system substrate with Installer and Manufacturers Representative present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panels.
 - 1. Inspect framing that will support insulated metal panels to determine if support components are installed as indicated on approved shop drawings and are within tolerances acceptable to metal panel manufacturer and installer. Confirm presence of acceptable framing members at recommended spacing to match installation requirements of metal panels.
 - 2. Panel Support Tolerances: Confirm that metal panel supports are within tolerances acceptable to metal panel manufacturer but not greater than the following:
 - a. 1/4 inch in 20 foot in any direction.
 - b. 3/8 inch over any single roof plane.
 - c. At Girt Spacing 10 feet or more: 1/4 inches, out only.
 - d. At Girt Spacing Less than 10 feet: 1/8 inches, out only.
 - 3. Inspect metal framing that will support panels, for rust and corrosion. Remove rust and corrosion and prepare surface for painting/coating. When dry panels may be installed. Any serious found framing defects shall be brought to the attention of the Engineer.
- B. Correct out-of-tolerance work and other deficient conditions prior to proceeding with insulated metal panel installation.
- C. Roof Manufacturer Representative shall examine all conditions, make any changes or support work and direct Contractor to execute prior to panel installations. A re-examination sign off shall be provided.
- D. In concert with Items A, B and C above make any changes or upgrades necessary to the existing framing and perimeter walls to prepare for and support proper panel and trim installations.

- E. Confirm work scheduling, progression and coordination of work areas with the Owners operations.
- F. Prepare any temporary systems or materials to phase work and provide building protection and full enclosure and workdays end. This includes protection of Owners materials and systems below roof.

3.2 METAL PANEL INSTALLATION

- A. Standing-Seam, Foamed-Insulation-Core Metal Roof Panels: Fasten insulated metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer. Strick compliance with the manufacturers' fabrication and installation instructions shall be maintained including the use of sealants.
 - 1. Install clips to supports with self-tapping fasteners.
 - 2. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so cleat, insulated metal roof panel, and factory-applied side-lap sealant are completely engaged.
 - 3. Apply battens to insulated metal roof panel seams, fully engaged to provide weathertight joints.
- B. Attach panels to metal framing using screws, fasteners, sealants, and adhesives recommended for application by metal panel manufacturer.
 - 1. Fasten metal panels to supports with fasteners at each location indicated on approved shop drawings, at spacing and with fasteners recommended by manufacturer.
 - 2. Cut panels in field where required using manufacturer's recommended methods.
 - 3. Provide weatherproof jacks for pipe and conduit penetrating metal panels.
 - 4. Dissimilar Materials: Where elements of metal panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by metal panel manufacturer.
- C. Attach panel flashing trim pieces to supports using recommended fasteners and joint sealers.
- D. Joint Sealers: Install tape sealers and liquid sealants where indicated and where required for weatherproof performance of metal panel assemblies.
 - 1. Seal panel base assembly, openings, panel head joints, and perimeter joints using joint sealers indicated in manufacturer's instructions.
 - 2. Seal roof panel joints utilizing tape sealer and vapor seal bead of non-curing butyl.
 - 3. Prepare joints and apply sealants per requirements of Division 07 Section "Joint Sealants."
- E. Inspections: Coordinate observations and inspections of work including sealant materials with Manufacturers Representative and obtain sign off of proper materials used and installation.

3.3 ACCESSORY INSTALLATION

- A. General: Install metal panel accessories with positive anchorage to building and weathertight mounting; provide for thermal expansion. Coordinate installation with flashings and other components.
 - 1. Install components required for a complete metal panel assembly, including trim, copings, flashings, sealants, closure strips, and similar items.
 - 2. Comply with details of assemblies utilized to establish compliance with performance requirements and manufacturer's written installation instructions.
 - 3. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weather resistant.
- B. Inspections: Coordinate observations and inspections of work including sealant materials with Manufacturer's Representative and obtain sign off of proper materials used and installation.
- C. Soffit: Install per manufacturer's instructions and to roof panel manufacturer's requirements. Support both longitudinally along eave and building, and across at panel dimension intervals. Secure and anchor panel support framing and panels in place. Evenly pattern solid and perforated soffit units. Where building air intakes or exhaust fan louvers exists, do not use perforated panels; at these locations use solid panels for a distance of at least 6 feet on either side of wall opening.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage the designated factory-authorized Manufacturers' Field Representative to test and inspect completed metal panel installation, including accessories, penetrations and trim. He/she shall certify the installation and report results in writing.
- B. Remove and replace applications and work where tests and inspections indicate that they do not comply with specified requirements, the intent of the contract documents and the manufacturers' installation and quality requirements.
- C. Additional tests and inspections, at Contractor's expense, shall be performed to determine compliance of replaced or additional work.
- D. Prepare test and inspection reports with manufacturers certifications of installation compliance.

3.5 CLEANING AND PROTECTION

- A. Remove temporary protective films immediately in accordance with metal panel manufacturer's instructions. Clean finished surfaces as recommended by metal panel manufacturer.
- B. Replace damaged panels and accessories that cannot be repaired to the satisfaction of the Architect.

- C. Clean areas of disturbance within the building and at the building floor to the satisfaction of the Architect/Owner.
- D. Clean, repair and restore any exterior grounds or areas used for work such as building perimeter, storage/staging areas and access routes, to the satisfaction of the Architect/Owner. This shall include disturbances and restoration of surfaces to before work condition.
- E. Remove all Contractor facilities, temporary controls and debris.

3.6 CLOSE OUT

- A. In addition to the requirements of the contract documents the Contractor shall obtain all municipal inspections during and at end of work and provide confirming documents including building permit and any required Certificates of Occupancy. Contractor shall be responsible for all cost and fees.
- B. Contractor with Manufacturers Representative shall provide informational training to Owners staff for roof system general inspection, cleaning and applicable maintenance, not to take place of or impact inspections required elsewhere in the contract documents
- C. Contractor shall provide for relocations of Owners systems that were impacted by work including any HVAC, electrical and alarm/detection systems. Use vendors presently involved if possible. Provide for any required inspection and/or testing as a result of this contract. Restore systems to full working and code compliant order.
- D. Contractor shall provide written confirmation from the manufacturer that roof was installed in accordance with manufacturers' instructions and witnessed by the manufacturers' representative as compliant and complete. Contractor shall be responsible for the execution during work and all associated cost to comply.

END OF SECTION 074116

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Formed wall sheet metal fabrications.

1.2 ACTION SUBMITTALS

A. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.
2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled Work.
3. Include identification of material, thickness, weight, and finish for each item and location in Project.
4. Include details for forming, including profiles, shapes, seams, and dimensions.
5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
6. Include details of termination points and assemblies.
7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
8. Include details of roof-penetration flashing.
9. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, flashings, and counterflashings.
10. Include details of special conditions.
11. Include details of connections to adjoining work.

B. Samples: For each exposed product and for each color and texture specified, 12 inches long by actual width.

1.3 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of coping and roof edge flashing that is FM Approvals approved.

B. Sample warranty.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
 - 1. For copings and roof edge flashings that are ANSI/SPRI/FM 4435/ES-1 tested and FM Approvals approved, shop shall be listed as able to fabricate required details as tested and approved.

1.5 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Sheet metal flashing and trim assemblies, including cleats, anchors, and fasteners, shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual: Architectural Metal Flashing, Condensation and Air Leakage Control, and Reroofing" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint

sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F , ambient; 180 deg F , material surfaces .

2.2 SHEET METALS

- A. Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Aluminum Sheet: ASTM B209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.

1. Exposed Coil-Coated Finish:

- a. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

2. Color: As selected by Architect from manufacturer's full range.
3. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

- C. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet in accordance with ASTM A653/A653M, G90 coating designation .

1. Surface: Smooth, flat and with manufacturer's standard clear acrylic coating on both sides.
2. Color: As selected by Architect from manufacturer's full range .
3. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

2.3 METAL INTERIOR LINER PANELS

- A. General:

1. Interior Liner panels shall include all related components and accessories necessary for a complete interior wall liner system.
2. Metal sheets shall be prefinished (coil coated) to the greatest extent possible prior to forming and panel fabrication.
3. Panels shall be fabricated in one-piece length from sill to roof line, except where panels are interrupted by auxiliary building components such as windows. Upper end of panels shall be fabricated to form a close fit.

B. Description:

1. Type: Precision roll formed metal sheet.
2. Fastening Type: Exposed
3. Style: deep ribbed to create uneven shadowed appearance, corrugation sequence every 12 inches, 1-high, 2-low (low ribs are 3/16 inches deep)
4. Dimensions: 36 x 1.25 inches
5. Thickness: 24 gauge
6. Finish: 70% PVDF Resin, color to be selected from manufacturer's full range.
7. Trims, provide all matching end, inside and outside corner trims necessary for a complete continuous installation.

2.4 METAL SOFFIT PANELS

A. General:

1. Exterior Metal Soffit Panels shall include all related components and accessories necessary for a complete exterior soffit system.
2. Metal sheets shall be prefinished (coil coated) to the greatest extent possible prior to forming and panel fabrication.
3. Panels shall be fabricated in one-piece length from edge to edge wherever possible, except where panels are interrupted by auxiliary building components.

B. Description:

1. Type: Precision roll formed metal sheet.
2. Material thickness: 0.032 Aluminum
3. Panel Coverage: 12 inches wide, interlocking
4. Panel Depth: 5/8 inches
5. Fastening Type: Concealed
6. Rib Configuration: Rectilinear, 4-up, 4-down.
7. Texture: Smooth
8. Finish: 75% PVDF Resin, color to be selected from manufacturer's full range.
9. Trims, provide all matching end, inside and outside corner trims necessary for a complete continuous installation.

2.5 MISCELLANEOUS MATERIALS

- A. Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal unless otherwise indicated.

- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - b. Blind Fasteners: High-strength aluminum or stainless steel rivets suitable for metal being fastened.
 - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
 - 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
 - 3. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel in accordance with ASTM A153/A153M or ASTM F2329.

2.6 FABRICATION, GENERAL

- A. Custom fabricate sheet metal flashing and trim to comply with details indicated and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required.
 - 1. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 - 2. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 - 3. Verify shapes and dimensions of surfaces to be covered and obtain field measurements for accurate fit before shop fabrication.
 - 4. Form sheet metal flashing and trim to fit substrates without excessive oil-canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 - 5. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances:
 - 1. Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
 - 2. Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified.
- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.

2. Use lapped expansion joints only where indicated on Drawings.
- D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal in accordance with cited sheet metal standard to provide for proper installation of elastomeric sealant.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard and by FM Global Property Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.
- G. Seams:
1. Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 2. Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
 3. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.

2.7 WALL SHEET METAL FABRICATIONS

- A. Opening Flashings in Frame Construction: Fabricate head, sill, and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch- high, end dams. Fabricate from the following materials:
1. Aluminum: 0.032 inch thick.
 2. Galvanized Steel: 0.022 inch thick.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.
1. Install fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 2. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of sealant.
 3. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement.

4. Install sheet metal flashing and trim to fit substrates and to result in watertight performance.
 5. Install continuous cleats with fasteners spaced not more than 12 inches o.c.
 6. Space individual cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
 7. Install exposed sheet metal flashing and trim with limited oil-canning, and free of buckling and tool marks.
 8. Do not field cut sheet metal flashing and trim by torch.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
1. Coat concealed side of uncoated-aluminum sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim.
1. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
 2. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
 3. Use lapped expansion joints only where indicated on Drawings.
- D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance .
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction.
1. Use sealant-filled joints unless otherwise indicated.
 - a. Embed hooked flanges of joint members not less than 1 inch into sealant.
 - b. Form joints to completely conceal sealant.
 - c. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way.
 - d. Adjust setting proportionately for installation at higher ambient temperatures.
 - 1) Do not install sealant-type joints at temperatures below 40 deg F.
 2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

- G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter.
1. Pretin edges of sheets with solder to width of 1-1/2 inches; however, reduce pretinning where pretinned surface would show in completed Work.
 2. Do not solder metallic-coated steel and aluminum sheet.
 3. Do not pretin zinc-tin alloy-coated copper.
 4. Do not use torches for soldering.
 5. Heat surfaces to receive solder, and flow solder into joint.
 - a. Fill joint completely.
 - b. Completely remove flux and spatter from exposed surfaces.
 6. Stainless Steel Soldering:
 - a. Tin edges of uncoated sheets, using solder for stainless steel and acid flux.
 - b. Promptly remove acid-flux residue from metal after tinning and soldering.
 - c. Comply with solder manufacturer's recommended methods for cleaning and neutralization.
 7. Copper Soldering: Tin edges of uncoated sheets, using solder for copper.
- H. Rivets: Rivet joints in uncoated aluminum where necessary for strength.

3.2 INSTALLATION OF WALL FLASHINGS

- A. Install sheet metal wall flashing to intercept and exclude penetrating moisture in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Opening Flashings in Frame Construction: Install continuous head, sill, and similar flashings to extend 4 inches beyond wall openings.

3.3 INSTALLATION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.4 CLEANING

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.

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- C. Clean off excess sealants.

3.5 PROTECTION

- A. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.

END OF SECTION 076200

SECTION 133419 - PRE-ENGINEERED METAL BUILDING

PART 1 - GENERAL

1.1 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

- A. Anchor Bolts and Tie Rods: Installed under the work of Section 033000.
- B. Embedded Sill Members: Installed under the work of Section 033000.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Concrete Formwork: Section 031100.
- B. Concrete Reinforcement: Section 032100.
- C. Cast-In-Place Concrete: Section 033000.
- D. Composite Sectional Overhead Doors: Section 083325.
- E. Structured Polycarbonate Panel Assemblies (Clerestory Lights): Section 133419
- F. Pre-Engineered Metal Building Frame - 133420
- G. Finish Hardware: Section 087100.
- H. High Build Glazed Coatings: Section 099659.

1.3 REFERENCES

- A. Reference Standards: Comply with the following as applicable:
 - 1. Design, Fabrication and Erection: "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings" and the "Code of Standard Practice For Steel Buildings and Bridges" by the American Institute of Steel Construction (AISC Specification and Code).
 - 2. Design and Fabrication of Cold-formed Steel Structural Members: "Specification for the Design of Cold-Formed Steel Structural Members" by the American Iron and Steel Institute (AISI Specification).
 - 3. Welding: Comply with the provisions of the "Structural Welding Code - Steel, AWS D1.1" or the "Structural Welding Code - Sheet Steel, AWS D1.3", by the American Welding Society (AWS Codes).

4. High-Strength Bolting: Provide high strength bolting in accordance with the “Specification for Structural Joints Using ASTM A325 or A490 Bolts” approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation on August 14, 1980 except as follows:
 - a. Item 1(c): Wind connections and all other connections transferring moment shall be included among the connections limited to friction-type.
 - b. Item 5(b): All high strength bolts shall have a hardened washer under the element (nut or bolt head) turned in tightening, regardless of the method of tightening.
 - c. Item 6: The inspection of bolt tightening shall be as specified under Item 6(d). Furnish the calibration device and the inspection torque wrench, and make them available, upon request, to representatives of the State or designated inspection laboratory during the entire period when steel is being fabricated and erected. The inspection torque wrench shall be capable of indicating that the job inspecting torque has been reached by a second method in addition to direct observation of the wrench dial. The inspection wrench calibration and the bolt tightening inspection shall be performed by the Contractor, and shall be witnessed by a representative of the Director or the designated inspection laboratory.
5. Pedestrian Doors and Frames: Comply with applicable requirements of Steel Door Institute’s “Recommended Specifications for Standard Steel Doors and Frames” (SDI-100).
6. Clevises, Turnbuckles, and Sleeve Nuts: Comply with the “Steel Construction Manual” by The American Institute of Steel Construction (AISC Manual).
7. Gages:
 - a. Sheet Steel: U.S. Standard.
 - b. Steel Wire: U.S. Steel Wire Gage.

1.4 DESIGN REQUIREMENTS

- A. Design Criteria: Wind, snow, and live loading as shown on plans.
 1. Exterior Wall and Roof System Deflection: Withstand imposed loads with maximum span deflection of $L/240$.
 2. Building Size: As shown on plans.
 3. Grounding: Building shall be grounded.

1.5 SUBMITTALS

- A. Shop Drawings: Drawings shall show specific application to this Project. Submit all required drawings in one submission, except as noted.
 1. Erection Drawings: Manufacturer’s complete erection drawings. Indicate manufacturer’s identification marking for the components.
 2. Structural Drawings:
 - a. a. Manufacturer’s drawings showing base plate dimensions and foundation loads for all columns and/or rigid frames.

- b. b. Manufacturer's drawings showing anchoring details for the sill members, door jambs, and other miscellaneous items requiring connections to the concrete foundation.
 - c. c. Manufacturer's details for any proposed wall wind bracing system other than portal columns as shown.
 - d. d. Foundation drawings showing dimensions and elevations of all piers, walls, and footings required.
 - e. e. Anchor bolt plan showing the location of all columns and/or rigid frames, and the location of all necessary anchor bolts or other main framing connections to the concrete foundation.
 - f. f. Anchor bolt and tie rod details.
 - 3. Note: Drawings required under 2.d., 2.e., and 2.f. shall not be submitted until the manufacturer's drawings required under 2.a., 2.b., and 2.c. have been approved.
 - 4. Note: Manufacturer's standard sheets showing loads or details for a multiple range of building spans, heights, and loadings will not be accepted.
 - a. Architectural Drawings: Architectural detail drawings for all auxiliary building components and accessories.
- B. Product Data: Manufacturer's catalog sheets, specifications and installation instructions for the following:
- 1. Roofing panels.
 - 2. Roof vent.
 - 3. Exterior wall panels.
 - 4. Pedestrian doors and frames.
 - 5. Snow Guards.
 - 6. Trim, exterior and interior.
 - 7. Flashings.
 - 8. Sealants and gaskets.
- C. Samples:
- 1. Twelve-inch square corner sections:
 - a. Roofing panel.
 - b. Exterior wall panel.
 - 2. Twelve-inch long sections:
 - a. Purlin.
 - b. Girt.
 - c. Corner, rake and eave trim.
 - d. Ridge cover.
 - e. Pedestrian door frame.
 - 3. Color Samples: Manufacturer's standard colors for exterior wall and roofing panels, trim, and other factory color-coated components.
- D. Quality Control Submittals:

1. Design Calculations: Manufacturer's design calculations, signed and sealed by a licensed Professional Engineer, registered in New York State, for the structural framing and exterior wall and roofing panels.
 - a. The Engineer's cover letter shall state that he or she has received a set of the Contract Drawings and Specifications and that the design calculations are based on the requirements of the Contract Drawings and Specifications.
 - b. Design shall take into consideration the necessary clearance for the overhead hangar door track at the rigid frame compression flange bracing, and the necessary increase in girt height at the concrete unit masonry core area.
2. Certificates: Metal building manufacturer's written certification that the structure has been designed in conformance to the specified design loading and other design requirements. Note: This is a pre-award submittal; refer to Supplementary Instructions to Bidders - Condition of Award.

E. Contract Closeout Submittals:

1. Warranties:
 - a. Roofing Panels: Metal building manufacturer's 25 year warranty on roofing panels and related trim against rupture, structural failure, or perforation due to atmospheric corrosion.
 - b. Exterior Wall Panels: Metal building manufacturer's 25 year warranty for factory applied color finish on exterior surfaces of exterior wall panels and related trim against blistering, peeling, cracking, flaking, checking, chipping, color change exceeding 5 N.B.S. units (per ASTM D-2244), and chalking exceeding a rating of 8 (per ASTM D-659).

1.6 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: The manufacturer of the pre-engineered metal building shall be regularly engaged in the design and fabrication of pre-engineered, pre-fabricated metal buildings, shall have furnished such buildings for five similar projects that have been in use for not less than five years, and shall be subject to the approval of the Director. The building manufacturer shall be capable of furnishing compatible auxiliary building components and accessories shown or specified.
 1. If requested, furnish to the Director the names and addresses of five similar projects where the manufacturer's building has been in use for five years.
- B. Installer's Qualifications: The person supervising the installation of the work of this Section shall be experienced in pre-engineered metal building work, and shall have been regularly employed by a company engaged in the erection and installation of such buildings for a minimum of three years.
 1. If requested, furnish to the Director the names and addresses of three similar projects for which the supervisor has supervised the erection and installation of pre-engineered metal buildings.

C. Regulatory Requirements:

1. Code: Comply with the applicable provisions of the New York State Uniform Fire Prevention and Building Code.
2. Column Fire Rating: Comply with the applicable specifications and details of Underwriters Laboratories, Inc.
3. Building Grounding: Comply with National Electrical Code.

D. Inspection: Quality assurance inspection may be made by the State. If quality assurance inspection is made by the State, it shall not relieve the fabricator or erector of responsibility for their own quality control program.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver building components, except structural steel, to the Site in unopened cartons, crates, or other protective containers bearing the manufacturer's labels.
- B. Components shall have manufacturer's identification marking corresponding to the marking shown on the erection drawings.
- C. Keep materials dry while in storage.
- D. Handle materials by a method which will prevent damage to components, including finishes.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Basic Materials: Except as otherwise specified or indicated on the Drawings, building components and assemblies shall be fabricated from the following applicable materials as required to produce units conforming to the design and types of fabrications required for the building.
 1. Structural Steel Members: ASTM A36, A529 or A572 except as otherwise indicated.
 2. Cold-Rolled Structural Steel: ASTM A446, Grade A except higher strength grade if needed to comply with design criteria.
 3. Cold-Formed Structural Steel: ASTM A570.
 4. Structural Steel Tubing: ASTM A500, Grade B or A501.
 5. Steel Plate and Bar Stock: ASTM A529 or A572.
 6. Steel Pipe: ASTM A53, type and weight as required, Grade B.
 7. Anchor Bolts and Tie Rods: ASTM A36 or A675, Grade 70.
 8. Clevises, Turnbuckles, and Sleeve Nuts: Similar to those shown in Part 4 of the AISC Manual. The safe working loads shall be adequate for the building furnished.
 9. High Strength Bolts: ASTM A325.

10. Common (Standard) Bolts: ASTM A307.
 11. Steel for Shims and Fillers: ASTM A569.
 12. Welding Materials: AWS Codes, type required for materials being welded.
 13. Covering Fasteners:
 - a. Screw Bolts: Type 300 series stainless steel capped low profile head, 200 inch lb min stripping tongue, color finish on exposed exterior surfaces matching adjacent panels/trim.
 - b. Sheet Metal Screws: Type 300 series stainless steel or ASTM A165 cadmium plated case hardened carbon steel, self-drilling or self-tapping, standard hexagonal head or hex-washer head, color finish on exposed exterior surfaces matching adjacent panels/trim.
 - c. Rivets: Aluminum, pull type, self-petalling, 1400 lb setting strength, 1650 lb shear strength, 350 lb min push out strength, color cap on exposed exterior surface matching adjacent panels/trim.
 - d. Sealing Washers: Neoprene washers, ASTM D735.
 14. Shop Primer Paint for Framing: Equal performance requirements of FS TT-P-636 or TT-P-664.
 15. Cold Galvanizing Compound: Single component compound giving 93 percent pure zinc in the dried film, and complying with DOD-P-21035A (NAVY).
 16. Bituminous Paint: Asphaltic type, SSPC - Paint 12.
 17. Bedding Mortar:
 - a. Shrink-Resistant Grout: Factory-packaged, shrink-resistant, non-staining, non-ferrous mortar grouting compound selected from the following:
 - 1) Masterflow 713 by Master Builders.
 - 2) SonogROUT by Sonneborn.
 - 3) Five Star Grout by U.S. Grout Corporation.
 - 4) Crystex by L&M Construction Chemicals.
 - 5) Non-Corrosive, Non-Shrink Grout by A.C. Horn.
- B. Assembly and Installation Accessories: Building manufacturer's standard reinforcements, extensions, clips, brackets, miscellaneous fasteners and anchoring devices, spacers, furring strips, closures, flashings, expansion joints, thermal breaks, adhesives, and other components needed for a complete, permanently weatherproof installation. Materials shall be non-deteriorating, corrosion resistant, and compatible with adjoining materials.
- C. Connections: Fasteners shall be of size and in quantities to securely and permanently join building components, and shall be complete with necessary hardware and accessories as required for the application. Connections shall allow for expansion and contraction in accordance with the approved design. Screw bolts and rivets shall have metal-backed sealing washers. Except as otherwise indicated, provide the following fastener types for the following locations:
1. Roofing Panels to Structural Members: Screw bolts or rivets.
 2. Wall Panels to Structural Members: Screw bolts or standard bolted connection.
 3. Wall Panels to Wall Panels: Screw bolts, sheet metal screws or rivets.
 4. Trim: Same fasteners as adjacent panels.
- D. Sealants, Gaskets and Closures:

1. Tape Sealant: Flat shaped, elastomeric, non-hardening, ribbon sealant; type recommended by building manufacturer for the particular use and conditions of application.
2. Tube or Pumpable Sealant: Polybutenebutyl or acrylic terpolymer base sealant, or other type sealant recommended by building manufacturer for the particular use and conditions of application.
3. Gaskets: Rubber, building manufacture's standard shapes.
4. Closures: Closed cell foam or rubber material, formed to match panel profiles, sized to provide weathertightness.

E. Galvanizing: Complying with the following requirements except where otherwise specified.

1. Formed Sheet Steel: ASTM A653, coating designation G-90.
2. Assembled Steel Products: ASTM A123.
3. Iron and Steel Hardware: ASTM A153.
4. Products Fabricated From Rolled, Pressed and Forged Steel Shapes, Plates, Bars and Strip: ASTM A123.

F. Color Finish: Factory applied color finish system on exposed surfaces of steel components specified to receive color finish, complying with the following requirements:

1. Surface Preparation: Galvanized steel shall be given a chemical conversion treatment conforming to Federal Government Specification MIL-C-490A, Type 1, Grade 1.
2. Coating: After conversion treatment, metal shall be precision coated with thermosetting polymerized enamel to a dry film of one mil, plus or minus 0.2 mil, over the entire material width prior to forming of panels.
3. Finish Pigmentation: Inorganic pigments selected for maximum durability and resistance to fading, except do not use aluminum pigment.
4. Finish Gloss: Evenly maintained over the entire surface at 30, plus or minus 5 units, as measured on a 60 degrees Gardner photovolt meter for appearance, balance, reflectivity and durability.
5. Colors: As selected by the Director from building manufacturer's standard colors.

2.2 ROOFING PANELS

A. General:

1. Roofing panels shall include all related components and accessories necessary for a complete roof system.
2. Metal sheets shall be prefinished (coil coated) to the greatest extent possible prior to forming and panel fabrication.
3. Panels shall be fabricated in maximum lengths possible as necessary to minimize end laps.

B. Description:

1. Type: Precision roll formed metal sheet.
2. Covering Width: 24 inches.

3. Seam Design (Sidejoint): Triple interlocking standing seam, field formed (locked) with special machine.
 4. Cross Section Profile:
 - a. 2-inch-high major ribs at 24 inches on center.
 - b. Minor ribs spaced between major ribs.
 5. Attachment to Supporting Members: Special concealed clips designed to allow panel movement to compensate for thermal effects.
 6. Sidejoint Sealant: Factory applied.
 7. **Basis of Design: Tremco Tremlock T-238, Stiffener Ribs**
 8. **Testing Data:**
 - a. Class A – Fire Rating
 - b. T-238 FM4471, UL580, UL1897, ASTM E - 1592 Uplift Test
 - c. ASTM E - 2140 - Water head
 - d. ASTM E - 1680 - Air Infiltration
 - e. ASTM E - 1646 - Water Infiltration
 - f. T-238 UL Class 4, FM Class 1 - SH - Impact Resistance
- C. Materials:
1. Panel Sheet: 24 gage galvanized steel.
- D. Coatings and Finishes:
1. Front Surface: G90 galvanized coating designation, and color finish.
 2. Back Surface: G90 galvanized coating designation, and panel manufacture's standard rust-inhibitive back surface finish used with specified front surface color finish.
- E. Roof System Trim, Flashing, and Accessories: Materials shall be the same materials used for the panels, unless otherwise indicated or required by the application. Configurations shall be the standard with the building manufacturer for the specified roofing panels, unless otherwise indicated. Coatings and finishes shall match roofing panels, except building manufacturer's standard finishes (as required by application) may be furnished on special use accessories.
1. Eave Trim.
 2. Gable/Rake Trim.
 3. Gutters.
 4. Downspouts.
- F. Snow Guard System.
1. Ridge Caps.
 2. Ridge Vents.
 3. Roof Transitions.
 4. Closure Pieces.
 5. Roof Penetration Flashings:
 - a. Pipe Flashing: Pleated, one-piece, ethylene propylene diene monomer rubber units with aluminum alloy reinforcing ring bonded to base flange, sized for pipe diameter.

2.3 EXTERIOR WALL PANELS

A. General:

1. Exterior wall panels shall include all related components and accessories necessary for a complete exterior wall system.
2. Metal sheets shall be prefinished (coil coated) to the greatest extent possible prior to forming and panel fabrication.
3. Panels shall be fabricated in one-piece length from sill to roof line, except where panels are interrupted by auxiliary building components such as windows. Upper end of panels shall be fabricated to form a close fit with roof system. Provisions shall be made for a weathertight closure at ends of panels.

B. Description:

1. Type: Precision roll formed metal sheet.
2. Fastening Type: Concealed Fastening
3. Seam Design (Sidejoint): Interlocking side ribs.
4. Covering Width: 16 inches.
5. Cross Section Profile:
 - a. 3-inch-deep major ribs at 5 inches on center.
 - b. ~~Minor ribs spaced between major ribs.~~
 - c. Embossment:
6. Attachment to Supporting Members: Concealed fasteners.
7. Sidejoint Sealant/Gasket/Seal: Factory applied.
8. Basis of Design: **Tremco Tremlock 565 Panel**
9. Testing Data:
 - a. Air Infiltration: ASTM E283
 - b. Water Penetration: ASTM E331

C. Materials:

1. Panel Sheet: 24 gage galvanized steel.
2. Thermal Breaks/Joiners: Building manufacturer's standard thermal non-conductive material.

D. Coatings and Finishes:

1. Front Surface: G90 galvanized coating designation, and color finish.
2. Back Surface: G90 galvanized coating designation, and panel manufacturer's standard rust-inhibitive back surface finish used with specified front surface color finish.

- E. Exterior Wall System Trim, Flashing, and Accessories: Materials shall be the same materials used for the panels, unless otherwise indicated or required by the application. Configurations shall be the standard with the building manufacturer for the specified wall panels, unless otherwise indicated. Coatings and finishes shall match wall panels, except building manufacturer's standard finishes (as required by application) may be furnished on special use accessories.

1. Corner Trim/Assemblies.
2. Opening Trim.
3. Base Angle/Channel/Tube Trim/Flashing.
4. Base Closure.
5. Wall Transitions.
6. Expansion Joint Covers.
7. Infills

2.4 INTERIOR LINER PANELS

A. General:

1. Interior Liner panels shall include all related components and accessories necessary for a complete interior wall liner system.
2. Metal sheets shall be prefinished (coil coated) to the greatest extent possible prior to forming and panel fabrication.
3. Panels shall be fabricated in one-piece length from sill to roof line, except where panels are interrupted by auxiliary building components such as windows. Upper end of panels shall be fabricated to form a close fit.

B. Description:

1. Type: Precision roll formed metal sheet.
2. Fastening Type: Exposed
3. Style: deep ribbed to create uneven shadowed appearance, corrugation sequence every 12 inches, 1-high, 2-low (low ribs are 3/16 inches deep)
4. Dimensions: 36 x 1.25 inches
5. Thickness: 24 gauge
6. Finish: 70% PVDF Resin, color to be selected from manufacturer's full range.
7. Trims, provide all matching end, inside and outside corner trims necessary for a complete continuous installation.

2.5 EXTERIOR PEDESTRIAN DOORS, FRAMES AND ACCESSORIES

A. Doors: SDI-100 Type II, Style 2, 1-3/4 inches thick, 18 gage zinc-coated steel with weather cap.

1. Core Material: Polyurethane foamed-in-place or resin impregnated kraft honeycomb.
2. U Value: 0.30 or less.

B. Frames: 16 gage zinc-coated steel, 6-inch jamb depth, fabricated to a configuration for self-framing and self-flashing installation in the wall covering system.

C. Fabrication: Prepare units to receive finish hardware, including cutouts, reinforcing, drilling, and tapping. Reinforce units to receive surface-applied hardware to be field applied.

- D. Shop Finish: After fabrication, units shall be cleaned and chemically treated for corrosion resistance and good paint adhesion. Units shall receive manufacturer's standard two coat baked on paint finish.
 - 1. Color: Selected from manufacturer's standard colors.
- E. Weatherstripping: Door openings shall be weatherstripped at jambs, head, and sill. Weatherstripped opening shall meet or exceed water and air infiltration standards in Steel Door Institute's SDI-115 and SDI-116 respectively.
 - 1. Sill: Aluminum extrusion with vinyl sweep strip.
 - 2. Jambs and Head: Aluminum extrusion with vinyl bulb.
- F. Thresholds: Extruded aluminum with mill finish, notched at ends for door stops, drilled and countersunk for attachment.
 - 1. Size, Profile and Surface Pattern: Building manufacturer's standard units except where otherwise indicated on the Drawings.
 - 2. Bedding Sealant: Butyl rubber type.

2.6 SNOW GUARDS

- A. Type: Pad-type, seam-mounted cast metal snow guards or Rail-type, seam-mounted snow guards.
- B. Delegated-Design Submittal: For snow guards, include analysis reports signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Include calculation of number and location of snow guards.
- C. Material: Finish to match roof color and finish.

2.7 FABRICATION

- A. Tolerances: Conform to tolerances set forth in MBMA Code of Standard Practice, except as follows:
 - 1. Alignment and fit-up of welded joints shall conform to the "Structural Welding Code - Steel" (AWS D1.1).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Examine surfaces to receive the metal building for defects that will adversely affect the execution and quality of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Protect factory applied finishes from damage during erection.
- B. Clean surfaces to receive the work of this Section.
- C. Isolation: Isolate aluminum in contact with cementitious materials and dissimilar metals, except compatible metals. Separate the materials by applying a heavy coat of bituminous paint or 10 mil self-adhesive polyethylene tape on the contact surfaces. Use gasketed fasteners where needed to eliminate the possibility of corrosive or electrolytic action between metals.

3.3 ERECTION AND INSTALLATION

- A. General: Erect and install the metal building and appurtenances in accordance with the manufacturer's printed instructions except as otherwise specified or required by the Reference Standards. Install the work of this Section so the structure is secure and weathertight, and exposed materials are free of visible dents, scratches, tool marks, cuts, and other imperfections. Install building systems free of rattles, wind whistles, and noise due to thermal movement.
- B. Framing Erection:
 - 1. Provide temporary bracing to securely hold members in proper position until permanent bracing is fastened in place.
 - 2. Erect primary and secondary structural members in their designed positions, and fasten each securely in place.
 - a. Prepare, place, and cure shrink-resistant grout in accordance with grout manufacturer's printed instructions.
 - 3. Do not field cut or alter structural members without approval of the Director.
 - 4. After erection, touch-up welded and abraded surfaces, bare spots, and field bolts with shop primer paint.
 - a. For galvanized items, first repair galvanized coating with a 2 mil thick coating of cold galvanizing compound applied in accordance with compound manufacturer's instructions.
- C. Roofing System:

1. Assemble and anchor panels in place, in straight alignment, with provision for necessary thermal and structural movement. Locate panel end laps over supports. Lap panel ends minimum 6 inches. Fasten panels to each structural support.
2. Seal longitudinal joints and transverse end laps.
 - a. Seal longitudinal joints with electrically operated seaming machine.
3. Flash and seal roof covering at ridges, hips, rakes, eaves, and junctions with all related building components and accessories so that the roof is watertight.

D. Wall System:

1. Assemble and anchor panels in place, aligned and plumb, with provision for necessary thermal and structural movement. Use panels of one-piece length from sill to roof line with no horizontal joints, except where panels are interrupted by auxiliary building components such as windows. Fasten panels to each structural support.
2. Seal longitudinal joints with sealant.
3. Flash and seal wall covering at sill, roof lines, and junctions with all related building components and accessories so that the walls are watertight.

E. Related Building Components: Install related components in their designed locations, fitted with required accessories. Securely fasten items to structural supports. Adjust and lubricate operative units for smooth and easy operation. Seal components watertight at junctions with wall and roof systems.

F. Tolerances: Conform to tolerances set forth in MBMA Code of Standard Practice, except as follows:

1. Alignment and fit-up of welded joints shall conform to the “Structural Welding Code - Steel” (AWS D1.1).

3.4 ADJUSTING

A. Restore minor visual damage to factory applied finishes in a manner to match the appearance and performance of the original finish, or remove the damaged parts and replace them with undamaged parts.

3.5 CLEANING

A. Remove strippable protective coatings after completion of work liable to damage the finish. Comply with manufacturer’s recommendations for coating removal.

B. Clean exposed exterior and interior surfaces of exterior wall panels. Remove any residue from strippable coatings. Comply with panel manufacturer’s printed recommendations for cleaning.

1. Also clean exposed surface of interior liner panels.

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END OF SECTION 133419

SECTION 232113 - HYDRONIC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes pipe and fitting materials, joining methods, special-duty valves, and specialties for the following:
 - 1. Condensate-drain piping.

1.3 PERFORMANCE REQUIREMENTS

- A. Hydronic piping components and installation shall be capable of withstanding the following minimum working pressure and temperature:
 - 1. Condensate-Drain Piping: 150 deg F.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of the following:
 - 1. Piping
- B. Provide piping schedule indicating type of intended installation and installation location. Refer to piping schedule below.
- C. Coordination Drawings: Plans and other details, drawn to scale, on which components are shown and coordinated with each other, using input from installers of the items involved. Refer to Specification Section 230010 General Mechanical Requirements for further information

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Welding certificates.
- C. Field quality-control test reports.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installers of Pressure-Sealed Joints: Installers shall be certified by the pressure-seal joint manufacturer as having been trained and qualified to join piping with pressure-seal pipe couplings and fittings.

B. Steel Support Welding: Qualify processes and operators according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

C. Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX.

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

D. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation. Safety valves and pressure vessels shall bear the appropriate ASME label. Fabricate and stamp air separators and expansion tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

E. To assure uniformity and compatibility of piping components in grooved piping systems, all grooved products utilized shall be supplied by a single manufacturer. Grooving tools shall be supplied from the same manufacturer as the grooved components. Provide training certificate documenting training by manufacturer's field representative per section 3.5.

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

- A. Drawn-Temper Copper Tubing: ASTM B 88, Type L.
- B. DWV Copper Tubing: ASTM B 306, Type DWV.
- C. Wrought-Copper Fittings: ASME B16.22.

2.2 JOINING MATERIALS

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

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

- A. Condensate-Drain piping installed aboveground shall be one of the following:
 - 1. Type DWV, drawn-temper copper tubing, wrought-copper fittings, and soldered joints.
 - 2. Type L, drawn-temper copper tubing, wrought-copper fittings, and soldered joints

3.2 PIPING INSTALLATIONS

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicate piping locations and arrangements if such were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- B. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping to permit valve servicing.
- F. Install piping at indicated slopes.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
 - 1. Provide 45 deg lateral fittings and clean out cap on condensate piping 1-1/4" and larger to accommodate cleanout of piping.
- I. Install piping to allow application of insulation.
- J. Select system components with pressure rating equal to or greater than system operating pressure.
- K. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.
- L. Install piping at a uniform grade of 0.2 percent upward in direction of flow.
- M. Reduce pipe sizes using eccentric reducer fitting installed with level side up.
- N. Install unions in piping, NPS 2 and smaller, adjacent to valves, at final connections of equipment, and elsewhere as indicated.

- O. Identify piping as specified in Section 230553 "Identification for HVAC Piping and Equipment."
- P. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."

3.3 HANGERS AND SUPPORTS

- A. Hanger, support, and anchor devices are specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment." Comply with the following requirements for maximum spacing of supports.
- B. Install the following pipe attachments:
 - 1. Adjustable steel clevis hangers for individual horizontal piping less than 20 feet long.
 - 2. Adjustable roller hangers and spring hangers for individual horizontal piping 20 feet or longer.
 - 3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet or longer, supported on a trapeze.
 - 4. Spring hangers to support vertical runs.
 - 5. Provide copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.
- C. Install hangers for steel piping with the following maximum spacing and minimum rod sizes:
 - 1. NPS 3/4: Maximum span, 7 feet; minimum rod size, 1/4 inch.
 - 2. NPS 1: Maximum span, 7 feet; minimum rod size, 1/4 inch.
 - 3. NPS 1-1/2: Maximum span, 9 feet; minimum rod size, 3/8 inch.
 - 4. NPS 2: Maximum span, 10 feet; minimum rod size, 3/8 inch.
 - 5. NPS 2-1/2: Maximum span, 11 feet; minimum rod size, 3/8 inch.
 - 6. NPS 3: Maximum span, 12 feet; minimum rod size, 3/8 inch.
 - 7. NPS 4: Maximum span, 12 feet; minimum rod size, 1/2 inch.
 - 8. NPS 6: Maximum span, 12 feet; minimum rod size, 1/2 inch.
- D. Install hangers for drawn-temper copper piping with the following maximum spacing and minimum rod sizes:
 - 1. NPS 3/4: Maximum span, 5 feet; minimum rod size, 1/4 inch.
 - 2. NPS 1: Maximum span, 6 feet; minimum rod size, 1/4 inch.
 - 3. NPS 1-1/2: Maximum span, 8 feet; minimum rod size, 3/8 inch.
 - 4. NPS 2: Maximum span, 8 feet; minimum rod size, 3/8 inch.
 - 5. NPS 2-1/2: Maximum span, 9 feet; minimum rod size, 3/8 inch.
 - 6. NPS 3: Maximum span, 10 feet; minimum rod size, 3/8 inch.
- E. Support vertical runs at roof, at each floor, and at 10-foot intervals between floors.

3.4 PIPE JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel or groove plain ends of steel pipe.

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- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

END OF SECTION 232113

SECTION 074213 – INSULATED METAL WALL PANELS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Foamed-insulation-core concealed fastener metal wall panels, with related metal trim and accessories.
- B. Related Sections:
 - 1. Division 07 Section "Insulated Metal Roof Panels" for factory-formed and insulated metal roof panels.
 - 2. Division 13 Section "Metal Building Systems" for steel framing supporting metal panels.

1.2 REFERENCES

- A. American Architectural Manufacturer's Association (AAMA):
 - 1. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems.
 - 2. AAMA 621 - Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) & Zinc-Aluminum Coated Steel Substrates.
- B. American Society of Civil Engineers (ASCE):
 - 1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- C. ASTM International (ASTM):
 - 1. ASTM A 755 - Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Pre-painted by the Coil-Coating Process for Exterior Exposed Building Products.
 - 2. ASTM A 792/A 792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - 3. ASTM C 920 - Specification for Elastomeric Joint Sealants.
 - 4. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus.
 - 5. ASTM D 2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
 - 6. ASTM D 4214 - Test Methods for Evaluating Degree of Chalking of Exterior Paint Films.
 - 7. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.

8. ASTM E 84 - Test Methods for Surface Burning Characteristics of Building Materials.
9. ASTM E 1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
10. ASTM E 1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
11. ASTM E 1680 - Standard Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems.
12. ASTM E 1980 - Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.

1.3 QUALITY ASSURANCE

- A. Manufacturer/Source: Provide metal panel assemblies and accessories from a single manufacturer approved under an accredited third-party quality control program
- B. Manufacturer Qualifications: Approved manufacturer listed in this Section with minimum ten years' experience in the manufacturing of similar products and successful use in similar applications.
 1. Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for preliminary substitution review. Submit bid cost for any substitution as Alternate 1 along with the specified product base bid.
 2. Product data, including certified independent test data indicating compliance with specified product requirements, fabrication and assembly details and compatibility with existing conditions and construction requirements.
 3. Samples of each component.
 4. Sample submittal from similar project.
 5. Project references: Minimum of five installations not less than five years old, with Owner and Architect contact information.
 6. Sample warranty.
 7. Approved manufacturers must meet separate requirements of Submittals Article.
- C. Substitutions following award of contract are not allowed.
- D. Approved manufacturers must meet all requirements of Submittals requirements.
- E. The bidding contractors shall assume all responsibility for completeness and cost required to make substitutions.
- F. Installer Qualifications: Experienced Installer with minimum of five year's experience with successfully completed projects of a similar nature, difficulty and scope.

1. Installer's Field Supervisor: Experienced mechanic supervising work on site whenever work is underway and certified by the manufacturer to do so and be on site whenever work is in progress.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Prior to erection of framing, conduct preinstallation meeting at site attended by Owner, Architect, metal panel installer, metal panel manufacturer's technical representative, inspection agency and related trade contractors.
 1. Coordinate building framing in relation to metal panel system.
 2. Coordinate openings and penetrations of metal panel system.

1.5 ACTION SUBMITTALS

- A. Product Data: Manufacturer's data sheets, details and material information for specified products.
- B. Shop Drawings: Show layouts of metal panels over metal framing. Include details of each condition of installation, panel profiles, and attachment to framing and building. Provide details of edge conditions, joints, fastener and sealant placement, flashings, openings, penetrations, curbs, vents, snow guards, lightning arresting equipment, and special details. Make distinctions between factory and field assembled work. Installing contractor to field-verify building and framing conditions and coordinate dimensionally with panel system and details.
- C. Include data indicating compliance with performance requirements.
- D. Indicate points of supporting structure that must coordinate with metal panel system installation and any modifications and/or additions to the existing framing required for panel installations.
- E. Samples for Initial Selection: For each exposed product specified including sealants. Provide Architect with panel and trim item sample color charts of manufacturer's full range of colors.
- F. Samples for Verification:
 1. Provide 12-inch-long section of each metal panel profile.
 2. Provide color chip verifying color selection of panels and exposed trim.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Information: For Installer firm and Installer's field supervisor.

- B. Manufacturer's Warranty: Sample copy of manufacturer's warranty.
- C. Phasing schedule coordinated with Owners operations presenting work areas and installations as they relate to removals and temporary protection of property.
- D. Temporary Methods plan for protecting phasing work, spaces under roof and exterior work to include materials and methods.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Manual: Roof data, contacts, details, shop drawings, system maintenance, routine inspection requirements, manufacturer's warranty inspection requirements and other information for Owners care.
- B. Manufacturer's Warranty: Executed copy of manufacturer's warranty.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect products of metal panel system during shipping, handling, and storage to prevent staining, denting, deterioration of components, or other damage. Protect panels and trim bundles during shipping. Protect painted surfaces with a strippable protective covering before shipping. Coordinate storage location(s) that are approved by the Owner. Keep materials clean and dry out of inclement weather.
- B. Deliver, unload, store, and erect metal panels and accessory items without misshaping panels or exposing panels to surface damage from weather or construction operations. Do not store on grade or where damage can occur however support sufficiently to avoid storage deflection (bending).
- C. Store in accordance with Manufacturer's written instructions. Provide wood collars for stacking and handling in the field.
- D. Shield foam insulated metal panels from direct sunlight until installation.
- E. Do not install any panels displaying damage, finish blemishes, fading, discoloration or uneven surfaces including finish.
- F. Fully protect in-place panels from other work and possibility of damage.

1.9 WARRANTY

- A. Warranty, General: Warranties specified shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
- B. Special Warranty for Metal Wall Panels: Written warranty in which Manufacturer agrees to repair or replace metal roof panels that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including rupturing, cracking, or puncturing.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - c. Signs of leaks, moisture or condensation indicating installation failures.
 - 2. Warranty Period: 5 years from date of Final Completion.
- C. Special Warranty on Panel Finishes: Written warranty in which Manufacturer agrees to repair finish or replace metal roof panels that show evidence of deterioration of factory-applied finishes under normal atmospheric conditions within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.
- D. Installer Warranty: Installer's warranty signed by Installer, covering the Work of this Section and extended system components indicated.
 - 1. Warranty Period: 2 years from date of completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Basis of Design Manufacturers/Products: Subject to compliance with requirements, provide products comparable to the Tremco Inc. Basis of Design product specified:
 - 1. ATAS International, Inc.

2. Provide basis of design product, or product meeting or exceeding specified requirements, approved by Architect prior to bid.
- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. Green Span Profiles from Tremco, Inc.
 2. ATAS International, Inc.
 3. Morin - A Kingspan Group Company.
 4. Metlspan

2.2 PERFORMANCE REQUIREMENTS

- A. General: Provide metal panel system meeting performance requirements as determined by application of specified tests by a qualified testing facility on manufacturer's standard assemblies.
- B. Structural:
1. Load Capacity - Determine positive and negative load resistance based on tests conducted in accordance with ASTM E 1592 and/or ASTM E 72.
 2. Load Calculation – Dictated by ASCE 7-10 and the building dimensions
 3. Deflection Limit – per code or L/180, whichever is greater.
 4. Connection – Designed considering the load (psf), tributary area (sqft), ultimate fastener pullout/pullover (lbs.) and appropriate factor of safety.
 5. Factor of Safety (panel): 2.0
 6. Factor of Safety (fasteners)
 - a. Two fasteners into steel: 2.25
 - b. One fastener into steel: 3.00
 - c. One or two fasteners into masonry: 4.00
- C. Material Thickness – The delivered material thickness (steel) shall be within 95% of the design thickness.
- D. Impact Resistance:
1. Very severe hail (VSH) resistance when tested in accordance with FM Standard 4881.
 2. Large Missile Impact tested in accordance with Miami Dade County TAS 201.
- E. Water-tightness: Verify the panels allow no uncontrolled water penetration when subjected to a pressure differential of -20-psf when tested in accordance with ASTM E 331.
- F. Air-tightness: Verify the panels allow no more than 0.0011 cfm/sf at a pressure differential of +/- 20-psf when tested in accordance with ASTM E 283.

G. Metal Facing to Foam Core Bond Strength:

1. Fatigue – Upon being subjected to two-million alternating cycles of L/180 deflection, the panels shall exhibit no evidence of delamination of the fascia or liner elements, cracking of the foam core, or permanent set.
2. Freeze/Heat Cycling – At the conclusion of twenty-one (21) eight-hour temperature cycles (-20° F to 180° F), the panels shall exhibit no evidence of delamination, blistering or permanent set.
3. Humidity – After enduring 1200 hours of 93% humidity at a temperature of 158° F, the panels shall exhibit no evidence of delamination, blistering or interface corrosion.
4. Autoclave – When exposed to 218°F and a pressure of 2-psig for 2-1/2 hours, the panels shall exhibit no delamination of the foam core from the metal skins.

H. Energy Efficiency: When tested in accordance with ASTM C 518 the panels provide a K-factor of: 0.139 Btu-in/hr-ft²-F° @ 75° F mean temperature (R-7.20) and 0.129 Btu-in/hr-ft²-F° @ 35° F mean temperature (R-7.75).

I. Fire Safety:

1. The panels will be classified according to FM 4880 for unlimited height and NFPA 285.
2. Surface Burning Characteristics
3. Verify the panels have a maximum Flame Spread of 25 and maximum Smoke Developed of 450 when tested in accordance with ASTM E84.

J. Material Compatibility:

1. Prevent galvanic action of dissimilar metals. This includes but is not limited to any direct contact of panels and/or trim with treated lumber or copper lightning attenuation equipment or indirect contact constituted by water runoff from HVAC drain-lines, etc.

2.3 INSULATED METAL WALL PANELS

A. Panels: Type: “Insulated Metal Wall Panels” consisting of roll-formed interior and exterior profiles chemically bonded to a continuously, foamed-in-place, polyisocyanurate, insulating core.

B. Profile: ShadowLine (MWP01)

1. Panel Use: Exterior Wall
2. Coverage Width: 42-inch
3. Thickness: 3-inch
4. Length: 8’-0” to 53’-0”
5. Exterior Gauge: 24.
6. Interior Gauge: 26
7. Exterior Substrate: Galvalume®.

8. Interior Substrate: Galvalume®.
 9. Exterior Finish: low-gloss PVDF.
 10. Color: As selected by Architect from manufacturer's full range.
 11. Interior Finish: Polyester.
 - a. Color: Regal White 1.
 12. Exterior Texture: Embossed.
 13. Interior Texture: Embossed.
 14. Joint: Green-Lock, offset double tongue-and-groove
 15. Core: Continuously poured-in-place polyisocyanurate insulating foam
 16. R-Value: R-8 per inch of thickness (nominal)
- C. Profile: WaveLine (MWP02)
1. Panel Use: Exterior Wall
 2. Coverage Width: 42-inch
 3. Thickness: 3-inch
 4. Length: 8'-0" to 40'-0"
 5. Exterior Gauge: 24, 22
 6. Interior Gauge: 26
 7. Exterior Substrate: Galvalume®.
 8. Interior Substrate: Galvalume®.
 9. Exterior Finish: low-gloss PVDF.
 10. Color: As selected by Architect from manufacturer's full range.
 11. Interior Finish: Polyester.
 - a. Color: Regal White I.
 12. Exterior Texture: Embossed.
 13. Interior Texture: Embossed.
 14. Joint: Green-Lock, offset double tongue-and-groove.
 15. Core: Continuously poured-in-place polyisocyanurate insulating foam.
 16. R-Value: R-8 per inch of thickness (nominal).
- D. Flashing: Match all flashings and trims with the adjacent panels in material gauge and finish. Install these trims per the panel manufacturer's details.
- E. Accessories:
1. Clips as required per panel thickness and gauge:
 - a. 14-ga., 4", 5-hole wall panel clip (AC-01).
 - b. 14-ga., 8", 3-hole wall panel clip (BAC-08).

- c. 12-ga., 12", 3-hole wall panel clip (BAC-12).
 - 2. Fasteners: Self-Drilling or Self-Tapping, Hex Head of appropriate length.
 - 3. Closures: UV resistant per the manufacturer's details (if necessary).
- F. Tube Sealants:
- 1. Non-skinning.
 - 2. Polyurethane.
- G. Tape Sealants: Butyl.

2.4 FABRICATION

- A. General: Provide factory fabricated and finished metal panels, trim, and accessories meeting performance requirements, indicated profiles, and structural requirements.
- B. Fabricate metal panel joints configured to accept sealant providing weathertight seal.
- C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions, approved shop drawings, and project drawings.

2.5 FINISHES

- A. Finishes, General: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
- B. Exterior Face Sheet Coil-Coated Finish System:
 - 1. Basis of Design: Tremco, Fluropon PVDF.
- C. Interior Face Sheet Coil-Coated Finish System:
 - 1. Polyester Two-Coat System: 0.20 – 0.25 mil primer with 0.7 – 0.8 mil color coat.
 - a. Basis of Design: Tremco, Regal White I.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine metal panel system substrate with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panels.
- B. Shipment - Immediately upon delivery of the wall panels and accessories, crosscheck the delivered materials against the shipper to insure a complete shipment.
- C. Substrate – Before installation begins, inspect and accept the structure with regard to plumb, level and true. The maximum deviation of steel alignment shall be limited to 0 (+\/-) 3/16” from the control with a 1/8” maximum change in deviation for any member of any 10-ft panel run. The erector shall not proceed with installation if the structural steel is not within the specified tolerances.
- D. Panels – During installation, examine the individual panels. Immediately notify the manufacturer of any panel defects. Do not install defective panels.
- E. Correct out-of-tolerance work and other deficient conditions prior to proceeding with insulated metal panel installation.

3.2 METAL PANEL INSTALLATION

- A. Panels: Install in accordance with the manufacturer’s recommended procedures, details and the construction drawings. Install the panels plumb, level and true. If necessary, make panel cuts with a “metal cutting” circular saw.
- B. Fasteners: Install fasteners in the locations shown on the construction drawings. Take care not to overdrive fasteners. Replace stripped fasteners by installing a new fastener in a different location.
- C. Trim: Install the flashing true-to-line and level or plumb and in accordance with the manufacture’s details and the construction drawings.
- D. Sealants: Before sealants are applied, clean and prime the surfaces according to the sealant manufacturer’s guidelines. Locate the sealants per the manufacturer’s details and the shop drawings without skips or voids.
- E. Manual: Refer to the Tremco Installation Guide for specific information regarding accountability, conditions, heavy equipment, verification of structure, alignment, side-joints, vapor barrier, sealants, field applied insulation, threaded fasteners, strippable film, field cutting, appearance, general installation sequence and details.
- F. Protection: Remove any and all strippable films either prior to or directly following installation. Take measures to avoid exposure of the film to direct sunlight for more than 24 hours.

G. Cleaning:

1. Touch Up – “Touch up” minor damage to factory applied finishes using factory approved, matching coatings provided by the manufacturer.
2. Soap - If necessary, clean panel surfaces with a combination of water and a light detergent.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor will engage a manufacturer’s technical representative acceptable to Architect to perform field inspections.
- B. Water-Spray Test: After completing portion of metal panel assembly including accessories and trim, test 2-bay area selected by Architect for water penetration, according to AAMA 501.2.

3.4 CLEANING AND PROTECTION

- A. Remove temporary protective films immediately in accordance with metal panel manufacturer's instructions. Clean finished surfaces as recommended by metal panel manufacturer.
- B. Replace damaged panels and accessories that cannot be repaired to the satisfaction of the Architect.

END OF SECTION 074213